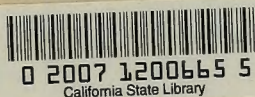


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EXTRACT

From an Act prescribing Rules for the Government of the State Library,
passed March 8th, 1861.

SECTION 11. The Librarian shall cause to be kept a register of all books issued and returned; and all books taken by the members of the Legislature, or its officers, shall be returned at the close of the session. If any person injure or fail to return any book taken from the Library, he shall forfeit and pay to the Librarian, for the benefit of the Library, three times the value thereof; and before the Controller shall issue his warrant in favor of any member or officer of the Legislature, or of this State, for his per diem, allowance, or salary, he shall be satisfied that such member or officer has returned all books taken out of the Library by him, and has settled all accounts for injuring such books or otherwise.

SEC. 15. Books may be taken from the Library by the members of the Legislature and its officers during the session of the same, and at any time by the Governor and the officers of the Executive Department of this State, who are required to keep their offices at the seat of government, the Justices of the Supreme Court, the Attorney-General, and the Trustees of the Library.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 6, 1877.

VOLUME XXXIV.
Number 1.

(Copyrighted.)

Mechanical Ore Concentration and Separation—No. 16.

[Written for the Press by FRANCIS M. F. CAZIN, M. E.,
Santa Fe, Mexico.]

Regulation of the Plunger.

As all sizes do not require the same amount of upward vertical stream or lift, and as by experience it has been ascertained that different sizes do require a different speed in the repetition of these lifts, I will give the rule for regulating lift of plunger and their number per minute, being the number of revolutions of the driving pulley. This rule is: the coarser the size the higher the lift; the finer the size the quicker the motion should be. One millimeter size works well with 120 strokes per minute. The limit for the lift is recognized by observing the overflow from one sieve to the other. This overflow should allow the particles of ore or rock to pass freely over the partitions without sticking to their top edge. The machinery of the automatic continuous one-plunger jig is so arranged as to allow a change of lift from one-eighth of an inch to two inches and a half lift, and the safest as well as easiest way to determine on the proper lift with this easy regulation is to test it. An easy, quiet flow, without jumping and splashing of the surface of the water, is a strong indication of an appropriate lift. The limits within which the machine permits variation have been determined by theory as well as practice, but the balance practice would do. Nevertheless, it may be interesting to the practical man also to ascertain how theory and practice have to combine in order to reach the result of success. I therefore indulge here in a specimen of the theory.

Table

Showing the speed of vertical stream of water required in order to keep in suspension therein round particles of galena, iron pyrites and quartz of different diameter:

MINERAL.	Diameter in Millimeters.	Speed in Meters per Second.									
		10	8	6	4	3	2	1	1	1	1
Galena.....	7.5	1.31	1.17	1.02	0.83	0.72	0.59	0.41	0.29		
Iron Pyrites.....	5.0	1.05	0.92	0.79	0.65	0.56	0.46	0.32	0.25		
Quartz.....	2.6	0.63	0.56	0.49	0.40	0.35	0.24	0.20	0.14		

A round particle of galena, two millimeters or one-twelfth inch in diameter, will be kept in suspension in a vertical upward water stream, having a speed of 590 millimeters per second or 35,400 millimeters per minute. Supposing plunger and sieve to be of equal size, and 120 full strokes or 240 half strokes per minute, each half stroke should theoretically measure 147 millimeters, or nearly six inches. Now, practice proves that with 120 full strokes a minute, two millimeters galena will not only be suspended but be raised by a lift of five-eighths of an inch or 15 millimeters. The material resting on the sieves and intercepting the water, therefore acts so as to accelerate the stream produced by the plunger to twenty times its original speed, allowing only one volume of water to be present when 19 volumes of material are raised. But practice again proved that five times the height of lift is the proper amount of material on the sieves; it shows that only one-quarter part of the volume of water is active in the vertical stream at the time within the material and the other three-quarters either approaching from below, or flowing over with the horizontal stream. Once these figures established, the consequences for other sizes and materials can be drawn from the above table. Thus it takes half the speed to keep quartz suspended, or the same speed will carry it double the distance; or it takes four to five times the size of quartz for one of galena to remain together on the sieves and not to separate. This peculiar motion has produced such close and excellent work as is produced by no other motion, either eccentric or elastic.

For the good reasons stated before I abstain to enter on a further detail concerning the special construction of the one-plunger jig, but let a correspondent of the New York Mining

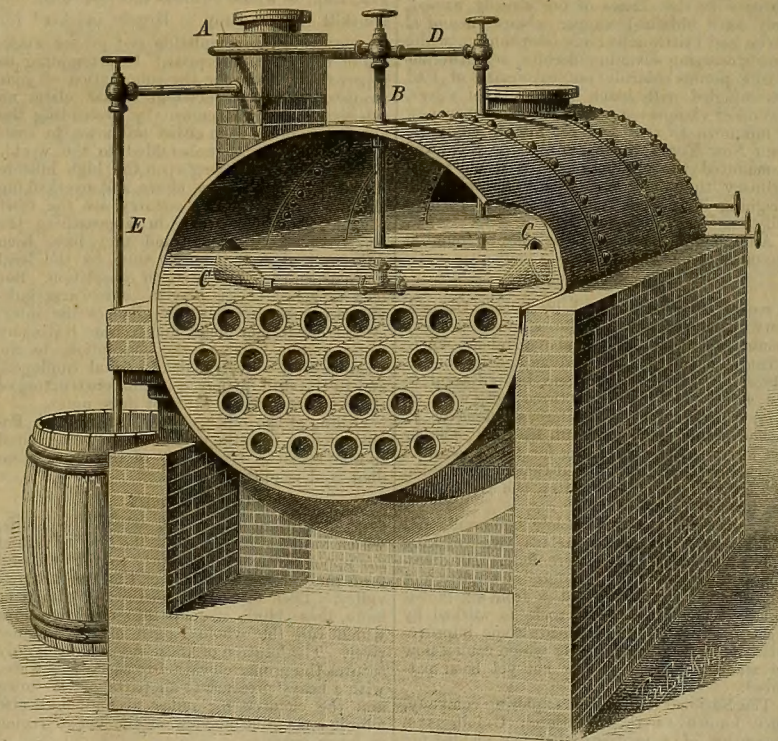
Journal, a mining engineer from Freiberg, Saxony, deliver an opinion upon it (Vol. XVI, No. 24):

"All those who have had the opportunity to observe the working of mineral-dressing arrangements will, like me, appreciate the importance of the fact that the one-plunger jig, as it is, accommodates itself to all the emergencies and necessities occurring, not only by a variation in the quality of ore and percentage of valuable material, but also to the use of one and the same apparatus for treating different sizes. Moreover, the practical engineer will appreciate that all the motions in the machinery of the one-plunger jig are correct, and do not involve those small but frequently recurring irregularities, resulting in friction and wear, as in all jigs in which plungers are fastened in their center to an oscillating crank or an eccentric. There is no apparent reason why the velocity or number of lifts with such a regular and unimpeded motion should not be increased, there being no other limits to this than the consis-

The bed can be provided by covering the sieve bottom with a layer of gun-shot of a size a little larger than the meshes of the wire-cloth (sieve) and, indeed, a bed of gun-shot is recommendable on account of causing less wear and tear of sieves, than the immediate contact of mineral with less even surface than shot. With such a bed the jig will act properly right from the start of its motion.

In case no shot bed is provided the jig can only be made to work properly by letting the heavy parts accumulate so as to cover the entire bottom of the sieve.

BULLION SHIPMENTS.—Since our last issue shipments from the prominent mines have been as follows: Modoc, December 26th, \$5,500; total to date, \$88,090; Calaveras, 26th, \$1,700; Leopard, 28th, \$5,200; Tybo Con., 25th, \$10,245.65; total to date, \$47,671.75; Ophir, 28th, 3 bars—value, \$11,643.30; Manhattan, 26th, 12 bars—value, \$12,404.40; California, 28th, 38



KEMP'S IMPROVED BOILER CLEANER.

tency of the material out of which the parts are constructed."

In working this or any other jig certain points are to be observed in order to procure satisfactory results. I will mention them here.

The stroke (by screw passing lengthways through the revolving crank and wrist) and the entire number of revolutions being properly regulated, work may begin. It is here to be stated that the crank, *p*, should describe the upper part (two-thirds approximately) of its revolution when the oscillating crank, *i*, with the rod, *j*, are raised, because thereby the stroke of plunger presses the water up through the sieve in (one-third) revolution and allows

The Bed on the Jig-Sieves.

When the work of the jiggling machine is begun the material on the sieve is mixed, as well as the ore in general. Thus light parts as well as heavy parts are lying immediately on the bottom of the sieve, and will lie directly on the bottom as long as there is not a sufficient amount of heavy material to cover the entire bottom of the sieve, the light parts continuing to drop after the heavy parts have reached the bottom. No useful effect can be attained unless there is on each sieve sufficient heavy substance to cover the entire sieve bottom. This at once proves the necessity of a bed of heavy material on each sieve of such size as will force it to remain there.

bars—value \$160,113.73; total to date, \$605,469.10; Con. Virginia, 28th, 25 bars—value, \$92,187.30; since dividend, \$190,740.68; Northern Belle, 26th, \$10,805.56; California, 30th, \$93,617.79—to date, \$699,086.89; Con. Virginia, 30th, \$25,209.47—since dividend, \$215,950.15; Chollar, 29th, \$6,474.33, 30th, \$8,012.06; Manhattan, 30th, \$14,800; Northern Belle, 28th, \$11,597.22—total to date, \$109,628.58; K. K. Con., 30th, \$4,000, total for December account, \$55,000; Manhattan, January 2d, \$13,400; Modoc, Dec. 30th, \$12,320; Con. Virginia, Jan. 2d, \$42,055.33—since dividend, \$258,005.48; California, Jan. 2d, \$98,546.74—total to date, \$797,633.63; Tybo Con., Dec. 28th, \$11,351.75—to date, \$59,023.50; Modoc, Jan. 1st, 232 bars, value, \$6,000—total for December, \$18,320; Northern Belle, Dec. 31st, \$14,567.27; Chollar, Jan. 2d, 6 bars, \$15,496.18; Justice, Dec. 16th, \$89,617; 25th, \$66,052, Jan. 2d, \$54,295—to date, \$209,964.

A DISPATCH from Salt Lake claims the mineral exports from Utah Territory in 1876 to be a little over \$6,000,000. Mr. Valentine's estimate places the product at \$5,207,519.

THE *Coso Mining News* says: The town of Cerro Gordo has lost its former prosperity. The streets seem almost deserted, and many business houses are closed.

Kemp's Boiler Cleaner.

From no cause arises more serious danger, annoyance or damage to steam boilers than from the accumulations of mud, even from the purest waters, necessitating a frequent cleaning; and from the formation of scale upon tubes, flues or bolts, leading to a burning and destruction of the iron; and when this extreme is not reached, leading to the consumption of largely increased quantities of fuel without corresponding benefits. The invention illustrated herewith has, after three years' test, demonstrated the feasibility of obviating all the annoyance, risk and expense arising from the deposit of mud, scale and sediment, even from the most turbid waters, or those most strongly impregnated, either with lime, magnesia, gypsum, or the many other mineral substances so often met with by those who use steam.

The automatic boiler cleaner and mud extractor acts upon the well known principle that all sediments in water arise first to the surface as a scum, when separated from a condition of solubility by the process of boiling. The experiment of drawing off this scum by a surface cock answered the purpose but partially, for the reason that the scum was constantly forming, while the surface cock could not constantly be kept in operation.

The boiler cleaner, on the contrary, is always at work, and the blowing-off process need be repeated only so often as experience shows an undue collection of sediment in the reservoir, *A*, which is situated on the arch wall, or other convenient point above the shell of the boiler. From the reservoir, pipes *D*, *B*, passing through the shell of the boiler, are arranged; *D*, being a straight pipe, terminating several inches below the water line, while the pipe *B* connects with a vertical pipe, to the ends of which are attached peculiarly shaped mouths, *C*, *C*, placed in such position as at all times to be partially submerged. When the water is heated, a current is at once established through the mouths, *C*, *C*, pipe *B*, and reservoir *A*, returning to the boiler through the pipe *D*, assisting the action of heat in agitating the water in the boiler and creating a current, which still further prevents the impurities from precipitating. The scum upon the surface is drawn into the mouths, *C*, and passes through the pipes, but reaching the reservoir the current expands and is partially broken, and the sediment and impurities at once deposit and may be drawn off at pleasure by the pipe *E*.

The removal of the sediment leaves the water free from that which would form scale, and, in case of old or very dirty boilers, it is found that when new deposits cease the water soon finds its way under existing deposits, and old scale drops freely to the bottom, leaving the iron perfectly uncoated. The invention has been thoroughly tested, and is fully warranted to do its work efficiently, and in no case have those who have used them withheld a certificate of their value to all who use steam. Indeed, so thoroughly have they commended themselves that unauthorized persons are found in many localities representing themselves as the inventors, or agents for the inventor. Our readers should beware of purchasing from any person not having due authorization from James F. Hotchkiss, Bay City, Michigan, sole owner of the patents, and from whom any further particulars may be obtained.

THERE was only one cloudy day last month, and for the first time within the memory of the oldest inhabitant it was a December without even a sprinkle of rain. The comparative temperature was fifty-three degrees, two degrees lower than in the corresponding months of the two previous years.

THE San Francisco mint coined over \$10,000,000 more in 1876 than in 1875. The total output since the mint commenced operations in 1854 is \$452,306,600.

THE flow of water at the bottom of the C. & C. shaft is very strong, averaging about 45 miner's inches measurement.

CORRESPONDENCE.

Mining, Etc., About Helena, M. T.

EDITORS PRESS:—As this is about the center of the Territory, and surrounded on all sides by mines from which a large revenue was derived, Helena soon got the start of her neighbors in population, which now numbers about 3,000, or not far from one-fifth of the entire Territory. In addition to the capitol, and a fine brick building for a public school, at present accommodating 350 pupils, there has just been finished a neat, substantial brick structure to be used as a Government assay office, at a cost of \$50,000, under the charge of Mr. C. Rumley, as United States assayer. There is a foundry and machine shop here, owned and run by Messrs. Davis & Tatem, where quartz mills, flour and saw mills, hoisting works, etc., are put up in complete order, and also a smelting furnace, at present run by Mr. V. T. Preest, known as the Helena reduction works, and supplied mostly by the galena and carbonate ores of Lewis and Clarke county, or from the Rumley, the North Pacific and Molly McGregor mines of Jefferson county. The furnace has four stacks, intended to be run two at a time, alternately, and is fitted out with a 60-horse engine and boiler, Roof's blower, Dodd's rock-breaker, a three-stamp battery, two cupel furnaces, improved wrought iron tuyeres, assay office, and a complete set of implements, together with a house sufficiently large to shelter 20,000 bushels of coal.

In this connection may be mentioned a new and improved mode of

Marking Minerals, Ores,

Fossils, petrifications and other specimens for cabinets, an invention of Mr. Chas. W. Cannon, of Helena, and covered by United States patent. The improvement consists chiefly in the use of plaster of paris, or a cement formed in the main of this material.

A small-pointed brush is used for putting on the inscription after the cement has become set, using India ink or paint. If preferred, the entire surface may first be covered with ink or paint, and the letters put on by scraping off the ink with some pointed instrument. In one case the letters will be black, and in the other white, each on a different colored background.

The labels can be made to assume any size or shape to please the fancy, and are not liable to injury, however roughly handled, so perfect is the adherence of the cement to the ores. The cabinets of Montana are generally marked in this way, and where neatly executed, the labeling presents a pleasing effect and seems to give universal satisfaction.

The annual bullion product of the Territory is estimated at about \$4,000,000. About \$500,000 of this is purchased at Helena, the product of the placer and quartz mines of the immediate vicinity and districts more or less remote.

The Gravel Mines

Were at one time very productive, and are still yielding considerable amounts. Those of Last Chance—the principal gulch—have yielded steadily and in large amounts since 1864, the total product to date probably not falling short of \$12,000,000. Grizzly gulch, from the Park down, has paid well the past season, most of the claims running from \$5 to \$7 per day to the man, and one claim at least has paid in dividends about \$1,000. Dry gulch and its tributaries panned out at the rate of from \$5 to \$10 per day, saying nothing of the Oro Fino, Tucker, Holmes, Greenhorn and other gulches. Immediately below Helena there is a heavy deposit of gravel, that has paid exceedingly well, and is still quite extensive. It appears to be an older channel that once ran at right angles to the present gulch, with a depth of pay dirt averaging 35 feet.

About \$1,000,000 have been taken out here by three companies. Mr. Frank Taylor's claim of 13 acres is one of the most valuable, and has hitherto been worked by means of towers 60 feet above the surface, into which the gravel is hauled on tramways by machinery, and thence dumped into sluice boxes. In this way, as much as \$154,000 were taken from a space 135 by 130 feet. This claim and others here will soon be worked to much better advantage when a

Large Flume,

Three feet wide by three deep, reaches this fine body of ground. It will be completed by Mr. W. A. Chessman at a cost of \$10,000, and has already been extended about a mile. It is intended not only for the working of a large body of gravel belonging to this gentleman, who also owns the water and expects to make it personally profitable, but also for the benefit of all owning claims in this locality.

As much of this ground has paid from \$5 to \$20 per day, with some runs as high as \$50 and \$100, a good return may be reasonably anticipated on the completion of this enterprise.

Quartz Mines Around Helena

In some respects one of the most remarkable mines ever met with, and quite a curiosity in its way, was found in this vicinity. It is won-

derful in the richness of some of its ores, as well as in their variety and combinations, embracing, as the details will show, every different class of silver ores known to the mineralogist if not some not laid down in the books.

The Lexington, belonging to Messrs. Benjamin and Cassel of your city, and Mr. W. C. Childs, agent of Wells, Fargo & Co., Helena, occurs in a granite formation, giving every evidence of a true fissure vein, with dip regular and well defined walls.

The width of vein matter is about five feet, the richest ore being from four inches to two and one-half feet thick, although not uninterruptedly continuous. The greatest depth at present attained is 80 feet, with a level of about 20 feet. Three men have extracted the past season 150 tons of ore, 135 of which was fair grade milling—55 tons yielding \$103 in silver. The other 15 tons consist of extremely rich ore, the silver appearing in every imaginable chemical combination, and the assays made from the ore from time to time, as taken from the mine, running (many of them) high into the thousands.

Pieces of horn silver from one to three pounds have occasionally made their appearance, showing a value by assay of upwards of \$24,000. Besides this, wire silver is sometimes found that is a curiosity in itself worth seeing. The wires are from the size of pins to that of ten-penny nails. About 300 pounds of the wire silver have been mined, the pieces weighing from 2 to 30 pounds each, and literally permeated with the coarse wires, which may be seen projecting out from all points of the ore.

The assays of this class show a near approach to pure silver, running in the neighborhood of \$35,000.

At the bottom of the shaft where they are at work (80 feet from surface) there is a vein from 12 to 18 inches in width, with ore in considerable quantities, containing black sulphurets of silver, horn silver, generally diffused through the ore, copper, silver glance, honey-combed chloride ore and virgin (leaf) silver. At this point the walls are perfectly defined and the vein on both incased between seams of talc, the ore assaying from \$12,000 to \$24,000.

By digging along the surface for 300 feet, in addition to the classes of ore already named, they have obtained copper glance, arsenic silver, and brittle silver ore (stephanite), white quartz carrying silver in chlorides, argentiferous galena, porous chloride ore, carbonates of lead intermingled with black sulphurets of silver, and other varieties or combinations either new or unknown to two or three mining engineers from New York who examined the mine and pronounced the productions the most extraordinary they had ever seen. One specimen weighing 37 pounds was seen here, perhaps fully one-fourth of horn silver.

A number of fine specimens may be found at the office of Cassel Brothers, in your city.

The Silver Hee's,

A recent discovery, owned by Messrs. Davis & Corwin, is situated on the side of a steep mountain a short distance above Helena, where it can be opened to great advantage by tunnel. The country rock is limestone, but adjacent to the slate. The crevice is three feet, with an average ore vein of argentiferous galena of 12 inches—running 40 per cent. lead and \$50 per ton silver. It is promising for the amount of development, and it is hoped that it may widen to a large chamber, as is often the case in similar formations.

Mr. J. Schafer, a little below Unionville and about four miles above Helena, was making good wages on the McIntyre lode. Its direction is east and west through the granite, not far from the limestone, and is from six inches to two feet in width. His rock is worked by arastra, on which he has made some improvement for facilitating crushing which cannot now be made public, as it has not yet been patented.

The National mining and exploring company, once known as the Whitlatch Union, is in possession of a property that has yielded not less than \$2,250,000, but at present depth of incline, 950 feet, find their vein broken up and faulted by a cross lode. With the exception of some \$20,000 taken out the past season on the tribute system, near the surface or from float quartz, but little has been done.

New machinery, consisting of a Babcock and a Wilcox sectional boiler and a large Worthington duplex pressure pump, were put up last fall and the mine was pretty well drained when visited. Some ore was reported in sight, and a further persistent search for the vein was in contemplation.

The Columbia, on the Park lode, five miles from Helena, had just resumed work with new machinery. They have shipped during the past four years over \$750,000 in bullion. At the depth of 300 feet their ore vein is three feet and runs from \$15 to \$18 in gold. The Evelyn, adjoining, owned by M. Courtwright & Co., had paid from \$20 to \$50, but no ore was being crushed.

The Pedro,

On the same lode, and a mile from Unionville, had reached a depth of 120 feet; vein from six inches to 18 inches, in granite. The quartz works from \$25 to \$75 in gold; the last lot, which was being cleaned up at Harvey's mill, in charge of Mr. J. W. Dalrymple, brought the company \$40. In accordance with a statement made by Mr. Henry Richards, the superintendent, and also a stockholder, it has paid its regular dividends since the 1st of last May, when the work commenced. With proper facilities

for mining and crushing \$10 gold quartz can be made to pay on this lode if the vein continues to hold its usual width.

The North and South Pacific, on Red mountain, in Ten-mile district, is well opened by tunnel and shaft. Lode from 25 to 30 feet, much of the ore consisting of antimonial silver. The shipments average from \$230 to \$300 per ton.

On the same mountain range, 15 miles from Helena, Mr. C. B. Vaughan is sole proprietor of

The Little Jennie,

On which some work was done in 1873. Two lodes cross each other at this point, with ledge matter in places from 40 to 50 feet wide, where they are reached by tunnel. Levels have been run on one of these, known as the Peerless, 140 and 340 feet east and west, and another, on the Little Jennie, 200 feet, disclosing four rich chimneys of argentiferous galena and gray copper ore (fahlerz). The fahl ore gives assays all the way from \$240 to \$18,000. First-class shipped to Freiberg worked from \$700 to \$900 per ton, and one lot sent to San Francisco yielded \$1,000; second class worth from \$250 to \$400. The lode is encased in granite walls, containing streaks of porphyry and talc mixed with veins of milling quartz, and widening in portions of the mine to chimneys of nearly pure ore, stamping it with a character for richness rarely surpassed, and ranking it among the best paying mines of Montana. A. C. K.

Helena, M. T.

Santa Cruz Water Works.

EDITORS PRESS:—The new water works at Santa Cruz is one of the finest and most valuable improvements connected with its rapid growth, and will be largely promotive of the future health and comfort of this little seaside city. These works have been built by a corporate company, whose president is H. K. Moore, Esq., of San Francisco, where is also its business location. The resident superintendent and manager of the works is E. R. Morgan, Esq., to whose business tact and constructive skill the company is largely indebted for its success in the completion and proper working of this great enterprise. In attempting to report these works for the information of your readers, your correspondent would claim no especial reportorial acumen by pretending the acquisition of an item either unknown to common observation, or unheralded to the world. For these works, sitting upon the high hillside like a large fortification, above and overlooking the town and adjacent country, are the most conspicuous objects seen in approaching the city from any direction; and they have been duly noticed, from time to time, by the local journals, in their progress and completion. But it is to give a larger play to our warm individual interest in whatever enhances the interests of our former home, and to bear testimony to the public value of the conception, to the wisdom of the investment of capital employed, and to the skill displayed in the construction of these works, that we attempt these notes.

Calling at the office of the company on Pacific avenue, near the postoffice, we were invited to take a seat in the buggy of the superintendent, and were taken to the

Two Reservoirs

On the hill, at the point where the bluffs, which form the back wall of the first terrace of the upper town, bend abruptly to the left and form the western boundary of the San Lorenzo valley. Then extending northward a mile or more, these bluffs rise up into the mountains which run the whole length of the Lorenzo river. The location of these reservoirs not only secures the proper elevation to carry the water with a heavy pressure to all parts of the town and the country for miles around, but also affords a magnificent view of the entire region in every direction.

The company have secured four acres of ground at this point, beginning on High street, with a frontage of 150 feet or more, and running back in a northerly direction to near the top of the bluff at its upper corner. The surface is covered with soil, and under it a chalk rock formation of unknown depth. The ground for about half its length from the street has but a slight declination south towards the street and east towards the river. From this middle point the excavations begin, which divide the other portion into two ascending terraces. The lower boundaries of these terraces are retreating walls made of the stone taken from the excavated hill. The lines of these walls are not straight, but slightly curved, so as to pass around the hill and at the same time give a graceful contour to the ornamentation of the grounds, which it is proposed so to beautify that they will afford the most delightful place of public resort to be found near the city. The lower reservoir is located at the lower end of the terrace, nearly midway of the grounds, and is a parallelogram 60x80 feet, sunk into the rocky foundation 11 or more feet, its almost perpendicular walls water-cemented, and holding 300,000 gallons of water. It is enclosed with a high board wall, neatly white-washed, and leaves a walk four feet wide all around the reservoir on its inside. The upper and highest reservoir is at the highest and extreme point of the bluff, at the upper end of the terrace, and has a view of the San Lorenzo valley northward. The view then swinging to the right, through

all intermediate points of the circle, looks the whole length of the peninsula formed by the river and ocean, and far out upon the latter, to the extreme southwest. This reservoir, like the other, is sunk into the solid rock; but, unlike the other, is an elliptical bowl in shape. It is likewise cemented, enclosed and holds about 150,000 gallons. The enclosures have windows in their sides to afford an unobstructed view of their entire interiors to an interested and curious public. Both reservoirs are well stocked with fish to keep pure the water, and will afford rare sport to the privileged angler.

The lower reservoir is 90 feet and the higher 150 feet above the river, where the

Steam Pumps,

Enticing the unwary waters into their monstrous throats, force them along and up their dark tubes to these lofty receptacles, 4,700 feet away.

Automatic Arrangements.

Both of these reservoirs are furnished with a metallic float, which is so ingeniously contrived that it automatically by two levers (one for each reservoir), surmounted at their outer ends by a broad, square, white tin, intended to be seen from a distance, and so attached to an elevated pole fixed in the wall of the highest reservoir that they fall outwardly, through all the intermediate points of the quadrant, from a perpendicular to a level position, indicates the exact depth of the water in each reservoir. By this simple mechanical contrivance a telegraph is constructed which informs the engineer near a mile away when his pumps need to begin or cease their motion. But this is not all that this float does, for when the lower reservoir is filled (and this reservoir is always filled before the upper one) the float reaches and loosens a spring which by its recoil opens a valve situated in a small pipe coming from the upper reservoir and terminating in a little house located over the spot where the feeding main branches, one leading to the lower and the other to the upper reservoir. This valve opens over a little water-wheel, which by its connection with proper machinery closes the valve of the lower branch main and opens the valve of the upper branch main, thus stopping the water flowing into the lower and forcing it an additional height of 60 feet into the upper reservoir. When this reservoir in turn is full, its own float by the same contrivance reverses all these movements, closes the upper pipe and again opens the lower. Thus, by this automatic telegraph and valve-controlling arrangement, the reservoirs are regulated, never lacking water and never overflowing.

The Engine House

And pumps are located on the San Lorenzo river, about a mile above Santa Cruz. The boiler-house is 20x30 feet, contains the largest boiler in the country, is very complete, and is furnished with patent safety valve and whistle. The pump room is 18x25 feet, two stories; the upper story occupied by engineer and family. The buildings are well built, hard finished and tastefully painted, and, notwithstanding the throbbing of its huge pumps, all has an air of quiet neatness. The pumps are Hooker's patent, manufactured and put in place by W. T. Garratt, of San Francisco; they are two in number, and are a marvel of compact efficiency. The larger one is a strong iron box three feet ten inches long, one foot eight inches in thickness and two feet deep, and contains within its recess 20 valves and other machinery, besides 35,000 gallons of water per hour, which, passing through it, it forces along the eight-inch feeding main with a pressure of over fifty pounds to the inch. The engine which drives this pump is as simple and concealed in machinery as the pump itself; for all that can be seen is a cylinder 18x24 inches at one end of the pump box and two feet from it, with a piston traversing between, with both ends hid within the cylinder and the pump box respectively—the steam power required to produce this simple motion rising to the pressure of 75 or 80 pounds to the square inch. This simple apparatus, with a few steam pipes and water pipes leading to and from the pump, is all that can be seen of that mighty force which propels 35,000 gallons of water one mile (nearly) and into the air 150 feet every hour! There is a smaller pump like the larger which can be worked, and the combined capacity reaches 50,000 per hour. The water supply is drawn from an immense walled well, just outside the buildings, entirely protected from possible overflow of the river. This well is sunk several feet below the river bed and forty feet at least from it. Its water sinks through immense sand filters laid in the bottom of the river, and passes into it pure and limpid by the force of gravity alone.

The feed pipes, as well as all the mains through the city, are the

"Wyckoff Wooden Pipe,"

And will bear the pressure of 900 pounds to the square inch. This supply pipe and the mains into the lower town are eight inches in the clear. The mains into the upper town are six inches. Branch pipes from four to six inches, and short runs are three inches. The mains, with all their branches now laid, reach the distance of 8½ miles. The company has made up to the present 200 connections and expect to make during the coming year 400 more. The revenue already derived from this source amounts to one per cent. on the investment. Pretty well for the first year's work. The company will soon run their mains along Mission

Continued on page 6.

MECHANICAL PROGRESS.

Rules for Tempering Steel.

The *Iron Age* gives some rules to be observed in tempering. 1. The steel should be very hard before tempering. If the articles to be tempered are not properly hardened at first it will be time and labor lost to temper them. 2. The heat for tempering should not be too suddenly applied. The slower the heating the tougher and stronger the steel. 3. The most careful and experienced workman is liable to be deceived in the color of the steel, and consequently in the temperature in imperfect light or at twilight. 4. Where water is used for plunging the steel in, the less frequently it is changed the better, provided it does not get greasy. The temperature to which the steel should be raised for various purposes is shown by the color of the steel when heated. Lancets, which must be very hard, in order that they may be ground to a keen edge, are tempered to the faint yellow tinge, equal to 430° F., while razors and surgical knives, which must be less easily broken, are tempered to the straw yellow, equal to 450° F. Pen knives are tempered upon an iron plate over the fire, the blades being laid upon it on their backs until they have acquired the full yellow color, equal to 470° F. Cold chisels and large shears for cutting iron, must stand rougher usage, and are therefore tempered to a brown yellow, equal to 490° F., while the brown, with purple spots, equal to 510° F., marks the tempering heat for axes and plane irons. Table knives are heated till they acquire a purple color, equal to 530° F., in order to let them down to the proper temper, and articles in which great elasticity is required, such as swords and watch springs, are tempered to a bright blue, equal to 550° F., while saws are brought to the highest tempering heat at which the dark blue color shows itself. This temperature, about 600° F., is that at which oil boils and flames, so that a bath of oil is very frequently used in tempering, the articles being immersed in it and the temperature ascertained either by a thermometer, or by the volume and color of the smoke which rises from the oil. Some tools are annealed by plunging them into oil heated to 400° F., and allowing them to cool down in it. Small steel tools, after being hardened by chilling in water, are coated with tallow heated over a flame till the tallow begins to smoke, and then stuck into cold tallow. Large steel implements are let down to the proper temper by being heated in a kind of oven known as a muffle.

A Note on Files.

Prof. J. E. Sweet, of Cornell University mechanical school, in one of his recent lectures, gave his students the following note on files, as reported in the *Polytechnic*: Each file should have a well-fitted handle; and for a given purpose I know of nothing more utterly unsuited than the tangs or shanks of files as universally made. By remodeling the tangs of our entire lot of files, I hope, during the term, to show and convince you that there is a good form as well as a bad one; although I feel sure that a quarter of a century at least will be required, (our graduates holding prominent position) before a general move can be made to change the wrong for the right. As they are now made, they are expensive to forge by hand, and very difficult to forge by machinery. There is no tool by which a proper hole can be made in the handle; nor can there, while they are of all sizes and degrees of taper, be such a tool made. Besides, the tangs will not, even if put in in the best manner, stay in the handle as they should. There is no more sense or economy in changing a file handle every time one wants to change a file, than there would be in so changing a hammer handle; and if the tangs were of such form that when a handle was put on it would stay, workmen would no more think of shifting the one than changing the other. That the part of the tang next the file where the handle is protected by the ferule, should be tapering to give it strength, is all right; but that the part back of the ferule should be parallel, or nearly so, and of such size that it will drive tightly within a standard sized hole, is in my opinion the true form. The handle, to be used a long time without cramping the hand, should have a good deal of convex surface and very little, if any, of concave; and there should be no beads or ornaments. The wood from which they are made should be thoroughly seasoned, or the ferules threaded on as a nut is screwed upon a bolt. Gas pipe, threaded on the inside and cut into short lengths, makes durable ferules. Files are cut their whole length, and to use only a small portion in the center sacrifices half their value. The best practice is to run their entire length at each stroke, running them at a steady uniform speed—not too fast; and to exert sufficient pressure to make them cut from end to end. If a file is run too fast, or allowed to slip over, it wears away the teeth; a pretty well worn file will cut if held to the work with sufficient pressure; and for steel (unless the file is made specially for it, with obtuse teeth), it will endure more if used first on softer metal. The teeth of a new file are rapidly broken off, unless used with care.

Welding.

We recently printed a paragraph on welding as viewed by an English mechanic. We read that this statement has called up some controversy. At a recent meeting of the Foremen's Association, Mr. George Newcombe made a 'dead set' against certain opinions which had been expressed on the subject at various discussions of the Iron and Steel Institute. He considered that they were quite mistaken as to the conditions necessary to secure good welding, from an erroneous notion of what was actually done, or sought to be done. He maintained that the sand was only necessary as a refractory agent to prevent the conduction of the heat, and had no use whatever as a means of cementing the pieces of iron under the process of welding. Mr. Howson defended his opinion by asserting that the melted silicate promoted welding by preventing oxide forming on the metal and so barring the way to an intimate homogeneous weld. It turned out, however, that each was looking at the matter too exclusively from his own peculiar standpoint. Mr. Newcombe arguing as a smith, and Mr. Howson as a manufacturer; for the slag undoubtedly is necessary for protection in puddling. Mr. Head, as usual, made a dash at first principles, and considered the reason of the matter lay in the answer to the question, What is welding? Probably they would never arrive at a solution of the nature of this particular form of the cohesive power of attraction. All they were likely to be successful in was in finding out the proper conditions. It was a question they were all deeply interested in, and very much worth studying. The permeation of hot iron by carbonic oxide and carbonic acid was also discussed with reference to the blisters in plate iron so annoying to manufacturers, some suggesting that they were formed by carbonic oxide, intercepted by the rolled skin, and others that they were caused by the generation of carbonic acid, the balance of opinion being in favor of their being 'bottled-up' beads of carbonic oxide. Towards the conclusion, an ironmaster present made the very wise remark that the masters might very often be benefited by taking a lesson from their workmen.

New Way of Making Miners' Picks.

An Englishman has devised an improvement in the manufacture of miners' picks which is thus described: In the first place a rod, bar or plate, consisting internally of steel, and externally of iron, is formed by making a pile, and rolling or drawing down the pile into rods, bars, or plates, of the section required, having the inner core of steel embraced, as it were, by a wrapper of iron. For such tools as miners' picks a compound bar of the above description is made, and cut into the lengths required for each tool; one or both ends of each length are afterwards sheared, cut or forged, or otherwise drawn down or shaped to a point or working edge or face, which is then hardened or tempered. The bar at mid-length or elsewhere may be split longitudinally and opened out to allow of its being attached to a handle, or other means of attaching it to a handle may be adopted. Picks constructed in the manner above described may be made lighter and stiffer than picks constructed in the ordinary manner, and will, in addition, when a cast-steel core is used, possess the principal advantages of picks formed entirely of cast-steel, without the disadvantages which sometimes tell against the use of such tools. The steel will also be protected in manufacture, and also when the ends of the pick are reheated at the time of dressing or sharpening in the ordinary way. If by repeated sharpening the iron be found to overrun the point of extremity, some of the iron may be removed by paring or otherwise, and the extremity may be upset to facilitate doing so.

MAKE YOUR INVENTIONS KNOWN.—Inventors and others having new machinery and implements to describe, should have cuts of them made. The *Newark Advertiser*, speaking of this matter, says: "It is hardly possible to introduce successfully an improvement in machinery of any class without the aid of a good engraving. It not only serves to show at a glance the valuable features of the machine, more effectually than the longest verbal description can do, but it also constitutes the very best method of advertising an invention, its attractive appearance securing the attention of the reader, while a column of reading matter might be overlooked." All of which is true, and cannot be too strongly impressed upon the minds of those who have new mechanical inventions which they wish to introduce to the public.

NEW RAILWAY CARRIAGE.—A French company is now building a special type of carriage for service on the little railway between Bayonne and Biarritz. The designer is M. Carmanraud. The framework is entirely in iron; in spite of their large size the weight of the carriages is relatively small; the panels of the body are made of thin slips of wood, covered on both sides with varnished canvas. There is a covered upper story and an interior staircase; each carriage is arranged for three classes, and has a goods department and smoking platform as well. The open spaces are as large as possible, to permit good views being taken. Petroleum is used for lighting; the lamps are so arranged as to give light to the interior and at the same time show the signals. Each carriage, all full, accommodates ninety-two passengers.

SCIENTIFIC PROGRESS.

Caterpillars in Coal.

At the last ordinary meeting of the Derby Naturalists' Society, the *Colliery Guardian* says that Mr. A. H. Stokes produced a caterpillar which had been presented to him as a 'find' in the coal, 61 yards deep, at High Moor, Eekington. The man from whom he obtained it stated that, on splitting a piece of coal in the ordinary course of his labor, he discovered the insect curled up inside, and it being of a 'blood-red color' it so alarmed him and others that, at first, they did not dare touch it. Eventually it was secured and taken to the daylight, where it proved its mortality by devouring voraciously some leaves. Although the spirit in which the insect had been preserved had tampered very much with the delicate epidermis, and had thus destroyed the coloring, yet it was soon recognized as the larva of the goat moth (*Cossus ligniparida*), the larva of which is supposed to be the 'cossus' of the ancient Romans, by whom it was esteemed a great table delicacy. The insect appeared to be 'full fed,' and quite ready to form its cocoon, and this would account for the position in which it was found. How it came down the mine it is, of course, impossible to say. The ordinary home of the insect is in the wood of willow trees, where the pupae are sometimes found, and it may have descended in the timber used in the mine, or it may have descended unobserved on some of the men's clothing. Some persons might doubt the ability of an insect to eat its way into coal. On this point, fortunately, we have ample evidence. A gentleman once placed some of these larvae in a box, which he deposited upon the piano. He was rather surprised the next morning on finding that these industrious biters had gnawed their way through the box into the piano, and had evidently gone on a voyage of discovery into the interior. Prof. Henslow, writing to the *Zoologist* (vol. viii., p. 2,897,) says: "I placed half a dozen caterpillars of the goat moth in a glass jar, with sawdust and a piece of willow, and covered the mouth with sheet lead, which was perforated with an awl to admit the air. Three of the caterpillars were to-day crawling on the floor, and on examining the jar, I found that they had effected their escape by gnawing the lead, having enlarged two of the perforations sufficiently to enable them to pass out of their prison." Now, an insect which can eat its way through lead and through walnut wood would not make a difficulty over a piece of coal. The larvae of different species of *Dieranura* are similarly powerful in the jaw, and Mr. Stokes's insect was at first taken for one of this order.

Spectra of the Planets.

Some researches by M. Vogel on the spectra of planets, undertaken in view of a prize question proposed by the Copenhagen Academy in 1873, which gained the prize, have been published in *Poggendorff's Annalen*. The following is a short resume of them: The spectroscopic shows the light of the planets to be in general reflected solar light. The principal Fraunhofer lines are found in the light of the brightest. The idea of a light proper to Jupiter and Saturn, as explaining their peculiar whiteness, seems unfounded; for the presence in the spectra of these planets of lines and bands of absorption, identical with those produced by our atmosphere, seems to prove the existence of aqueous vapors in the gaseous envelopes of these planets, and it is difficult to suppose the temperature of their surface high enough to cause an emission of light. The solar and planetary spectra differs in that the latter have absorption bands, more or less intense, in the less refrangible parts; and these may be attributed to the atmospheres of the planets. The further the star is from the sun, the more preponderating is the influence of this atmosphere. The interior planets, Mercury and Venus, have only very weak absorption bands in the red and yellow, which are coincident with lines produced by passage of light through our atmosphere. Mars presents the same bands, but more marked. In the spectra of Jupiter and Saturn, there is, besides these bands, a very intense band in the red, and all the more refrangible part (violet and blue) is greatly weakened, without bands being distinguishable. Lastly, the spectra of Uranus and Neptune are crossed everywhere with broad and intense absorption bands.

MURDER OF SCIENTISTS.—The *Chicago Times* says: Late news from New Guinea conveys the intelligence that two persons engaged in making scientific collections on that island were lately murdered by the natives. The one was a Dr. James of the United States, the other a Swede, his companion, who had been some time with him exploring Gule island. The two had gone in their large boat to the east side of Hall sound to shoot birds of paradise, when they were attacked by three canoes and both were killed. The native crew managed to get away in the boat and carried the news of the sad calamity to Cape York. Only a fortnight before the notice of his death reached England Dr. James's first collections arrived there, and the excellent way in which they were preserved, together with the careful notes accompanying them, betoken that science has lost a promising auxiliary through his untimely decease.

The Moon's Motion.

The reduction of the star occultations observed at the transit of Venus stations, for the purpose of determining their longitude, renders necessary an investigation of the errors of the moon's place, as given in the Nautical Almanac for the period during which the work was in progress. Such an investigation, says the *Independent*, has just been published by Professor Newcomb, as Part III of the papers issued by the Transit of Venus Commission. It appears, in the first place, that, on the whole, the moon has for the last 14 or 15 years been falling continually behind the place indicated by the tables. In 1864 the tabular and observed positions were sensibly accordant; but in 1874 the moon was on the average .94" (about 11 miles) behind computation. In respect to this Professor Newcomb remarks: "The sudden alteration of nearly one second per annum in the mean motion of the moon seems to me one of the most extraordinary of astronomical phenomena; but as I have discussed it in several papers during the last five years, I shall do no more here than call attention to its continuance, and to the impossibility of representing it by any small number of periodic terms, without introducing discordances into the longitude during previous years." The explanation suggested in the papers referred to is that there may have been an actual change in the rapidity of the earth's rotation, the length of the day having recently shortened something like 1-400 of a second, in consequence, probably, of some geological movement of the crust of the earth. Another result, hardly less startling to mathematical astronomers, is the discovery of a new inequality in the moon's motion, amounting to about 1.5" each way. It may be either an inequality of the eccentricity and perigee with a period of 16½ years, or merely of the moon's longitude with a period of 27.4 days. No theoretical explanation of this irregularity has been reached. According to Prof. N., the only apparent cause to which it can be attributed is the attraction of some of the planets. The whole discussion is thoroughly worked out and the paper is one of great interest and importance to astronomers.

Cause of Error in a Thermometer.

Mr. H. C. Russel publishes notes on some remarkable errors in thermometers recorded at Sydney observatory, 1876. For upwards of five years the same hygrometer has been in use at the observatory. The dry bulb is small, only 0.3 inches in diameter, and the instrument, up to February 26th, had always given very satisfactory readings, tested by those of a standard which hangs only 3 inches from it. The difference in the readings was usually 0.2° to 0.3°. On that day the maximum shade temperature rose to 96.4° about noon; at 3 p. m. the dry bulb and standard read 83.7°, and at 9 p. m. 68.9° and 69°. Next morning they read 69.6° and 69.8°. As this was Sunday, they were not read again until 9 a. m. on the 28th, when the dry bulb read 87.3°, and the standard, 64.9°, showing a difference of 22.4°. It was at once thought that the glass was cracked, and let in the air, but as no crack could be seen, after careful examination, it was determined to continue the reading. The author had always found before that if a thermometer cracks in the bulb the mercury rises till the tube is full, and he expected it would be so in this case though he could see no crack. The result, however, was that the difference steadily decreased, at first at the rate of 1° each day, and in 35 days the difference had fallen to less than 0.5°, or almost to its normal condition. Between April 7th and 17th it rose again, then fell. On the 3d of May, and again on the 7th, sudden rises took place; since then the difference has been diminishing, except a slight rise on May 21st and 22d. When very closely examined with the microscope, a very small piece of colored glass is to be seen in the bulb, as if lead had been reduced by the blowpipe, and on one side of the bulb a mark is visible, as if there was a minute quantity of water between the mercury and the glass at one spot.

CLIMATIC CHANGES IN RUSSIA.—The winters in Russia are becoming colder every year, and the summers hotter, more dry and less fruitful, owing, as is clearly stated by Livingston, to the destruction of the woodlands which formerly abounded in the southern districts. The clearing of these lands has caused such an enormous evaporation, that many once capacious water-courses have become mere swamps or are completely dry. The Dnieper becomes every day more shallow, and its tributaries are no longer worthy of the name of streams. The question of replanting has frequently been agitated, but the dried condition of the earth in many places in Southern Russia makes it a great difficulty. Energetic measures, however, are about being adopted to overcome this difficulty by scientific means.

SIDERAPHTHITE.—This is the name of a new iron amalgam which is composed of 65 parts iron, 23 nickel, 4 tungsten, 5 aluminum, 5 copper. It resists sulphureted hydrogen, is not attacked by vegetable acids, and only slightly by mineral acids. It is really more useful than standard silver, which it can be produced at a cost not exceeding that of German silver. For alloys which have to be silver-plated to prevent oxidation, the inoxidizable iron, as the above is called, is stated to be a perfectly successful substitute.

MINING SHAREHOLDERS' DIRECTORY.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alps S M Co	Ely District	10	25	Dec 16	Jan 16	Feb 9	O D Squire	331 Montgomery st
Adams Hill Con M Co	Eureka	8	25	Dec 17	Jan 12	Feb 2	W W Taylor	309 Montgomery st
Amazon Con M Co	Key	2	25	Nov 23	Jan 23	Feb 2	A J Nichols	350 Pine st
American Flag M & M Co	Ely District	9	25	Dec 19	Jan 23	Feb 23	G R Spitzer	320 California st
Alta S M Co	Washoe	5	25	Jan 3	Feb 5	Feb 23	W H Watson	302 Montgomery st
Crown Point Ravine M Co	Washoe	4	15	Dec 15	Jan 22	Feb 10	J M Buffington	309 California st
Con Imperial M Co	Washoe	2	25	Dec 19	Jan 24	Feb 14	W E Dean	419 California st
Crown Con M Co	Washoe	13	25	Dec 7	Jan 10	Jan 3	C A Sankey	331 Montgomery st
Belmont M Co	Nev	10	50	Nov 22	Jan 4	Feb 20	F A Squire	419 E Forme st
Florida M Co	Washoe	7	25	Dec 6	Jan 13	Feb 8	L Hermann	220 Sansome st
Glasgow G & S M Co	Washoe	4	15	Dec 6	Jan 10	Jan 31	J A Reichart	330 Pine st
Gould & Curry S M Co	Washoe	23	1 00	Nov 15	Dec 23	Jan 16	A K Durbrow	309 Montgomery st
Lady Bryan M Co	Washoe	2	50	Nov 2	Dec 28	Jan 18	W W McClintock	419 California st
Lanille M & M Co	Cal	2	25	Nov 28	Jan 8	Jan 23	L Hermann	220 Sansome st
Mansfield M Co	Cal	6	50	Nov 28	Jan 4	Jan 23	J M Buffington	321 California st
Niagara G & S M Co	Nev	4	25	Dec 4	Jan 5	Jan 23	W R Townsend	Nevada Block
North Con Virginia M Co	Washoe	6	25	Nov 21	Dec 22	Jan 16	J Maguire	419 California st
Raymond & Ely M Co	Pioche	6	1 00	Dec 5	Jan 15	Feb 8	T W Colburn	418 California st
Ely Patch Con M & M Co	Nev	5	5	Nov 11	Dec 19	Jan 9	D F Verdinal	409 California st
Washoe M Co	Washoe	2	1 00	Dec 28	Jan 23	Feb 5	J B Holmes	309 Montgomery st
Superior G & S M Co	Washoe	4	10	Dec 15	Jan 17	Feb 5	J Tyson	411 California st
Trojan M Co	Washoe	4	25	Dec 14	Jan 15	Feb 5	D Wiler	328 Montgomery st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

Alpine G & S M Co	Washoe	1	3	Dec 5	Jan 6	Jan 21	C A Gould	419 California st
Aurora G & S M Co	New	3	10	Dec 23	Feb 5	Feb 28	T S Rich	240 Montgomery st
Black Hawk Coal M Co	Cal	—	5	Nov 16	Jan 17	Feb 17	H Powell	520 Montgomery st
Cabinet M Co	Washoe	4	5	Dec 11	Jan 16	Feb 15	J F Sterling	330 Pine
Composolitan M Co	Washoe	4	25	Dec 8	Jan 12	Jan 31	M Landers	309 Montgomery st
California Star Oil Works Co	Cal	1	10	Dec 18	Jan 30	Feb 15	J S Taylor	312 California st
Denver Coal M Co	Cal	2	20	Dec 13	Feb 14	Feb 23	C C Westzer	500a Block
East Branch M Co	Cal	6	15	Dec 9	Jan 10	Jan 30	J H Page	429 California st
Great Blue Gravel Range M Co	Cal	7	50	Dec 22	Jan 27	Feb 14	W Bryant	33 Merchants E
Gold Run M Co	Cal	14	35	Dec 14	Dec 31	Jan 30	C C Palmer	41 Market st
Josiah Gravel M Co	Cal	10	19	Dec 15	Jan 20	Jan 25	W J Smith	531 California st
Lexington M Co	New	1	5	Nov 10	Jan 12	Jan 30	H B Congdon	330 Elm st
Montezuma M Co	New	1	5	Nov 23	Jan 2	Jan 19	H B Wheaton	402 Montgomery st
Monumental Q M Co	Cal	2	25	Nov 17	Dec 26	Jan 18	W H Manlove	5 Market st
New York Hill M Co	Cal	1	20	Dec 10	Feb 16	Feb 17	J F Hermann	612 Commercial st
Newhall Petroleum Co	Cal	1	1	Dec 13	Feb 20	Feb 23	S S Rogers	215 California st
Peytona G & S M Co	New	—	50	Nov 21	Dec 23	Jan 8	T J Owens	215 Sansome st
Plymouth Rock M Co	Utah	3	1	Dec 2	Jan 8	Jan 27	E Chastin	442 California st
San Francisco Petroleum Co	Cal	2	5	Nov 22	Dec 25	Jan 18	W Easton	32 Montgomery st
San Francisco Sulphur M Co	New	1	10	Nov 20	Dec 25	Jan 20	R Burt	328 Montgomery st
Silver City M Co	New	1	25	Nov 16	Dec 22	Jan 11	A K Durbow	382 Montgomery st
Taylor M & M Co	Cal	—	20	Dec 27	Jan 23	Feb 23	S S Murfey	607 Montgomery st
Vulcan Coal M Co	Cal	1	10	Dec 19	Feb 6	Mar 1	J Greif	636 Washington st
Waverly Hydraulic M Co	Cal	2	12	Nov 10	Dec 18	Jan 15	F H Rogers	334 Pine st
White Pine M Co	White Pine	6	50	Dec 20	Jan 20	Feb 1	W J Rogers	401 California st

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
ton M Co	Washoe	J S Kennedy	419 California st	Annual	Jan 13
nd Diamond Coal M Co	Cal	J H Dobhnson	305 Sansome st	Annual	Jan 13
ingham Bay Coal M Co	Oregon	J H Dobhnson	305 Sansome st	Annual	Jan 13
Virginia M Co	Washoe	C F Gordon	309 Montgomery st	Annual	Jan 13
Virginia M Co	Cal	A W Havens	309 Montgomery st	Annual	Jan 13
ay Coal Co	Oregon	T C Beach	84 Montgomery st	Annual	Jan 13
S M Co	Nev	W W Parrish	328 Montgomery st	Annual	Jan 13
erson S M Co	Nev	F Madge	Merchants' Ex	Annual	Jan 13
kerberker M Co	Nev	C A Sankey	331 Montgomery st	Annual	Jan 13
uth M Co	Nev	J H Sayre	330 Pine st	Annual	Jan 13
ation M Co	Nev	E F Stone	419 California st	Annual	Jan 13
ppa M Co	Nev	F E Luty	507 Montgomery st	Annual	Jan 13
outh M Co	Cal	L Leavitt	309 Montgomery st	Annual	Jan 13
isian G & S M Co	Nev	R H Brown	326 California st	Annual	Jan 13
auce M Co	Nev	D Wilder	328 Montgomery st	Annual	Jan 13
th Justice M Co	Nev	E F Stone	419 California st	Annual	Jan 13
th Justice S M Co	Washoe	W W Weston	319 Montgomery st	Annual	Jan 13
an Coal M Co	Cal	J Greff	232 Sutter st	Annual	Jan 13

LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Black Bear Quartz M Co	Cal	W L Oliver	316 California at	40	Oct 15
California M Co	Washoe	O P Gordon	Nevada Block	2 00	Dec 15
Consolidated Amador M Co	Cal	F B Latham	426 California at	25	Oct 15
San Virginia M Co	Washoe	A W Hovens	Nevada Block	2 00	Dec 15
Comanche M & M Co	Nev	W W Traylor	Nevada Block	20	Oct 25
Empire G M Co	Cal	Chas Collishoun		75	Jan 1
Leopard M Co	Nev	R H Brown	426 California at	50	Dec 15
Manhattan S M Co	Nev	J Crockett	419 California at	1 00	Jan 10
North Bellie M & M Co	Nev	W Willis	309 Montgomery at	1 00	Dec 15
St Patrick M Co	Cal	D F Verdunel	409 California at	30	Mar 1
West Comstock G & S M Co	Washoe	Oliver G Wood	534 California at	75	Feb 24

40 Eureka Con.....	14@15	100 Northern Belle.....	22
100 Gila.....	60c	300 New York.....	75@90c
50 Gould & Curry.....	11@13	300 Niagara.....	6@12c
6 Hale & Norcross.....	6	125 Ophir.....	20@20c
2000 Jenny Glyn.....	1c	260 Phil Sheridan.....	24@2c
100 Justice.....	4@4c	50 Savage.....	50
110 Justice.....	18@18c	200 South Barcelona.....	2
100 Leviathan.....	80c	1000 Trojan.....	45@52c
6 Leopard.....	5	10 Union Con.....	9

The year just closed has been about as bad as any one for stock dealers as they ever had. Although the production has been greater, and the mines have been profitably worked, a general distrust of stock dealing has been manifest, and the public has not come forward so readily as in former years. Again some of the big deals have

The Mining Share Market

The year just closed has been about as bad a one for stock dealers as they ever had. Although the production has been greater, and the mines have been profitably worked, a general distrust of stock dealing has been manifest, and the public has not come forward so readily as in years past. Again, some of the big dealers have left the street and gone into other classes of business, so the market is not so well sustained as usual.

The news from the mines continues good, with the exception that the water on the Comstock still continues to give trouble. The year ends and begins rather darkly for the stock market, but it is to be hoped that this will not have too unfavorable an influence on the mining interests of the coast.

A NEW AUSTRALIAN WILD FRUIT.—MR. W. Toward lately brought under the notice of the Queensland *Chronicle* specimens of a wild fruit which, according to his account, has been only recently discovered by settlers on the Burrum, and of the edible of which even the blacks until lately had no knowledge, they having been first introduced to taste it by observing that their dogs greedily devoured those that had fallen from over-ripeness. In size and appearance it is very like a small apple; the color, externally, bright red; inside, greenish white; the pulp closely resembling that of an apple, but drier and more fibrous. The flavor is tart but not unpleasant, and approximating to that of a common crab or wood apple. It contains five or six seeds of a bright mahogany color, each enclosed in a separate core, and about an inch in length. The tree is described as very tall and ornamental, and the locality where it abounds near the mouth of the Burrum. The fruit, although not very palatable in its wild condition, could no doubt be easily improved by cultivation. The tree in question abounds on the headwaters of Tinana creek and Boppel range, and the apple, by keeping, becomes mellow and delicious. It seems to belong to the sapotaceous order, and to be referable to one of two genera, *Lechros* and *Mimusops*.

THERE are now in operation in the United States no less than 800 paper mills, which are valued at \$40,000,000 of capital invested, with a total production of \$70,000,000. These mills usually employ 20,000 people, whose earnings are footed up at \$10,000,000 annually.

California Board—Latest Sales.

35 Mexican.....	580	300 Yellow Jacket.....	151
300 Mansfield.....	526	85 Yellow Jacket.....	151
300 Monumental.....	10c		

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

GOVERNOR.—*Amador Ledger*, Dec. 30: About a year ago the stock went begging at about \$1.50 per share, to-day it is worth \$40. This increased value is not owing to the manipulation of stockholders, but the important discoveries which have been made in the mine. The old shaft is down 700 feet. The first level being worked is 500 feet from the surface. Here a ledge is met with five feet thick, and of excellent character of ore. Drifting has been prosecuted on the ledge 140 feet. About the same may be said of the 600-ft level, excepting that drifting has been pushed to 160 feet. In the 700-ft level the ore body averages 10 feet in thickness, and it is the best rock at present met with in the mine. The drift is in 200 feet. This rock is worth \$30 per ton. Taking the rock from the three drifts it is worth \$20 per ton. Three hundred feet north of the old shaft a new shaft is being sunk, 12 feet by 5 feet in the clear. It is down 130 feet and still sinking. For workman's shaft cannot be beaten by any in the county. Drifting is done temporarily with a small engine under large hoisting works can be erected, material for which is already on the ground. The engine is a 16-horse. A 10-stamp mill has been running for about ten months, but the very favorable prospects of the mine have warranted the building of a new 20-stamp mill about eight hundred feet nearer Brydson than the old mill. The new mill is said to be the best in the county. A double track is being run to the mine, the new mill for running in the rock. The length of the track is 1,000 feet. The cars are run with a wire rope, the down going full car hauling up the empty car. In a short time this mine, that was so low down only about a year ago, will be paying its regular monthly dividends.

NORTH GOWER.—*Adjoining* the Governor, the ledge of which has been traced to the southern boundary, the contract was let the other side to sink 200 feet further on the ledge.

BONANZA.—*Belding & Manon*, the owners of the Drytown Bonanza, are in the best of spirits over the development of their mine. The last clean-up paid an average of \$20 per ton—the best yield since the mine has been opened. There is plenty of rock of equally high grade in sight.

CROWN POINT.—The new ten-stamp mill is all ready for work with the exception of laying the pipe for securing a supply of water.

OLIVE.—Is contiguous to the Bonanza on the west. A shaft has been sunk between 50 and 60 feet, giving the richest prospect ever seen in the county. There is no room for doubt concerning the gold-bearing nature of the rock. Free gold and sulphurets are visible all through it.

FRONT.—This is an old mine situated near Drytown. Yesterday it ranked among the richest mines in the county, but from some cause unknown to us work was abandoned.

MONTICLARE.—*Capitalists* from San Francisco were here a few days ago on a visit of inspection to the Monticlar mine. They are thinking of investing in mining property around Jackson. After going over the claim, they expressed themselves as more than satisfied with the prospects of a rich and permanent mine presented to them.

MCHANIC'S MINE.—*Amador Dispatch*, Dec. 30: This mine is gradually becoming recognized as one of the solid and substantial mines of the county as the work of development progresses. The owners have all their machinery in good working order, and are still sinking their shaft as rapidly as possible, and the prospects grow more and more flattering as they go down.

ALPINE.

ADVANCE.—*Alpine Chronicle*, Dec. 23: The drifting is progressing very satisfactorily. Arrangements are being perfected for working the mine on the new level in the spring. The employees of the company have been investing in the stock of the company—showing that they have confidence in the claim.

HAULING ORE.—The continued fine weather is enabling Manager Chalmers to accumulate a large body of Exchange ore at the company's mill, which will soon be completed.

BUTTE.

NEW IDEA IN MINING.—*Butte Record*, Dec. 30: A Mr. Hedges, who, some two months ago, went to Oroville, built a boat 85 feet long and 40 feet wide. A large pipe, which descends through the bottom of the boat, is attached to a derrick and can be hoisted or lowered at pleasure. The idea that caused the building of this vessel is that the pipe can be lowered to the bottom of Feather river, and, by suction, the covering of the bed-rock can be sucked up to the deck, when the gold will be washed out. A similar boat was used at Gold Bluff some years ago, but was not successful. Mr. Hedges feels confident that with the improvements he uses, the boat will be successful. It has already cost him a large amount, but he is steadfast in his faith and has only put in his own money.

CALAVERAS.

BIG CLAN-UP.—*Calaveras Chronicle*, Dec. 30: The extraordinary yield of the Champion mine, at West Point, has been such a regular thing for so long a time that the intelligence of a big clean-up scarcely provokes comment. People have come to regard enormous returns from that mine as a matter of course, and the sight of a posse of armed men conveying a "bonanza" of Champion treasure to town is by no means infrequent. The crushing of 65 tons of Champion ore, just completed, yielded in the neighborhood of \$7,000—an average of over \$100 per ton. And that is not in excess of former returns from the same quantity of rock—not a whit better yield than the mine has been making for years. We have frequently challenged the State to match our "Champion," but West Point still carries the "belt" for having the richest quartz ledge in the county.

EL DORADO.

VOLCANO-INDIAN ITEMS.—*Greenwood Cor. Mount Democrat*, Dec. 30: Business in and around this old mining camp is beginning to wear a look of prosperity once again. I recently visited the place, and found everything in a very promising condition, both in regard to quartz and gravel mines. There are now two quartz mills running there night and day. The mill on the Volcano mine has just lately been completed and put in running order. It is a ten-stamp mill, run by water power, with hardy-gear wheel, and is a complete and substantial structure, with all the latest improvements. The mine and mill are owned by Messrs. Graves, Wolf & Co. The ledge is four and a half feet thick at the surface, and carries its full size down to the depth of 130 feet, where they are now working. They have on the dump about 300 tons of good ore ready for milling. From 17 tons which had been crushed at Georgetown previous to the erection of their own mill, they realized the handsome sum of \$4,000. The other mine and mill (also ten stamps) is owned by a San Francisco company and is under the superintendence of Mr. Rodecker. It is also running full-handed, and with good results. The California water company are making extensive preparations for the opening of their gravel mines, as also are all the miners who own claims in this vicinity.

GRIFITH MINE.—Yesterday we paid a flying visit to the Griffith Consolidated mine, near Diamond Springs. We went to the bottom of the shaft and gave the ledge a thorough inspection. Rich is a feeble word to express the quality of the ore which is exposed. There is fully eight feet of vein matter in sight, a portion of which will yield as much as up in the hundreds, and neither the hanging wall or the foot wall is yet in sight.

FRESNO.

COPPER.—*Fresno Examiner*, Dec. 29: The Ne Plus Ultra copper mining company have nearly gotten their machine in readiness for working. When the mine is started up

again work can be prosecuted with greater vigor and more economically than before. The water will be pumped out and the ore hoisted by steam power. Arrangements are also being perfected for working the low grade ores, of which there is an abundance in the mine. It is certain the mine will pay well when it is again started up.

INYO.

DEFIANCE.—*Consolidated Mining News*, Dec. 30: We are glad to know that the Defiance furnaces are to be started up next Monday, with the fact that Mr. Hedy will start on a routine receiving coal on the 3d of January. He thinks the Centennial year has not been a successful one, so far as mining is concerned, and is bound to steer clear of anything hereafter that is likely to cause or influence a failure on the part of the Defiance. That a most successful run will be made by these furnaces there is not a question of doubt, and as the numerous drifts and shafts now being worked in the mine are all developing good bodies of ore, there is every reason to believe that the Defiance will soon work out of her indebtedness and enter on a prosperous and dividend-paying future. Everything in and around Darwin is now looking more hopeful than ever.

RED ROCK DISTRICT.—The Red Rock mining district is situated about 25 miles from the S. P. R. R. in the Mohave valley. Mr. J. H. Lent has just returned from there. He located several new borax claims, and will return to that district in a few days to enter upon their development. Specimens brought in by him show that the deposits of the borate are nearly in a pure state. This, we understand, is worth in San Francisco \$100 per ton, and it will be even that when shipped to that point for \$17, it can be sold at there a margin for a profit. There is not a question but what these mines will soon attract the attention of capitalists.

WORKING TAILINGS.—A German by the name of Ernest Koch is working the tailings left after ore that has been treated by the chlorination process at the Providence mine. He is a thoroughly scientific man, and is a graduate of the University of Freiberg in Prussia. He has contracted to work 2,000 tons of the material at the Providence and 4,000 tons at the reduction works of Oscar Matham. He has a process discovered by himself, and is enabled to have about 90 per cent. of all the metal left in the pulp. At the Providence he obtains all the way from \$8 to \$15 per ton of silver and from \$1 to \$3 of gold, all of which was formerly thrown away. No silver has been saved at the mine by the mill process. He uses some kind of a chemical that puts all the metal in the pulp into a solution, after which it is precipitated. We were not informed what the chemicals used consist of or how they operate, as the inventor does not wish to give it publicity as yet. We regard Mr. Koch as one of the valuable accessions made to our mining community. He is putting into circulation gold heretofore lost entirely, and which, in its present condition, is of no use to anybody. Gold savers are what are needed now among miners. It is not a question of how much treasure is taken out that determines whether operators will get rich, but how much they save.

LAKE.

ITEMS.—*Lake Democrat*, Dec. 27: The Sulphur Banks quicksilver mining company are putting up new ore driers, in the shape of cylinders which revolve over a furnace while the ore passes through them. The old practice of drying ore in the sun has been found too slow a process. The works under the new regime were started up at mid-day, and the driers are now in full operation. The old Hills mine will put on a full force of hands by the 15th of January. It is expected that the American mine will have 200 men at work by the 1st of January. The Great Eastern Consolidated, John H. Grove, Superintendent, has a new boiler on the ground and is getting ready for work in the spring. The Redington mine shipped 908 sacks of quicksilver to San Francisco during November.

NEVADA.

CRUSHING.—*Foothill Tidings*, Dec. 30: Good crushings are coming from the Alpha & Omega, a claim out by the late owner, Mr. O. H. Mitchell, Capt. Harry Thomas and others. They have been at work on it for several months past, and the rock has paid from \$20 to \$30 per ton right along.

CONSOLIDATED WYOMING.—*Nevada Transcript*, Dec. 30: We were pleased on our visit to the Consolidated Wyoming mine, on Friday, to see 16 stamps pounding away, and to learn from the superintendent that about 500 tons of ore per month is being reduced, which means that the mine are about a dozen miners employed to keep the stamps all going. One miner broke six tons of ore in one day, last week, which fact shows how easily ore is obtained. The sulphurets saved yield about \$80 per ton by the chlorination process. The ledge at the point being worked is from 18 inches to five feet in thickness. We saw the result of a clean-up of the copper plates, while at the same time the rock which was estimated worth \$1,100. Below the plates are blankets and other apparatus for saving gold, which were not cleaned up while we were there. A drift from the lower level was run to the north, 200 feet beyond any place heretofore worked in the mine, and on raising a winze a very rich body of ore has been struck. We saw some pieces which showed gold in liberal quantities. If an extensive body of this ore exists there, the dividends of the Con. Wyoming will be frequent and liberal.

PLACER.

BIG BLAST.—*Dutch Flat Forum*, Dec. 27: We are informed by D. T. Hughes, Superintendent of the Blue Tent Consolidated mines, that a blast of 900 kegs of powder was exploded in the South Yuba claims belonging to that company on Tuesday, which did remarkable execution. There was a straight drift run into the bank a distance of 88 feet, and from the inner end of which drifts were run both ways at right angles a distance of 176 feet. The bank over the drift is about 180 feet high. The explosion of the whole blast was a distance of five or six feet and thoroughly pulverized the whole mass in good shape for working. An eye witness, who is accustomed to such work, says it was the most effective work he ever witnessed. We are informed that the claims of the Blue Tent company continue to look well, in fact never had as flattering prospects as at the present time.

WATER.—The weather continues dry and the supply of water in ditches is still diminishing day by day. The South Yuba canal company turned off on Monday last, having drawn its reservoirs as low as practicable. This of course shuts down all the claims which have been taking water from that ditch. The ditch of the Cedar Creek company has a small head running in it, which is being utilized by the Dyer and Dyer miners. The extensive preparations for a full season's washing, and are anxiously waiting for the clerk of the weather to tap his reservoirs. The Baker claim is the only claim in this section that is washing. This claim is using water about five hours per day, and the work of opening is progressing well. A blast of 80 kegs of powder was exploded on Saturday last, loosening up quite a large body of gravel. The gravel is being washed, and the water is being used. The mines were never in better condition and the chances for a large yield never better. Nearly everything, however, is at a standstill at present, waiting for rain.

LITTLE YORK MINING.—The water was turned on the Empire mine last week and washing resumed. With its heavy banks of blue gravel pulverized by powder blasts, the large boulders by means of derrick, the work is progressing in ship-shape. From the richness of the gravel and the superior manner in which it is being worked, good returns in the future is assured beyond a doubt. The Christmas Hill company are busily engaged in making preparations for washing, which will take one week more to complete.

YOU BET.—Everything is very quiet at You Bet at present, as the water supply has almost ceased. The Hussey claim is fitted up ready to commence washing as soon as water comes. They have just completed a flume five feet wide and 900 feet long. The English company still continue washing a few hours each day.

SHADY RUN.—The Wild Yankee have turned their attention to cleaning bedrock at present. The North Ameri-

can company are still advancing their prospect drifts, with the indications increasing for a very extensive claim.

PLUMAS.

MORE BLUE GRAVEL.—*Plumas National*, Dec. 30th: Messrs. Kelly and Hartley have recently commenced a new mining operation on the Middle fork of Feather river, just below Bell's bar. They made a location of ground some time ago, and have now bought the adjoining claims and have ready to start a new mine near the river, as possible, so as to have the required dump grade for sluices, etc. Mr. Kelly has lately been up at the claims, looking up locations for dump-houses, timber-houses, etc. They are satisfied that they have got the blue lead, and we hope their anticipations will be fully realized. They are the owners of the whole of Poplar creek, a splendid privilege, and propose to divert it across the main river, and raise it to a height of 450 feet above the river bed. Their ditch will then be extended down the river as fast as required. The name of the Spring company has been fixed upon.

ITEMS.—Still the weather is clear, cold and frosty. The miners are commencing to look anxiously for storm, for when they depend upon snow water, they are glad to see the ground thoroughly saturated before the deep snows come. The outlook now is for a dry season, but it may come thick and fast by-and-by and make up for lost time. The quartz mills on Wolf creek and near Greenville are "doing their best," and at work on A No. 1 rock. Quartz is better in Plumas than ever, and confidence in this class of mines is steadily increasing. The Maxwell company are progressing nicely with their drift and flume down the river. The heavy rain early in the fall caused them considerable trouble, but they have repaired damages and are still pushing the work ahead.

SANTA CRUZ.

COAL DISCOVERY.—*Watsonville Pajaronian*, Dec. 23: Wm. Strader and others have for several years past been prospecting to find coal in the Santa Cruz range of mountains bounding the Pajaro valley on the north, on the north side of Corralitos creek, two or three miles above Corralitos. Last week a vein six feet in thickness was struck, and large masses of coal were taken out, and two or three hundred pound specimens brought here. The past three days will be long enough to show that the coal is good, and all who have examined the vein think the mother lode of the range has been found, and that coal mining will, ere long, become one of the principal industries of this section. The works are situated on the lumber tract of Ford & Sanborn, who have given every facility for proper investigations. This discovery, should it prove as rich as is now expected by experienced coal miners, is but an introduction to many more discoveries which are sure to follow in the same range, and will encourage the building, within the next year, of a broad gauge railroad to connect with the Southern Pacific at this place.

SIERRA.

SOLD.—*Mountain Messenger*, Dec. 30: H. Scamman has sold the old Williams place on Dugan flat to Chinamen, and it will be mined away. G. W. Hughes has sold his place to the same company. Said company is putting up a flume to take water from the South Fork.

THE PERFORMANCE of the B. M. locomotive demonstrates that its powers to get out gravel are almost unlimited. From what it has already done it is judged to be capable of taking out 2,000 car-loads in 24 hours.

THE GOLD BLUFF MILL has been running lately and the rock has yielded well.

THE SWALLOW mine at Monte Cristo is paying very well at present.

THE INDEPENDENCE mine has fallen into the hands of the Sierra Buttes company. We are informed that they got the property for about \$15,000.

MINING WORKS BURNED.—On Sunday, Dec. 17th, the works of the North America mining company, at Hesperia, were destroyed by fire. The alarm was given at once, and a brake-pump was manned, but to their consternation they found that the waste-gate of the reservoir was open and no time was to be had. The reservoir was full of water and the flames, which were burning in the mine, soon subdued the flames, the men in the mine were rung out as soon as possible, and fortunately no lives were lost. All the buildings around the mine were destroyed, together with the winter supply of timbers, lumber, hay, etc. The fire burned back into the tunnel as far as the double track extends, about 200 feet, caving in the tunnel and almost utterly destroying it. Ten cars were burned on the track, and five or six more were damaged. The dump and ruined. The loss is about \$20,000 in round numbers.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—*Gold Hill News*, Dec. 27: Daily yield, 275 tons of ore, which is being crushed as fast as it is extracted. The greater portion of this ore is hoisted through the Ophir shaft, as the use of the Consolidated shaft is nearly taken up with the hoisting of ore for the California. Nothing is being done in the way of prospecting on the 1550-ft level. The north winze has been put in good repair, and a drift started south at the 1650-ft level. This drift will be run to a point opposite where the west drift from the C. & C. shaft will strike the ledge, when a cross-cut will then be run to meet and connect with that drift. The face of this drift, from the time it was started, until to-day, has been in ore which will yield \$10 to \$15 per ton. What the width of the ore at this point cannot of course yet be determined, but all doubts as to the ore extending downward is set at rest by the opening of this station.

IMPERIAL CONSOLIDATED.—The sump of the main incline is being cleaned out, and a large water tank is being erected at the 2000-ft station preparatory to resuming the sinking of the main incline. The east cross-cut on the 2,000-ft level is steadily advancing the face showing some fine quartz. The ore vein at that point appears to have a very great width and the developments show that it has not, to say the most, been more than partially prospected.

OVERMAN.—A strong flow of water was encountered day before yesterday in the drift on the 1400-ft level, which obliged a suspension of the work at that point until the large pumps can be put fairly to work. As soon as the water can be drained off winzes can be started downward on the ore from the 1200-ft level.

CALIFORNIA.—Daily yield, 550 tons of ore. The ore stops and breasts in every portion of the mine are showing richly and promise a long and prosperous yield. The south drift on the 1600-ft level is still advancing, the face rich ore. The north winze, which is 1850-ft level from north winze, shows the ore at that point to be as rich as any that has been found on the levels above. This is within a very short distance of the south line, and begins to look as if the opening up of as rich bodies of ore as that has yet been found in the mine was almost an assured fact. The mills are kept steadily running, and the future prospects are, so far as can be judged, are of the brightest character.

NORTH CO. VIRGINIA.—A heavy flow of water and some very soft ground was encountered in the west drift on the 1100-ft level during the first part of the week. The water bursting in from the sides of the drift caused the rock to slake and swell so badly as to oblige a stoppage of the work in the face and the starting of a new drift farther back, in order to avoid the fearfully bad ground encountered.

BALTIMORE AND AMERICAN FLAT.—The upraise on the 1050-ft level is steadily advancing, following the small vein of ore, which continues of a uniform size and character. The northeast drift on the 1450-ft level shows an improvement with every yard that it advances. The west cross-cut from the main south drift on the 1800-ft level continue to improve in both looks and quality daily. The assays are not very large, ranging from \$10 to \$30, but the character of the quartz and ledge is such that there is not a doubt but a concentration of the ore vein has been encountered, which may open into a veritable bonanza at almost any day.

LADY BRYAN.—The foundations for the heavy machinery

are completed. Mr. I. F. Thompson, the chief engineer and contractor, has commenced the placing of the machinery, and will press it to completion at the most vigorous rate possible.

BUCKEYE.—The north drift on the 350-ft level is rapidly approaching the point at which it is expected the best portion of the north ore chimney on that level will be opened. The Hope mill is soon to start up on ore from the mine.

JUSTICE.—Daily yield, 330 tons of ore; mills all kept running to their full capacities. The ore breasts on the 400, 500, and 600-ft levels continue to both look and yield well. The ore stops on the 700 and 800-ft levels are showing a steady improvement. The winze sinking below the 800-ft level is still in ore of a fine quality. The bullion yield is gradually increasing.

BEST AND BELCHER.—Cross-cutting and driving the diamond drills on the 1700-ft level are making fair progress. So far there is nothing of interest in the shape of ore developments.

HALE & NORCROSS.—The pumps were gaining upon the water until the past three days, when a stoppage of the Savage pumping-engine for repairs caused a rise in the water to a point 21 feet above the 1900-ft station, at which point it is now held with the Norcross pumps alone. The heavy head of water is entirely gone, and as soon as the two pumps can again be set at work the flow will be over-combined rapidly.

GOLD & CRYSTAL.—The repairs to the pumping compartment of the shaft are being pushed with all the energy possible. The shaft has not been in as fine working condition for years as it is at the present time.

SILVER HILL.—Sinking the main incline is progressing at the rate of 12 feet per week.

BELCHER.—Daily yield, 75 tons of ore, keeping the Europa mill steadily running. The ore breasts are gradually giving out on the old levels, so that much more of an effort is required to keep up the supply of milling ore than formerly.

CHOLLAR-POTOMI.—Daily yield, 100 tons of ore, the assay value of which is \$30 per ton. Sinking the combination shaft is making good progress.

UTAH.—Sinking the main shaft is making fair progress, the bottom still in very hard blasting rock. The flow of water gives little trouble.

SUCCESS.—The new pumping machinery is in full blast and is doing its work splendidly. Everything works with the utmost ease and perfection, and the water has already been drained almost to the bottom of the shaft.

OPHIR.—Sinking the main incline is making the best of progress. Driving the north drift on the 700-ft level is also making good headway. Daily yield, 200 tons of ore.

FLORIDA.—The flow of water is light and gives no trouble.

ALTA.—It is the intention to send the shaft downward with all the speed possible until the ore vein is reached.

AUREOLA & ARGENTINA.—A drift has been run from the ravine west of the shaft to intersect the bottom of the shaft. This drift will prove a very advantageous arrangement, as it will tap the shaft 100 feet below the surface and save that distance in hoisting or pumping.

LADY WASHINGTON.—The north drift from the main east cross-cut is in 70 feet to depth, following the very promising ore vein or feeder heretofore mentioned. For the last 40 feet this vein has been from two feet in width to the entire width of the drift. It is composed of soft, porous rock, with a mixture of clay, and assays from \$10 to \$40 to the ton.

YELLOW JACK.—Sinking the new shaft is making the best of progress, the bottom in dry ground that works as finely as it is possible for it to do. The side railroad track to the shaft is completed.

LEVATHIAN.—As soon as timbering is completed cross-cutting will be resumed.

PROSPERITY.—Owing to the great amount of water, sinking the shaft deeper is found to be inexpedient at present.

KOSKUTIT.—The cross-cut on the 500-ft level is steadily advancing. The rock begins to show signs of softening, indicative of a near approach to the ledge.

CALDONIA.—Sinking the main shaft is making about two and a half feet per day. The rock in the bottom is not so hard, but the flow of water is still strong.

THE WEST TUNNEL.—The west tunnel, running to the water recently encountered in the bottom of the shaft, will reach a point directly under the shaft in about 10 days' time.

DAYTON.—The north prospecting drift on the 220-ft level is showing some fine ore. Both of the north drifts on the 500 and 700-ft levels are looking splendidly.

TROJAN.—The ore body continues to improve. In the north drift on the 300-ft level. The upraise on the same level is also showing finely.

SAVAGE.—The heavy pumping engine has been delayed in its operations for several days past, on account of having to put a new piston in the large cylinder.

SILVER CITY.—The work of cleaning out and repairing the incline and reopening the lower level has made excellent progress. The engine is now in full work, water reduced, and ore extraction is now in order.

SOUTH COMSTOCK.—The fine quartz vein run into by the main east drift at the 300-ft level continues its good showing and excellent assays.

PHIL SHERIDAN.—The flow of water is not strong and gives but little trouble.

CROWN POINT.—Sinking the main incline is making the best of progress.

TANOR.—Preparations for the erection of the new hoisting works building and machinery is going ahead rapidly.

STRET TUNNEL.—Total length of tunnel, 14,507 feet. Face of header in a hard composite of porphyry, quartz and clay.

BELMONT DISTRICT.

THE STRIKE.—*Reese River Revueille*, Dec. 26: From the numerous private telegrams received by us to-day from Belmont, the inference is that the recent strike in the Belmont mine is a valuable one, and of some importance that is stretched to its full distance. One dispatch, from a very reliable gentleman of Belmont, says that the strike was made in the south drift, on the 530-foot level, west vein. That being the case, the development will prove the most valuable ever made in the mine. We congratulate those who have their all at stake in that good old camp.

ELY DISTRICT.

BULLION.—*Pioche Record*, Dec. 23: Wells, Fargo & Co. shipped bullion yesterday valued at \$1,382.

ORE.—Alfred Grant arrived from Leeds on Wednesday with a lot of ore from one of Barbee's claims. This ore will be crushed at the Alps mill. Ore was traveling down Main street to the Alps mill yesterday in large quantities from the Raymond & Ely mine.

A RUMOR.—We have it on pretty good authority that the Newark mill, in Condon canyon, is about being leased by two well-known business men of Pioche. The aid of that mill would be of immense benefit to chloriders, who now have to wait too long a time.

THE HSA.—All the paraphernalia of the t-b-stamp mill at Hesperia has been removed to Leeds district with the exception of a spur wheel and some battery blocks. The wheel was too large for the small Mormon wagons, and a special contract with some of our teamsters here will have to be made.

EUREKA DISTRICT.

THE RICHMOND.—*Eureka Sentinel*, Dec. 29: This mine is a practical demonstration of the fact that the despised limestone formation of the Base Range contains a deposit of a body of ore second to none in the State outside of the Comstock, and vying with that in its proportions and value. It has not achieved a notoriety commensurate with its deserts, from the fact that it has not been the shuttlecock of the stock board, as it is under the control of an English company, who are content to pocket their dividends without the intervention of the brokers. The mine is worked intelligently and with due regard to the future needs of its increased development. During the last six months a body of ore was found on the lower level that has proved itself a veritable bonanza, its extent and value as yet undetermined. The breasts and stops on the 900-

Continued from page 2.

street one and a half miles to the "Natural Bridge," and another across the San Lorenzo and on the Branciforte terrace, giving to all East Santa Cruz an abundant supply of soft water.

We will close this already lengthy article with the statement of two points which have been attained in the construction of these works in the direction of economy, both in outlay of money and expenditure of mechanical forces, illustrative of wise management and constructive skill by the resident superintendent. The first is the attainment of an equal pressure throughout the length of the mains in the town by means of a uniform and direct grade from the top to the lowest level in the pipe which connects the mains with the reservoir. This gives the full pressure of the altitude of the reservoir (which is from 90 to 80 feet in every part of the city), with but little loss by friction. The other is, by an ingenious device, the transformation of the feed pipe into a returning supply main. This is accomplished by a valve in a pipe connecting the feed pipe with the main descending into the town. When the pumps are working, the pressure of the water flowing through the feed pipe into the reservoir closes this valve, but when they cease, this valve opens and the water flows back in the feed pipe, equally as in the town mains, in proportion to the consumption of its water. C. N. W.

Watsonville, December 18th, 1876.

Quicksilver.

The following exhaustive article on "quicksilver," by Senor Don F. A. Sola, we take from *Iron*: Spain, for several centuries, had exclusive possession of the sources of the supply of quicksilver. The Spanish mines at Almaden, which, in spite of the important discoveries mentioned further on, are the richest deposit in the world, were worked in the most remote periods. A passage of Pliny shows that the Romans depended on them exclusively for the manufacture of vermilion, and he gives evidence of their immense importance in the ancient world. When the 10,000 *libre* of ore had been extracted from them for the needs of the year, they were shut with solemn ceremonies, and the key of the mines was lodged with the prefect. They could not be opened again without orders direct from Rome. It is generally considered that the Carthaginians, or at least the Phenicians, preceded the Romans in working the Almaden mines. Historic proof of this fact, it is true, is wanting, but its admissibility seems to me to be possible; firstly, from the great importance attached to their Spanish possessions and their mineral wealth by the Phenicians; secondly, from the proximity of these mines to the center of the Phenician occupation in Spain; thirdly, from the manufacture of vermilion denoting a certain degree of progress in industrial arts, which is more intelligible on the part of a commercial people than on the part of a mere nation of soldiers; fourthly, from the fact that the Romans, who never displayed any marked aptitude for industry, were but the pupils of the peoples who had preceded them in civilization.

Whatever their antecedents, the Almaden mines stood alone in the world during the long period between the rise of the Roman power and the beginning of mineral industry in America.

The separation of silver from its ores, in the amalgamation process, is the principal large use to which mercury is put. The discovery by Spain of the rich silver mines of Mexico and Peru caused a great increase in production, and from that time forward Almaden became important. In Peru the cinnabar mines of Huancavelica had been discovered, and in Austria those of Idria, in the province of Carniola; but the former were closed at the end of the last century, the winning having been conducted in a very reckless fashion. The Spanish government, which retained a monopoly of the trade with the new world, persuaded the Emperor of Austria to an arrangement under which the latter, after retaining sufficient for use in Austria, made over to the Spaniards the whole surplus output of the mines at Idria. The Spaniards carried on a very profitable trade with the mercury which they bought at their own price from Austria, and sold at their own in America. Spain thus remained mistress of the market, although no longer the exclusive producer of the metal. She took from Austria, every year, 368 tons of mercury, at £240 per ton, reselling it at £360 per ton. At about this time negotiations were being made with the famous Fugger family by the Spanish government for ceding to them the right of working the Almaden mines and reducing the cinnabar. This concession was enjoyed by the Fugger family from 1525 to 1645, and enriched it enormously. Its members became princes of the Roman empire, and accumulated one of those colossal fortunes at which history is amazed. Their name, Ibericised into the form *Fucar*, became a synonym for wealth, and the Spanish proverb, "richer than a *Fucar*," is still current.

The mines discovered in Germany and Tuscany being of no great importance, the only apprehension of the Spaniards was to see China, who was supposed to possess enormous deposits of cinnabar, appear in the market as a seller. The contrary, however, has really happened, China being a buyer in the markets of both Europe and America. Just when no such thing was being thought of by any one, new discoveries were made, on such a scale that the former conditions of the mercury market have entirely passed away.

At the time of the gold fever in California the gold-finders in the Trinidad placers used to come across grains of reddish stone of so high a specific gravity that on washing the sands they always settled at the bottom of the cradles, after lighter matters had been removed. The name of "red stuff" was given to it by the miners, just as that of "blue stuff" was given to other numerous fragments of a bluish color. The first were cinnabar, the second an extremely rich sulphate of silver.

In a country where science and action are both practical, and easily come together for the common good, these indications were speedily utilized. When the importance of the "placers" became less, investigations of a very costly nature were set on foot. At the cost of labors which would have discouraged less energetic and enduring men, the veins were discovered which are now great sources of wealth. At the present time New Almaden, New Idria, Napa, Colusa, Sonoma and Lake counties, afford ample field for the energies of that puissant race, which to its unrelenting exploration has added unrelenting winning, and to these an unrelenting progress in the methods of treatment of the output. Three patents for distilling furnaces are in existence: Randol's, Knox & Osborn's, and Livermore's. These are for treating poor ores, either in cakes or in a pulverulent condition. Ores differ very considerably in richness, the range being from 20 to 2 per cent. All has been the work of less than a quarter of a century, and at the present time more than half the world's consumption of quicksilver is yielded by that privileged country.

The metal is brought to market in iron flasks holding 76 pounds (34.5 kilogrammes) of mercury. Of the total annual production of 100,000 bottles, 60,000 come from California. From the port of San Francisco, where the greater part of this is shipped, there having been forwarded, during the last 15 years, 400,000 bottles, of the total value, in round numbers, of £2,850,000. New Almaden, which for some years has been the most productive mercury mine in the world, produced 34,765 bottles in 1862, 40,391 in 1863, and 47,191 in 1864. The highest output in any year of the original (Spanish) Almaden mine was 32,336 bottles; its annual rate at present is restricted to 9,000 bottles. The results of the American production have been, in the first place, to arrest the upward tendency of the price of quicksilver, and, in the second, to increase the stock, as shown by the contrast between the 23,591 bottles entered at New York in 1874, and the 41,165 entered in 1875. In the third place, the consumption has so increased that China, which in 1873 took 1,900 bottles, figures in the statistical accounts of San Francisco in 1875 for 18,190 bottles; while Mexico, which in the first of these two years limited its demands to 3,761 bottles, took 5,757 in 1875. Lastly, the home consumption on has been enabled to rise to 15,000 or 20,000 bottles a year, which is the quantity retained by the States for their own use. The California mines produced last year a total of 40,900 bottles, distributed as follows: Redington, 13,000 bottles; New Almaden, 9,000; New Idria, 8,800; Guadalupe, 3,400; Great Western, 3,400; Saint John, 700; Liverdale, 700; Buckeye, 700; Manhattan, 450; Great Eastern, 400; Phoenix, 350. The weight here shown is about 1,420 tons. The production of Sulphur Bank, which takes the second rank among American quicksilver mines, and that of several mines of less account, were not included in the document from which we extracted the foregoing figures.

We can now see to what an extent the market has been modified. Spain has never been in a position to offer more than 40,000 bottles a year; the Almaden furnace now producing a standard of 25,000 bottles, and she standard consumption being about 100,000 bottles. The difference is furnished by other sources of supply than Spain. The quicksilver market, therefore, it is self-evident, is no longer a monopoly of Spain. It was ours so long as we were the only producers, but England, for whose custom all producers are desirous, as she consumes on her own account about half the total product, or say 45,000 bottles, has become the field of competition, and the market has been transferred to London. To this change the house of Rothschild has contributed by the share it has taken in quicksilver transactions, the possession of the Spanish mines having been made over to it for a certain number of years. [The house of Rothschild acquired the right to work the Almaden mines by a cession made in consequence of a contract entered into with the Spanish government in 1843.]

Fortunately for ourselves, the heavy cost which the California mercury has to defray for carriage before it can make its appearance on the London market, as well as other charges which it has to bear before it leaves its port of exportation, affects it sufficiently to tell very decidedly in our favor, and make our competition possible. The time, however, is come when we would do well to rouse ourselves from any dream of undisturbed possession, and endeavor to get all the profit we can out of conditions which we are not in a position to annihilate.

The decided tendency to rise which was marked before the discovery of Californian cinnabar has not only not been contra-indicated, but there has been a considerable decline.

The two principal elements of price are the cost of raising and the cost of purifying.

The first of these elements, the cost of raising, may as well stand out of the discussion; labor is dear at Almaden, as treble pay is given. This cannot be avoided; since the miners cannot work more than three hours a day without being poisoned. But any reduction in the cost of raising would tell very slightly on the cost of the metal, since even the triple pay brings up the first charge to only 2s. 6d. per cwt. The question is thus limited to one of treatment of ore, and it is in this that we in Spain have to confess room for improvement.

The furnaces in which distillation is carried on at Almaden are those of Bustamante, invented by that distinguished engineer in 1648 (that is to say, at the time that the Fuggers gave up the mines), and the so-called Idrian, introduced in 1806. This latter year is the latest term of improvement. Idria itself, however, has twice since then reformed its distilling, and in California, as we have already stated, there are three patent systems in use. As it is reasonable to suppose that each and all of these newly-introduced systems have improved on the older ones, this mere recapitulation shows us as very much behindhand.

The treatment of cinnabar is difficult, on account of the volatile nature of mercury, which, if not prevented, escapes with the products of combustion. The damage done by mercury fumes are specified by Dr. Roberts in a remarkable work treating of Berrens's system, by which evaporation is completely avoided.

The ordinary estimate of the loss by evaporation in the Almaden mines is 50 per cent. The result of an experiment by the celebrated engineer Escosura, who obtained a minimum of loss of 4.36 per cent., has sometimes been looked upon as a standard; but the results obtained in a laboratory cannot for a moment be compared with practical furnace-work as carried out at Almaden. Senor Monasterio, director of the Madrid school of mines, was commissioned some years ago by the government to report upon the system proposed by M. Pellet, a French engineer, as compared with that followed at the Idria furnaces. He reported unfavorably to Pellet's system, and it is therefore to be supposed that he did the best he could with the San Luis furnace, on the Idria plan. The percentage of loss stated by him was 5.59 per cent.; but the figures are open to question—firstly, for the same reasons as those given in reference to Escosura; and, secondly, from the testimony of M. Huyot, who (*Annales des Mines*, 1852) states the loss at Idria to be 27 to 29 per cent. Senor Monasterio concludes his report in the following words: "Can it be supposed that, under normal circumstances, when one has not the same interest (i. e., in the ordinary course of working), the loss rises to twice the amount? Even then, it would only be 20.16 per cent., or less than half the amount which has been stated in public documents." It would almost seem as if Senor Monasterio were satisfied with 20.16 per cent. of loss—which, by the way, comes very near to Huyot's estimate of the loss of the Idria furnaces. Letting it, however, stand at this, and supposing that the mines at Almaden have produced to a value of £60,000,000 since the establishment of Bustamante's furnaces, the proportionate loss will be not less than £12,000,000.

The ratio of loss in the patent furnaces used in the United States I am not acquainted with, but I cannot conceive it possible that the Americans would look without concern on the loss of such immense quantities of mercury, discharged uselessly into the atmosphere. It is very possible, therefore, that we are seriously at a disadvantage, relatively, to the mines of California.

The advantages which the Almaden mines possess over their rivals beyond sea are very considerable. In the first place, their ores are much richer than those of California; the preliminary costs have been long since defrayed, and the seams are of great thickness, some workings being 12 feet, others 15 feet, and others nearly 30 feet thick. Spanish quicksilver, too, can be put on the English market at only a fraction of the freightage paid by Californian metal. These are conditions which ought to turn the balance in competition, and if the increasing consumption of America absorbs its output, as it tends to do, the market of Europe can and ought to belong to Spain.

Almaden only raises four tons of mercury a day or 25,000 bottles, the seven months of working. [The furnaces are closed from May to September on account of the heat.] England wants 45 tons. Since we could let her have them, why do we not?

Fortunately for Spain, an improvement is at hand. A distinguished chemist of Barcelona is now testing at Almaden a furnace of his invention, which is reported to save the whole amount of the mercury distilled, whatever the quality of the ores. The tests were conducted in the presence of a commission of three mining engineers specially appointed by the government.

Two experiments were made. In the first, the inventor, Senor Berrens, operating with great care, obtained a quantity of mercury equal to the proportion contained in the ore, less 0.79 per cent. In the second, the inventor, so far from operating with care, seemed to act with studied recklessness, and the commission were

surprised to see the ordinary precautions totally abandoned. The inventor hastened the period of roasting; he drove the steam engine at the rate of 126 strokes a minute, he shortened by 25 hours the time taken for roasting in the previous experiment, and raised the temperature of the furnace to a white heat. He did all that could be done to entirely ruin the operation, and yet the loss did not exceed 3.62 per cent. Indeed this loss was apparent only, not real, for the leaf of gold placed at the top of the flue did not show the smallest trace of mercurial change, proving that no loss by evaporation had taken place. This was acknowledged by the commission, which allowed that the mercury thus wanting might be deposited in a part of the apparatus contrived *ad hoc*. The object of the inventor in his second experiment was to show that his system was not easily prejudiced by careless working.

The Berrens furnace has the further advantage of remaining in use all the year round. The two experiments were carried out in August at an exterior temperature of 27° to 33° C., so that without increasing the proportion of work, the 25,000 bottles produced in seven months could be raised to 43,000 bottles, working all the twelvemonth through.

The reality of this important improvement has been testified to by competent authority of the commission, which presented its report last January.

Manganese.

The following letter, from a leading Boston house—Hobbs, Pope & Co.—explains why it was written. We publish it on account of its valuable information, relative to the varieties and the whereabouts of manganese:

Editor American Manufacturer:—I have read in the issue of your paper of 7th inst. an article headed "A Manganese Mine that Beats Gold," taken from the Atlanta (Ga.) *Constitution*. Editorially, you explained the misstatements or errors the above article contained as relating to ferro-manganese, and with your permission we would call attention to the statements made concerning manganese. As miners, shippers and dealers in manganese, we have acquired an intimate acquaintance with this ore and the mining of it, and would beg to call attention to a few of the statements made in the article referred to. The assertion that manganese is exceedingly rare is entirely erroneous, when it is well known that nearly every State in the Union produces it to a greater or less extent, as well as all the provinces of the Dominion of Canada. The mines of England, Saxony, Spain and Turkey, mainly supply the European markets with ore. Hardly a week passes that we do not receive samples of manganese ore for examination from some section of the country, but the greater proportion of them are of a low grade and unworthy of attention. The deposit of ore in Bartow county is described as the "richest, longest and purest" to be found on this continent; we hardly know what is meant by "longest" in this connection, but having examined many samples of ore from Georgia, we have never known of any quantity of ore obtained from that section which could be described as remarkably rich or pure. The fact is that manganese of high test and superior quality is obtainable only in limited quantities; were we able to obtain more than a sufficient quantity of this description to supply our home trade, we could find a ready market for such surplus abroad at good prices, while the medium and lower grades of ore, which are obtainable in almost any desired quantity, will not often pay to ship in competition with the European mines. The statement that there is enough manganese in Bartow county to manufacture 50 tons of ferro-manganese per day for 50 years is a very loose statement, which cannot be demonstrated, and certainly shows ignorance on the subject of manganese mining. It is not found in "inexhaustible beds" like coal, but its deposits are very unreliable, it being almost always found in "pockets," or in "veins" or "seams," which can never be relied upon as carrying ore for any specified distance; it is, in fact, next to impossible to estimate the yield of a manganese mine for any specified time beyond the immediate future.

In conclusion, one point in the article surprises us more than any other, which is, the fact of openly stating to buyers of ferro-manganese the enormous profit which the owner of this "bonanza" will receive from them, which course we should hardly think advisable for his interest.

NEW EMERY STONES.—A German technical publication gives some particulars of a new kind of polishing stone manufactured by Van Baerle & Co., (Worms, Germany), and consisting of emery, soluble glass and petroleum. The emery stones in general use consist of gum, shellac, and emery. When stones of this description are turned rapidly, either dry or with oil, they get heated to such an extent that the gum or shellac becomes soft, the stone turns greasy, and does not act any longer. The new stones are said to be free from this objection. Their speed may be increased from 1,000 to 2,000 revolutions per minute, according to the size of the stone. When they are used for polishing steel, the latter does not get heated to such an extent as with other stones; the steel does not become annealed, and preserves its hardness. The new stones are damped by means of a rag soaked in petroleum and oil, and are made in three shades of fineness—fine, medium, and coarse.

Vipond Mines and Machinery.

The *New Northwest* (Montana) says: The mining regions of Quartz hill and Vipond, in Beaverhead county, can now hold up their heads. The Monroe mining company has completed and put in operation its mill and for the last four weeks it has been running continuously without stoppage of any moment—and shipping silver.

Retrospective.

The localities named have not been very prominent before the Montana public; there never has been any particular excitement about them, or stamped to them, but the few proprietors owning leads have been feeling satisfied with the prospects before them, and have been quietly sinking their shafts and accumulating ore on their dumps, building roads and bridges, awaiting the day when the value of their mines would be recognized to an extent which would encourage some one to build reducing works within reach of their ores. They manifested their faith in their mines by one undertaking which at least proved their indomitable energy—they built a road from Divide to the mining region, which for three miles, through a canyon of the Big Hole river, surmounted more difficulties than are found in any like distance in Montana, besides building a bridge across the river, which has withstood its rapid current successfully. Of course these kind of men compel success and success seems in their grasp.

Character of Ores.

Last spring the ores of Quartz hill were supposed to be of a character requiring the use of the roasting processes in reducing them, their known extent was large, and they were pretty well developed as the country goes. Those of the Vipond district were known to be more base than those of Quartz hill, their extent was also known to be great, some of the veins being, even in this country of wide lodes, very wide. The great trouble anticipated was that the cost of reducing them might be so great that their value would be so lessened as to make them unprofitable to work—their grade having been known to be medium.

Putting up Works.

Last spring one of the owners on Quartz hill, M. Dewey, and his associates, determined not to wait longer, but to ascertain for themselves what could be done with their ores. They accordingly began building an arastra, to be operated by water, furnished from the Big Hole river, a dam having been constructed the year before across the river at the head of Dewey's flat, and a ditch dug the whole length of the flat. Just as these gentlemen had begun their operations, the Monroe silver mining company, through its representatives, appeared upon the scene with the declared intention of moving the Sterling mill to which property they had obtained title, to Dewey's flat, and working the ores of their mine on Quartz hill, as well as doing such work in reducing ores for the miners as should present itself. The construction of the arastra and the building of the mill went on side by side, until about four months after the beginning of each both were successfully at work.

Free Milling.

Meantime, through the forethought of the Monroe company and some of the other proprietors on Quartz hill, it had been demonstrated by the working of a few tons of their ore at the Centennial mill, Butte, that some at least of the Quartz hill ore, especially that of the Monroe company and of the other proprietors who had had the courage and means to make the trial, were free. One of the most successful mining superintendents in Montana having examined the district pronounced that roasting would be detrimental to them; samples sent to San Francisco for examination had been pronounced to be of free milling ore; consequently the Monroe company changed their plan from that of reducing by roasting to wet crushing. The new Purvine pan had also been brought into use in the trial of the ores at Butte, with happy results, saving a large percentage of the value of the battery assays and producing bullion of a very high degree of fineness. When, therefore, about the middle of October the arastra, and the first of November the mill, began operations, it was with an assurance of success with which but few undertakings have been favored.

Good Results.

Both worked well. Ten samples of ores from many of the leads on Quartz hill have been worked successfully in the arastra, and the baser ores from the Vipond district have been successfully reduced. The Monroe company has just finished a run of 100 tons of their ores with satisfactory results. The ores of both districts prove to be of so free a character that no trouble is anticipated in reducing them at an expense which will enable all the mines to be successfully worked. The Monroe company is adding to its capacity by getting in two of the Purvine pans of the largest size, and with its capital arrangement for handling ores and its efficient batteries, expects to be able to work at least 30 tons per day. It will undoubtedly keep at work all winter. Cold weather has put a stop to the operations of the arastra, but the proprietors are enlarging their producing capacity also, to be ready for larger operations in the spring. The people of the two districts are to be congratulated on the prospects before them, and the Territory at large will hold out to them a friendly and appreciative hand.

USEFUL INFORMATION.

Photography Underground.

We have to record (says the *Birmingham Post*) a novel and interesting application of this most useful art. A few days ago, we believe for the first time, an experiment was successfully made for the purpose of obtaining an accurate picture of some underground workings in a coal mine, the process being effected by means of the oxyhydrogen light, generally known as the lime light, in combination with magnesium ribbon in combustion. The scene of the experiment was the Bradford colliery, Bentley, near Walsall, where a few days ago Mr. Frederick Brown, of Walsall, accompanied by Mr. Chidley, representing the firm of Messrs. Duigan & Co., solicitors of that town, attended at the mine for the purpose of obtaining representations of certain portions of the underground workings to illustrate a question of practical mining which is incidental to a litigation respecting that colliery, and having made some preliminary experiments with magnesium light, came to the conclusion that photography would be perfectly possible under conditions which exclude sunlight altogether. Upon the following day Mr. Brown, attended by one of the proprietors of the mine and the deputies, successfully obtained pictures of the portions of the mine indicated by Mr. Chidley. The photographs, as finished, are not only in themselves valuable for the purposes of evidence for which they were required, but, when viewed in the stereoscope, form perfectly accurate delineations of the places from which they were taken, and, indeed, without an explanation that they had been taken altogether by artificial light, the ordinary observer would suppose them to have been produced by the action of the sun in the ordinary way. The process occupied for each picture was from 25 minutes to half an hour, while the sensitive plate was under the action of the light. One of the principal technical obstacles which Mr. Brown had to encounter in the chemical portion of the process was that the ordinary wet plate, although so much more rapid in its action, would not retain its moisture for the lengthened time of exposure rendered necessary under the altered conditions of light and the well known increased temperature in mines; but this difficulty was, after repeated experiment, admirably overcome by a chemical formula which Mr. Brown was fortunately able to devise to meet the special emergency. The difficulties of focussing arising from the cramped position in the mine were, of course, merely mechanical, but consumed much time to overcome. The result appears important in many ways, as suggesting in future the possibility as well as the propriety of photographing the interior of mines after accidents, and in the course of litigations and the like, for the edification of those who have not had the opportunity of visiting the spots, and yet might have to decide questions respecting them. The possibility, also, of introducing a powerful and steady light completely under control, which may be fed from the surface by means of flexible tubing, and which would enable a light rivaling that of day to be sent into dangerous places from a convenient and safe distance, appears to us to open a pathway to very important practical application.

Fire-Proof Towns.

The *American Exchange and Review* says: While numerous fires destroy about 80 cents in the \$100 annually of the whole combustible property of the United States, and something like one-third of this ratio in Europe, it is yet a curious fact that there are cities and towns almost absolutely fire-proof; that is to say, inflammability, internal hazard and external exposure are reduced to the minimum. Two examples of such flame exemptions exist in Buenos Ayres and Montevideo, two South American capitals, about 100 miles distant from each other, the former of which is still destitute of anything like a sufficient water supply, while the latter was similarly deficient until a few years ago. South American earthquakes make one-story houses the fashion in South America, and one-story houses are poor flame spreaders; and in addition to this, the country around the two cities named is poorly supplied with timber, so the houses have been built with a view to the greatest possible economy of wood, and there is an absence of heat-expanding iron and heat-disintegrating stone. For joists, rafters, etc., the people of Buenos Ayres are compelled by circumstances to use hard woods. The rule in the construction of buildings is, that if a large number of small wooden rods, like canes, be placed—say two inches apart, like a gridiron, over two thin brick walls supporting their ends, a fire made below will burn through a few of the rods that are directly in the flame, and there the destruction ends. In the same manner, if a cart-load of shavings and pine wood were placed under a bed in a Buenos Ayres house, and other furniture piled thereon, and the whole set on fire, four or five of the joists of the floor above would be burned, and the bricks and tiles would fall through, but there the damage would end, for the house could not be set on fire. The mode of building is as follows, the material of the walls being brick. Each floor and the roof, for the latter is quite flat, is supported by joists of hard wood laid about 18 inches apart. Across these are placed rails of the same kind of wood, $2\frac{1}{2} \times 1\frac{1}{2}$

inches, and the space between the latter bridged over by thin bricks, $1\frac{3}{4}$ inches long; another layer of bricks is then put on, and over it a floor of tiles. The roof is made in exactly the same manner, except that it is laid in cement, and has a slant of one foot in 30 to 35. The doors and windows have no boxes, but only frames for the sash, and there is no lathing, nor wainscot, nor skirting. The doors and window shutters are of cedar, or some hard wood that is slow to ignite.

The Permanent Exhibition.

The *Philadelphia North American* says: The permanent exhibition promises to be a grand success, the applications for room being already so numerous as to more than fill the main building, and that fact will give our readers an idea of what the exhibition will be. Many foreigners have applied for space, and it is believed that nearly all the countries represented at the Centennial exposition will secure room in the permanent exhibition for the display of their goods. Those articles exhibited during the summer and fall will generally be removed, to be replaced by other and still better ones, fresh from the manufacturers and artists of this and the old world. The manager has received such an immense number of applications that he will be compelled to make selections from the mass of articles submitted, and by so doing those accepted will be of the best quality, and in numerous instances superior to those of the same character displayed at the recent exposition. The directors design to improve the conveniences of the main building in every possible manner, especially in widening the passages and avenues, and introducing such other changes as may be deemed necessary to facilitate the movements of large crowds and give visitors better opportunities to view the exhibits. The success of the permanent exhibition is assured beyond a doubt, and we have no fears but it will be conducted in such an enterprising and liberal spirit as to merit the support and well wishes not only of Philadelphia, but of the country.

BLEACHING WOOL.—MM. Daudier & Son thus describe a new process for bleaching wool. It consists in plunging the wool or vegetable matters into a concentrated bath of chloride of calcium, and submitting them to prolonged boiling; to the bath may be added some hydrochloric acid, or compounds of that acid with metallic bases, such as aluminum, iron, zinc, copper, or tin, which will then act energetically on vegetable matters, while it will produce no alteration on wood.

GOOD HEALTH.

Air for Infants.

We cannot lay down any rule with regard to exposing infants to the outer air, but we know they must have it in some way. Mothers must be discreet and not expose their infants to so low a temperature that even their warm clothing cannot retain sufficient animal heat to resist the depressing influence of cold. The extremes of temperature must be lessened by good management. The heat of summer can be lessened in its effects upon infants by keeping them in cool rooms during the heat of the day, and in warm rooms (no: hot) during the cold; exposing them to the outer air in the former case morning and evening, and in the latter case, in the warmest hours of the day.

In the damp, chilly temperature of spring and autumn, when the special diseases of infancy are apt to prevail, too much care and watchfulness cannot be bestowed. Adults, barely able to move their bodies, have been strengthened and raised to a good degree of health by being placed in some convenient carriage and taken out to ride daily. In the same way sick infants may be wonderfully improved by being taken into the outer air and given gentle exercise. By it the strong are made stronger and the weak are rendered less feeble. We have known infants so feeble that the fresh air was their only medicine, and on this they recovered. Compare rural with city children. The pale faces and soft muscles of the latter do not compare well with the ruddy faces, hard muscles, active limbs and sprightly eyes of those who spend most of their time, every proper day, in the open air.

While we regard the purity we are not to disregard the temperature of the inhaled air. The mother's plan should be to preserve as uniform a temperature as possible. For it is not the absolute temperature that harms infants, so much as the vicissitudes of it. A house in mid-winter should not have a temperature higher than 70° Fah. It is this difference that does the harm, the sudden change from heat to cold. Let me repeat, mothers should not suppose that because harm does not follow exposure at once no harm has been done. Ordinarily the bad influences of indiscreet exposures appear gradually. Some infants are more predisposed to "take cold" than others. Some are very susceptible to vicissitudes of temperature. They may be but slightly exposed on some damp, chilly afternoon. They are put to bed in apparently a good state of health. They do not sleep well. The next day they are hoarse, and by night are feverish, and in a few hours may have indications of sore throat, or inflammation of the lungs, or croup. What shall a mother

do? If she expose her infant to a lower temperature than that to which it has been accustomed, it may take cold. If she keeps it snugly warm within the nursery or the house, it becomes very tender and susceptible, so that, on the whole, she may find, as others have, that her infant is safer, less likely to take a severe cold, if discreetly exposed, than if confined to the hot air of her dwelling.

The most and best a mother can do on this subject, is to collect from the wise and experienced in the business of raising children all the knowledge they have, and then use her discretion in its application. The greatest wisdom and the keenest discretion cannot always protect infants in such a way that they never "take cold." A young mother, then, needs the advice of those who have obtained their wisdom by experience and observation. She must not judge of the proper temperature for the health and comfort of her infant by her own sensations. She must have in use a thermometer, so that she may know exactly what the temperature is in the nursery and in the outer air. Our feelings are not trustworthy thermometers.

Feeble children, in whom the powers of resistance are small, should be guarded against exposures in damp and chilly weather. Fresh air contributes to the health and comfort of infants, but severe cold is an excess of freshness and may injure on the general principle that moderation benefits and excess harms. A vigorous child, who can easily resist the depressing influences of cold, and who is so warmly clothed that it can retain the animal heat generated by the various functions of his nature, is ordinarily very much benefited by inhaling cool air. It renders him still more robust and hardy. It improves his digestion and his assimilation. It enriches his blood and gives strength and rapid development. The weakly and poorly developed do need great watchfulness from the mother. We repeat, the comfort and health of infants requires discretion in exposing them to unaccustomed degrees of cold.—*Prairie Farmer.*

Poison in Blue Cloth.

EDITORS PRESS:—While the papers are discussing the properties of poisons in different articles of wearing apparel, I wish to give my experience with a very common garment, "blue overall cloth." Twice I had a milking jacket made from the same material, and twice I have suffered and am now suffering from its poisonous condition. The arms appear inflamed, especially at the wrists, where the cloth comes in contact with the skin, and the itching thereby is intolerable. For some days I could not account for the affliction, until I remembered having had the same symptoms when I first put on a former jacket. I immediately sent the blue vestment to the wash-tub, the washer being poisoned in one washing.

As blue color is generally made from green and yellow, it is very probable that "paris green" is used. If so, no wonder it produces the itch. [See note below.—*Eds. Press.*]

The cloth is so universally worn as overalls that much evil may be caused from the effects of the poison without knowing the why or wherefore. Let any person who wishes to test the above facts procure a small strip of the goods and tie it around the wrist, and if inflammation takes place, with a desire to allay the itching, they will find by experience the truth of my statement. **JOHN TAYLOR.**

Mt. Pleasant, Dec. 11th, 1876.

[Our correspondent is doubtless accurate in his experiences, but he is at fault in his surmises. A blue color is not and cannot be produced by a combination of green and yellow. Blue is a primary color and cannot be produced by any mixture whatever. Our correspondent is doubtless misled by the memory that blue and yellow produce green by mixture. There is no "paris green" in any blue dye, and our sufferer cannot attribute his discomfort to this cause. Blue dyes were formerly made almost wholly of "prussian blue" (prussiate of iron), but of late the introduction of aniline colors has been general. We have read of poisoning by aniline dyes, and here may be the trouble. So far as the practical effects of the cloth are made known by our correspondent, his contribution is of general value and should be heeded.—*Eds. Press.*]

AVOID CHILLS.—It is one of the facts best known to science that when a part of the outer surface of the body has been exposed long to cold the greatest risk is run in trying suddenly to re-induce warmth. To become thoroughly chilled and then to pass into a very warm atmosphere, such as is found near a fire, results in a dangerous reaction which, a few hours later, may cause pneumonia, or bronchitis, or both diseases. The capillaries of the lungs become engorged, and the circulation becomes static, so that there must be a reaction of heat inflammation before recovery can occur. Common colds, says a contemporary, are taken in the same way; the exposed mucous surfaces of the nose and throat are subjected to a chill, then they are subjected to heat; then there follows congestion, reaction of heat, pouring out of fluid matter, and the other local phenomena of catarrh.

MINING SCIENTIFIC PRESS

W. B. EWER..... SENIOR EDITOR.

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SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus and terms of subscription.

THE ORIGINAL ARTICLES in this paper are mostly set in solid type, giving in our columns one-third more reading than is contained in ordinary leaded matter.

ADDRESS all letters to the firm, and not to individual members, or others, who may at any time be absent from our office.

Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, January 6, 1876.

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BRUCKNER'S ROASTING FURNACE IMPROVED.—We had the pleasure a few weeks since of meeting Mr. Bruckner on an overland train on his way to Colorado, whither he was going to examine and re-fit quite a number of his furnaces, which have been in operation there for several years. Mr. B. showed us the drawings of several improvements in his furnaces, which he is now introducing wherever new ones are put up. During his ten years' absence in Europe he has introduced a large number of these furnaces into various mines in Germany. He has also invented an improved apparatus for pulverizing quartz, which he assures us has been thoroughly tested at Freiberg and pronounced a success. He claims a large economy in the process of reduction, more efficient pulverization and a great reduction in the cost of the machinery. Mr. Bruckner will soon visit this city to make arrangements for the manufacture here of his improved machinery.

SECRETARY ROBESON has assured the secretary of war that the navy department will cordially co-operate with the war department in the daily simultaneous meteorological observations now being made by many nations around the world.

ABOUT two out of every three passengers on the train which fell through the bridge at Ashblat were killed by the fall, the fire or the cold.

COMMODORE VANDERBILT died in New York on Thursday last. His death has been expected for a long time.

THE telegraph reports that the snow storm of Monday and Tuesday throughout the Eastern States was the heaviest for several years.

THE December progress in the Sutro tunnel was 327 feet.

A New Volume.

With this issue the MINING AND SCIENTIFIC PRESS enters upon its thirty-fourth volume. The paper appears to-day in an entirely new dress of type, which is but an indication of renewed prosperity and a desire to present to our readers a paper worthy in every respect of their patronage and good esteem. The MINING AND SCIENTIFIC PRESS began its existence in May, 1860, and has been published without intermission ever since. It has kept pace with a growing country from year to year, and with its growth improvements have been made from time to time for the benefit of our patrons. It contains now a great deal more reading matter than it did a few years since, as we now use mainly brevier and nonpareil type set solid, where we used to have bourgeois leaded. By this means more space is gained for reading matter, of which we have endeavored to furnish as great a variety as possible.

Situated in the center of the greatest mining field in the world, we have devoted a great share of our space to the mining interests of the country, giving the current news from all localities from week to week. We have paid close attention to all improvements of benefit to the industrial classes, and illustrated such new inventions as appeared to us worthy of special notice.

We consider that during the past year our columns have contained a variety of useful and interesting matter to the mining public, furnished by no other technical journal. Our efforts have naturally been devoted to the development of home industries, but in so doing we have ignored nothing abroad which would be useful at home.

The letters of our traveling correspondents continued through the last volume and to be continued in this, have been of great value. Among the continued articles of interest and value have been those entitled "Facts about Peat," "Quicksilver," "Mechanical Ore Concentration and Separation," "Gems and Precious Stones," "Drainage of the Comstock," etc. The "Comstock Papers" have been interesting as a complete historical record of that great lode. These papers will be continued in this volume. Aside from the continued articles, we have presented the usual variety of reading matter on different topics, and have illustrated such articles as seemed necessary.

We have kept a complete record of Pacific coast inventions, giving weekly—as we shall continue to do—the list of patents issued in Washington, and describing in detail such as are of special interest to Pacific coast readers. In all industrial matters we have endeavored to report progress and give such hints and suggestions as are applicable to the field.

This year we start in with hopes of still further increasing the value of the PRESS. We now have our own press, folding machine, cutter, etc., and send out the paper cut and sewed and ready to be read, without trouble to the reader. We appear to-day in a new dress of type, which, though of course a source of great expense, we feel justified in assuming in order to keep pace with the growing industries which we represent.

We hope during the next few months to be able to present even more original illustrations than heretofore. One of the proprietors of the PRESS is now in the East making arrangements to this end and we hope to introduce the photo-engraving process, which offers better facilities than any we now possess. When these arrangements are made, we shall be able to give more original engravings than we have previously done, and thus still further enhance the usefulness of the paper.

It will be our endeavor in 1877, as before, to continue to improve the PRESS as far as possible and spare no pains or trouble in maintaining its excellence. Our list of subscribers has attained proportions which warrant our making these improvements, and our advertising patronage is of the most respectable character both as to style and amount. Still, it takes a great deal of money to "run" a journal like this, and we naturally desire to increase our list of subscribers. No person interested in mining pursuits can afford to be without the PRESS. It not only gives him the current news, but describes all the new improvements, and gives him the experience of others in the same business. Mechanics also in all parts of the coast should read and foster the journal specially devoted to their interests. We collate from all available sources practical information of value to them, and give them hints worth far more than any subscription price.

The beginning of the new year is a very favorable time to renew subscriptions, or for new subscribers to commence taking the paper. At the end of the volume they have a complete book, closely indexed, appropriately illustrated, and giving facts on a large variety of topics, easily available for reference. The PRESS has now been in existence long enough to prove its worth and to show that it fills its field properly, and we feel justified in assuring any new readers that they will without doubt be satisfied in the investment of subscribing for a year. If our friends will continue to lend their assistance as they have in the past, the paper will continue to improve even more rapidly than heretofore.

Bullion Product of 1876.

John J. Valentine, General Superintendent of Wells, Fargo & Co.'s exchange and banking house, has issued his annual statement of the precious metals produced west of the Missouri river during the year 1876. From his compilation it will be seen that the aggregate yield is the largest of any yet known in a corresponding duration of time, amounting to \$90,875,173—an increase over 1875 of \$9,986,136. This increase has notably taken place in Arizona, Nevada, Colorado and California, while a slight falling off has been apparent in Montana, Mexico, Oregon, Utah, Washington and British Columbia. The largest increase is in Nevada, which produces five-ninths of the entire amount of gold and silver of the United States. From the subjoined statement may be seen the amount of precious metals yielded in the various States and Territories during 1876:

State or Territory	Gold Dust and Bullion	Silver Bullion	Ores & Base	Total
California	\$16,000,569	\$790,308	\$1,711,910	\$18,502,787
Nevada	1,461,071	44,725,802	4,312,074	50,500,947
Oregon	62,372	220,095	1,62,372	1,62,372
Washington	1,413,608	220,095	35,000	1,668,703
Montana	2,162,208	774,284	350,000	3,286,492
Utah	62,574	774,284	4,312,074	5,148,932
Colorado	2,829,877	774,284	1,314,109	4,918,270
New Mexico	1,028,281	774,284	18,621	1,821,186
Mexico	10,288	1,028,281	54,212	1,141,569
British Columbia	1,441,568	1,028,281	54,212	2,524,061
Totals	\$25,080,570	\$51,808,064	\$13,986,543	\$90,875,173

The method and form of the foregoing is exactly similar to that of statements which we have compiled since 1870, wherein no attempt was made to show the amount of gold contained in silver or dore bullion, or the lead and copper in base bullion; but the violent fluctuations in silver as compared to gold during the present year renders an analysis desirable, and no pains have been spared to arrive at a correct conclusion.

In round figures, of \$37,000,000 produced from the Comstock lode this year, \$17,125,000, or quite 46 per cent., was gold; of the whole product of Nevada 35 per cent. was gold, and of the total silver product, so-called, \$18,647,925, or 31 per cent. was gold. The gross yield is constituted as follows: gold, \$44,328,501; silver, \$41,506,672; lead and copper, \$5,040,000. Total, \$90,875,173. It is possible that the falling off in Montana is more apparent than real, as not so much base bullion and ores by \$250,000 is credited as was claimed for it. A large gold yield is often claimed for Arizona and New Mexico; but as \$2,710,000, or an average of less than \$100,000 per year, is the total amount deposited in the United States Mints since 1848 as from those territories combined, such claims cannot well be substantiated.

Various discrepancies have arisen in the estimates of United States officials of the amount of gold and silver produced in the various years. For instance, 1871, which was a more productive year than 1870, is estimated as yielding ten millions of dollars less. From this fact, and various other discrepancies, Mr. Valentine infers that there is universal exaggeration as to the sum total of gold and silver produced throughout the world. In the past year the United States has produced in silver \$41,000,000, in gold about \$45,000,000. Other countries have produced in silver, \$36,000,000, and in gold \$56,000,000. The lowest price paid in London for silver per standard ounce was 46½ pence, the highest 53½ pence. The exports of silver to India and China have been larger this past year than in any previous one since the Sepoy rebellion, and the railroad era in India during 1856-7, when a total of \$145,000,000 was registered. A comparison of years shows that the gold product of the world was a trifle larger than that of the last two years, but smaller than that of any previous year since 1851. The deficit is about equally divided between the gold producing countries. On the contrary, silver has steadily advanced, noticeably in the United States, and records a sum twice the amount of that registered early in the fifties. Since the demonetization of silver in Germany it is estimated that \$40,000,000 have been sold by that government, with \$80,000,000 remaining. In case the legal tender and national bank one-dollar notes should be retired and silver substituted, \$100,000,000 would not be regarded as excessive for the use of the United States. For the great depreciation of silver in the past year there does not appear a very satisfactory explanation when comparing the actual demand with the actual production.

The following is the product for a series of years according to Mr. Valentine's estimate:

Year	Gold, etc.	Silver	Gold
1871	\$2,100,000	\$20,286,000	\$23,386,000
1872	2,250,000	20,527,500	20,459,453
1873	3,450,000	28,352,100	40,456,593
1874	3,800,000	20,498,000	40,103,405
1875	5,100,000	34,043,010	41,745,147
1876	6,040,000	41,606,672	44,328,501

Academy of Sciences.

The annual meeting of this society was held on Tuesday evening last. The business transacted consisted of the reading of reports of officers.

The report of C. G. Yale, Recording Secretary: The academy held 24 meetings during the year, with an aggregate attendance of 623, and average attendance of 26. Fifty-one papers on scientific subjects were read by members of the academy. Two life members were elected, and two died, leaving the present life membership 79. Thirty-seven new resident members were elected, and 44 were dropped from the rolls for non-payment of dues, and 7 resigned, leaving 287 resident members. Aggregate life and resident members, 366.

The report of E. F. Hall, Jr., Treasurer, showed that the society disbursed \$10,283.31 last year, and that the receipts were something less, so that about \$2,000 deficit must be provided for.

Mr. Harford, curator of the museum, read his report, showing the condition of affairs in the different departments, and the progress made by the curators. The expenditures in the museum for the past year were \$1,450.

President Davidson read a very interesting address, reviewing the progress of science on this coast and the field open for it. He took occasion to say that though the Academy was for the first time a borrower, this was no cause of alarm or uneasiness. They had confidence in the strength of their position, and see clear daylight beyond. The collections were made available for study and comparison, and he believed the broad aims and policy of the Academy would be sustained.

The election of officers for the ensuing year, as certified by the Board of Election, was then announced. There had been no opposition ticket, and the old officers were therefore declared unanimously re-elected, as follows:

President, George Davidson; First Vice-President, Henry Edwards; Second Vice-President, Henry C. Hyde; Corresponding Secretary, Dr. A. B. Stout; Recording Secretary, Charles G. Yale; Treasurer, Ed. F. Hall, Jr.; Librarian, Charles Troyer; Director of Museum, W. G. W. Harford; Trustees, D. D. Colton, R. E. C. Stearns, Thos. P. Madden, Wm. Ashburner, George E. Gray, R. C. Harrison, John F. Miller.

The President announced that in accordance with the annual custom and privilege under the by-laws, the Council of the Academy had recommended for life members Dr. A. B. Stout and Henry Edwards, Esq., for valuable services to the Academy. On motion, those gentlemen were elected.

Our New Dress.

The PRESS is rather proud of its new clothes and does not hesitate to ask its friends to contrast the new, bright surfaces with the garments which have been laid aside. The donning of new type is an event in the history of any newspaper. It is an indication of prosperity. It is a plain demonstration that readers of the paper rank it so high that their patronage warrants expenditure for improvements. And when the publishers return to the patrons the benefit of their substantial support, it should be the occasion for all friends of the paper to give it another push forward. We trust that the PRESS will thus be received and promoted by every reader.

We think the reader will find the new type much clearer and more legible than the old. It has an open countenance and a frank expression which we much admire. The impression, too, is sharp and well defined, and thus may be the thoughts which are presented. Although it is with regret that we lay aside the old type, which has gained for us so many times the eyes of our readers and the expressions of their approval, we trust that the new may secure renewed and increased favor. With this expression of our hope and purpose, we present the first issue of Volume XXXIV. to the reader.

THE British fleet has withdrawn from Turkish waters. One correspondent says this has no political significance. Another says it is because the Sultan, in an interview with the Marquis of Salisbury, definitely refused to accept the proposals formulated by the Powers.

THE managers of the trunk lines have decided to advance the rates on grain and fourth-class freight between Chicago and New York five cents, making the rate 35 cents on grain and 40 cents on fourth-class.

IN THE House this week Mr. Bright asked leave to introduce a bill for free coinage of silver dollars containing 412½ grains, and that no charge shall be made for converting standard silver bullion into coin dollars.

THE late heavy gales on the English coast have caused very great damage. A number of marine disasters are reported.

THE San Francisco Mint coined in 1876 the sum of \$42,704,000.

Improved Screw and Bolt Cutting Dies.

The accompanying engraving represents an improvement in screw and bolt cutting dies, patented through the MINING AND SCIENTIFIC PRESS Patent Agency, June 6, 1876, by John A. Campbell, of Astoria, Oregon, and Thomas T. Eyre, of Salem, Oregon. Having experienced much trouble in having threads cut for different purposes, where machine bolts are not used, and in making repairs, re-cutting bolts and closing the nuts, on account of cutting and fitting and sometimes cutting too much or not enough, the inventors perfected this improvement. Any mechanic will see at a glance its advantage over the old screw plate. The improvement can be made to suit any style of plate where two dies are used.

In the engraving, A represents the stock or screw plate. For convenience the inventors have applied their invention to a screw plate in which the handles are formed on diagonal corners of the plate, so as to leave the ends of the plate free for the passage of the screws which operate the dies. The recess, D, or slot in which the dies, B, C, move, is made narrower at one end than at the other, so that the narrower die, C, moves in the narrow portion, while a wider die, B, moves in the wider portion, thus providing a shoulder, E, (its upper edge rounding off sharp to prevent clogging) on each side of the slot or recess, against which the larger die will strike when moved toward the smaller die, C. The sides of the slot or recess are made V-shaped in the usual way, and the edges of the dies are grooved accordingly, so as to guide the dies and hold them in place. A thumb or lever screw, f, passes through the end of the screw plate A, so that its end will press against the narrow die C, while another screw, g, passes through the opposite end of the plate, so that its end presses against the back of the die B.

In using this screw plate, the size of the screw to be made is first obtained. The narrow die C, is then set by means of the thumb-screw f, so that when the wider die B is forced up against the shoulder E of the recess D, the screws formed by the two dies will be of the proper size. The widest die is then moved back, so as to admit the ends of the bolt or screw-rod; and, as the screw is finished, the die B is moved up by means of the screw g, until it strikes the shoulders E, thus finishing the screw. These shoulders, E, serve as a gauge for determining the size of every screw.

When the die C is once set, every screw or thread formed by the dies will be uniform as long as the die B is moved up against the shoulders E in making the threads, and by shifting the position of the die C any desired size of screws can be made, thus providing a very convenient screw plate, by which man or boy can cut as many bolts as they wish without the necessity of cutting and fitting by guess, or cutting too much, as is often done; being a great saving of time. It can be adjusted to any bolt or the point of the tap, and all be finished the same, where more than one is wanted, or one cut to any desired size, when set to the size wanted. For further information apply to J. L. Boone, this office.

A Self-Lighting Lamp Burner.

Who that has lighted his match to find the lamp and then made the struggle to remove the chimney and touch the wick before the fire reaches his thumb, has not wished that lamps would light themselves? We give on this page a little engraving of an attachment which promises to do just that. As may be seen from the drawing, the attachment consists of a tube fitted into the burner, with proper fastenings. The upper part of the tube is divided into two parts, the edges of which are turned inward and provided with teeth similar to a saw. By inserting a common friction match into the tube from the outside of the burner, as the match is forced up toward the wick tube it becomes ignited, and is fired thereby to light the lamp. For convenience at night a match can be partly inserted, so as to be pushed further up and ignited instantly at any time.

Our representative at the East writes us that he has seen this little appliance work to his satisfaction. He informs us, also, that should there be any parties who wish to introduce the sale of it on this coast, they may address the "Manhattan Self-Lighting Lamp Company," No. 62 Fulton street, N. Y. Samples will be sent, post-paid, on receipt of 50 cents in currency or postage stamps.

It is said that Tweed is utterly broken down at last and ready to make any terms to bring his troubles to an end. It may safely be predicted that he will surrender all the property still within his control, and make a clean breast of the whole ring business to some prudent, trustworthy representative of the prosecution.

The managers of the trunk lines have decided to advance the rates on grain and fourth-class freight between Chicago and New York five cents, making the rate 35 cents on grain and 40 cents on fourth class. The rates took effect Wednesday.

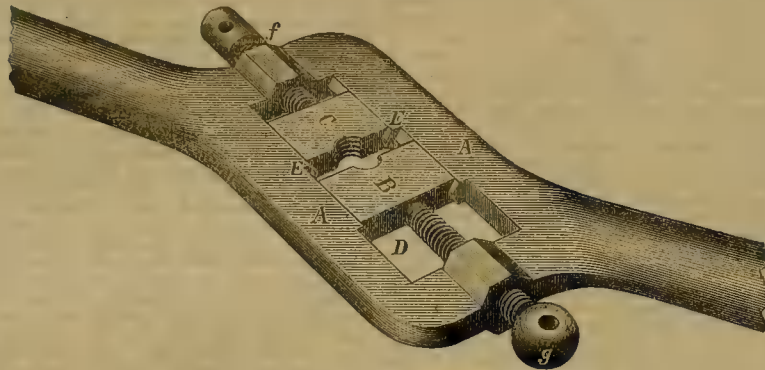
The Two Leading Industries of the State at Variance.

Differences Between the Hydraulic Miners, Ditch Owners and the Farmers—Important Suits Pending—Progress of the Controversy, etc.

For many years past the farmers owning and cultivating the bottom lands along the several rivers and minor streams that traverse or have their sources near the great auriferous gravel deposits in which hydraulic mining is being carried on, have been complaining of the damage done such lands by the detritus carried down these streams and deposited thereon. The rivers along which this injury has been most extensive are the Feather, Bear and the Main Yuba, although some harm has also been done to the lands lying on or adjacent to Dry creek, Butte county, and to those along the American and Cosumnes rivers, with some little caused elsewhere in the counties most exposed to the encroachments of sedimentary matter. During all the earlier history of these mining operations, when the population engaged therein, being much more numerous than now, constituted the best customers of those who cultivated the soil, buying at liberal prices and consuming largely of their products, the farmers raised no objection to the evil they now complain of, nor did they or any one else then question the right of the

the determination of which was by the miners deemed of more importance than the mere matter of damages, which could in no event have been large, the sum claimed by the plaintiff amounting to no more than \$10,000. Among other questions of moment, these special issues involved that of the right of the miners after having discharged these tailings upon their own ground to run or suffer them to flow into the creeks and rivers adjacent, as well, also, as that of their right to augment the volume of water naturally flowing in these streams by conducting water from other sources, and after using to empty it into them, thereby increasing the quantity of sand, gravel and sediment brought down and deposited by them on the lands below.

The defense introduced a large amount of affirmative testimony on these several points, but, as the jury failed to pass upon them, they were left open and unsettled, except in so far as they might be considered inferentially determined by the finding of the jury on the main issue. A certain amount of damage, though not large, was shown to have been sustained by the plaintiff, and upon what hypothesis this verdict was based, save that the defendants had a right to inflict this damage, it is difficult to conceive. However this might have been, the defendants were themselves so little satisfied with the result of the suit, that they resolved to get rid of further annoyance of this sort by buying up all the lands injuriously affected by



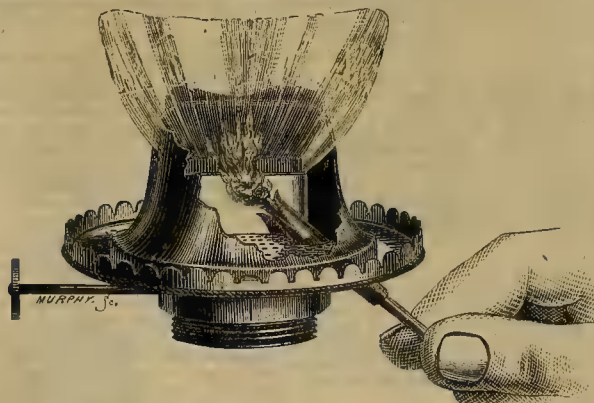
IMPROVED SCREW AND BOLT CUTTING DIE.

miners to run their tailings into the rivers and canyons as they are doing at present. And even for many years after these tailings began to prove troublesome, the farmers did no more than murmur and protest, being deterred from precipitating a legal conflict because of the great expense and the uncertain results that might be expected to attend the same.

Inaugurating Hostilities.

And so matters were suffered to remain until about three years ago, when a farmer named Crumb, owning a small place on Dry creek, Butte county, brought an action against the Spring Valley canal and mining company, to recover damages for injury done his land by the tailings flowing from their mines. This company, washing four or five miles above, con-

ducted operations on a large scale, running a heavy head of water the year round, and, as a consequence, sent down great quantities of these tailings, which were gradually covering up the plaintiff's grounds, a portion of his peach orchard having been destroyed prior to the commencement of this suit. Although Crumb appeared alone as plaintiff in this action, it was understood that he received aid and encouragement from other parties in the neighborhood who had similar grievances to be redressed, it being intended that this should serve as a test case, in which the question of the liability of the miners for injuries of this kind should be judicially determined. This suit was tried at Oroville, before a mixed jury of farmers and miners, and resulted in a verdict for the defendants, the jury deciding that there was no cause of action. While this verdict was, as a matter of course, satisfactory to the defendants on the question of damages, the main issue in the suit, it did not dispose of several



EXCELSIOR SELF-LIGHTING LAMP BURNER.

benefit the same, while for the purpose of reclaiming the tule swamps they will prove of incalculable value.

An Attempt to Procure Seasonable Legislation.

During the last session of the California Legislature, some of the larger and more influential mine owners sought to procure the appointment by that body of a committee to examine and ascertain the amount of damage done and hereafter likely to be done by this mining debris, and suggest what measures, if any, should in their opinion be adopted for averting the same, this committee to report the result of their labors to the Legislature at their next session. This effort, so timely and well worthy of attention, proved, however, of no avail, these legislators either failing to comprehend the urgent and momentous nature of the subject, or being deterred from undertaking a task involving so many new and important questions and beset with such inherent difficulties. Later in the session the Committee on Mines and Mining, to whom this business had been referred, recommended in their report on the subject, that

Special Issues

That had been raised in the course of the trial,

Congress be memorialized for the appointment of a commission of engineers to investigate the matter with a view to having the National Legislature provide some general plan for disposing of these tailings without prejudice to the interests of either the farmers or the miners; and in this shape the matter stands at present, so far as Congress and the State Legislature are concerned.

The Farmers Meet and Deliberate.

Early in the month of January last, the farmers of Sutter and Yuba counties, including some other classes of business men, began holding meetings in Marysville to consider this question and devise some feasible plan looking to its final adjustment. At these meetings a wide diversity of opinion prevailed as to the proper means to be pursued for gaining the end proposed, those present thereat not being agreed in regard to the rights and liabilities of the miners in the premises. These deliberations, however, finally culminated in the appointment of a committee, charged with the duty of preparing a bill to be submitted to the State Legislature then in session, by the provisions of which all hydraulic miners are to be made responsible for injuries of this kind in amounts proportioned to the quantity of tailings they run off, it having been further determined to petition that body for the enactment of a law whereby the damage arising from hydraulic washings may be, if possible, prevented.

They Finally Combine for Aggressive Purposes—The Legal Contest Renewed.

Along in the early part of the summer the land owners, after much conference, began forming associations in the several townships most affected by the accumulation of this hydraulic debris. Towards the latter part of July, James H. Keyes, a farmer residing on Lower Bear river, where he owned and cultivated about 1,000 acres of bottom land, commenced a suit in the Fourth Judicial District against the principal hydraulic miners tailing into Bear river and its tributaries, it being understood that Keyes, in this action, represented the Farmers' Association of Wheatland township, Sutter county. The defendants to this suit consist of 22 different parties, some of them incorporated companies and others individual or partnership concerns; there being included in the number several properties of considerable value, and which are being operated on a moderately large scale, but none that rank among the first class in the State. This suit is brought in equity for the reason, as the plaintiff alleges, that he would, in a court of law, be without remedy. Having set forth his cause of grievance, the complainant prays that by a decree of the Court the defendants be perpetually enjoined and restrained from depositing the tailings and debris of their several mining claims in the channel of Bear river or any of its tributaries, or suffering them to flow therein, as well also as from fouling or polluting the water of those streams, thereby rendering it unfit for domestic use or the purpose of irrigation; and, further, that the defendants be by order of the Court restrained from committing any of said acts during the pendency of this suit, and that the plaintiff have judgment for costs incurred in prosecuting the same. That he has proceeded to seek relief in equity instead of instituting an action for damages in law against each of these defendants is, as the plaintiff avers, because this latter course would necessitate the commencement by him of at least 50 different actions, to say nothing of others afterwards required to prevent a repetition of these wrongful doings, the costs of which would greatly exceed any amount of damages he might hope to recover, even if a judgment obtained against these parties could be collected, which, owing to their being transient and irresponsible persons, it could not.

Damage—Past and Prospective.

In this complaint it is affirmed that the defendants are running these tailings into the streams mentioned at the rate of 8,000,000 cubic yards per annum, they having within the past three years deposited over 20,000,000 cubic yards therein; that the bodies of gravel upon which they are operating are of such magnitude that they cannot be run off in the course of 20 years, during which time, if the sending down of these tailings is suffered to go on without effectual measures being taken to prevent their lodgment upon the bottom lands along Bear river, amounting to some 40,000 acres, these lands will be so covered up as to render them unfit for cultivation, 10,000 acres thereof having already been covered by a stratum of this material to a depth of three feet or more; and, finally, that a part of the complainant's land, of which he has over a thousand acres, has already in this manner been inundated to a depth varying from three inches to three feet, and that more of it would have been so overflowed had he not, at an expense of several thousand dollars, constructed levees for its protection.

The Miners also League Together for Mutual Protection.

Foreseeing in this movement a threatened danger to this entire branch of business, the large hydraulic operators and ditch owners throughout the more central mining counties, resolved, after the example set them by the farmers, to adopt a plan of co-operation for their mutual aid and security, to which end an alliance, styled the Hydraulic Miners' Association, was, in September last, formed in this city, the preliminary steps looking to such an organization having been taken some time

Continued on page 12.

The Barometer as an Indicator of Gas in Collieries.

That the barometer is not so valuable an instrument for indicating the presence of gas in collieries as many people believe is the opinion of many of our ablest mining engineers, although the last mines regulation act requires that after dangerous gas has been found a barometer and thermometer shall be placed above ground in a conspicuous position. At a recent meeting of the Midland Institute of Mining Engineers the value of the barometer was noticed by several of the speakers when discussing a valuable paper on the causes of colliery explosions, read by the President. In it he stated that they must look to some additional indicator as to the presence and giving out of gas in mines than the barometer. During a very low depression of the barometer a short time since, so far as his experience went, no more gas had been reported during that low state of the barometer than there was when it was very high. He had made inquiries about it, and Mr. Daglish, the manager of some pits in Yorkshire, told him the same thing, and he had been very particular in making inquiries concerning it. Mr. Wilson (The Oaks) gave it as his opinion that the barometer was an instrument which, so far as mines were concerned, could be dispensed with, although by act of parliament they were bound to have it. In all cases where he had had the management of collieries he had noticed that if there was a large quantity of gas previous to the barometer falling they had it also previous to its rising. It was the same when The Oaks was closed, and he believed that had the direction of the wind been taken at the time and the temperature of the air, that it would have been found that it was the temperature more than the barometer that had affected the pressure of the gas. As to the variations of that pressure, it had been his practical experience for many years that wherever they had a hot pit and the thermometer had been high they had less gas, and immediately after increasing the current of air, and thus reducing the temperature, they had more gas. The chairman said that many years ago Mr. Taylor read a most interesting paper before the members of the Northern Institute with respect to explosions in collieries, and gave a table showing that most of the large explosions had taken place when the barometer was high, and not low.

Mr. Robinson had known the barometer and the thermometer stationary for 24 hours, except that the thermometer fell a little at night. He had seen the gas come out to such an extent that whilst he could have gone to the pit with a naked light at one time, 20 minutes afterwards he could not have gone 300 yards. That was owing to the wind changing, the barometer having nothing to do with it. When they were troubled with carbonic acid gas, and the wind got to the southwest, all scientific knowledge was of no use. Mr. Maddison said that he had traversed 27½ miles before ever the barometer began to fall, and he had heard the wind whistle by into cracks, which proved that the mercury was too slow for the action of the gas. Mr. Barker, in agreeing with Mr. Maddison, said that he had known in the Oaks pit five hours previously that a change was taking place in the atmospheric pressure before the barometer indicated that such was the case, and, therefore, he agreed with the remark that the mercurial column moved slowly. Engineers who are in favor of the barometer, or otherwise, we have no doubt will agree that the ventilation of a colliery should be of such a character as not to be dangerously affected by any fluctuations of the barometer. We all know that miners depend a great deal too much on the safety-lamp, which they too often think is a shield against danger from any quarter and cause, and it may be that some deputies, and even underwriters, look more to the barometer than they ought to do, instead of seeing that the ventilation at all times was as good as it possibly could be. Had that been done it is probable we should have had less accidents from explosions of gas to record than we have had to do.—*London Mining Journal.*

Tea-Preparing Machine.

We have recently had the advantage of seeing the plan and specification of a tea-drying apparatus patented by Mr. Ansell, of the Dooteriah estate. If this machine does in practice what its inventor claims for it on theoretical grounds, it certainly will be an inestimable boon to planters, and we hope a source of considerable profit to its inventor. Until one of these machines has been actually set up and has stood the test of at least one season's practical trial, it would of course be rash in the extreme to hazard even an opinion as to its merits or defects—so many inventions are simply perfection on paper, and yet, somehow, do not answer in practice. Apparently the main novelty in Mr. Ansell's machine is that he proposes to use steam for drying the tea, and that the apparatus is self-acting. In other words, the steam not required for rolling the leaf by machinery is available for drying it, and the leaf goes in at the top of the machine and comes out at the bottom manufactured tea. Mr. Ansell claims for his machine that it will turn out 150 lbs. of dry tea per hour, or in the working day of 10 hours, 18 m. 60 lbs., with an expenditure of 112 lbs. of wood per hour, or 14 maunds per day; being at the rate of about three-quarters of a maund per maund of tea. According to Mr. An-

sell's plan, too, the heat to which the leaf is subjected can be regulated to a nicety according to the wish of the manufacturer, and the possibility of burning is altogether obviated. In addition to the saving of fuel, it also would appear that Mr. Ansell's machine will economize labor very considerably. On the whole, we must say we are pleased with Mr. Ansell's invention, and if he can do in practice what he claims to be able to achieve on paper—dry a maund of tea with three-quarters of a maund of wood—he has solved one of the problems which all planters have so long been desirous to achieve—economy of fuel in the manufacture of tea.—*Darjeeling News.*

Measurements of Angles by Bees.

The editor of the "Scientific Record" in the *Phrenological Journal* makes some observations as to the structure of the compound eyes of the higher insects, that may possibly furnish a basis for the scientific explanation of the accuracy with which bees measure angles. As most readers are aware, the cornea of the insect eye consists of a single membranous layer of transparent lenses or cells, sometimes hexagonal, as represented in standard works, but almost as frequently round or square, depending on their situation. These cells, or double convex lenses, are about one-third-thousandth of an inch in diameter, and, by a method of experiment calculated to ascertain their thickness, I find it to be in bees about one-fifteen-thousandth of an inch. The cornea is not movable as respects its position, but, by means of a circular muscular band, it can, as a whole, be rendered more or less convex, according to circumstances of vision. If a calculation be entered into, as concerns the accuracy of direction of which convex lenses so minute are susceptible, compared with the lenses of the human eye, it will appear that, whereas the average deficiency as respects the estimation of angles in a trained geometer, is about one degree in ninety, the deficiency as concerns the eye of a bee cannot exceed three-one-millionths of that amount—that is to say, if a human eye may be stated as able to distinguish dimly between an angle of 89 degrees and one of 90, the eye of an insect is, by calculation, capable of distinguishing between an angle of 89 999997-1000000 and an angle of 90. The extraordinary nicety with which building insects construct their works is thus readily accounted for by the extraordinary nicety of perception consequent upon such congeries of lenses, and by the immovability of the eye as concerns its position in the head, without the necessity of calling in a special instinct. The lobster, the eye of which terminates a bulb styled the eyestalk, and has a cornea consisting of square lenses, shows, under extraordinary circumstances, a nicety of perception as concerns direction which approximates to that of insects.

FATAL RESULT OF TOO MUCH CURIOSITY.—The Virginia City (Nev.) papers relate the finding of the dead body of a man employed in the Gould & Curry mine, on the 1700-foot level, on Christmas day. The circumstances attending this mysterious death, so far as they ever can become known in this world, are fully detailed in the evidence. The deceased descended to his station for the last time about 5 o'clock p. m. on Christmas day. He notified the engineer that he would not ring the bell on him for half an hour or more. On reaching the 1500-foot level he rings the cage up out of sight of the station, and that is the last known of him until about 11 o'clock at night, when he is found dead in the north drift from the 1700-foot station of the mine. Instead of using the giraffe and being lowered by the engine to that level, he goes on foot down the incline. This of itself is a difficult task, as much of the way there are obstructions in the latter compartment. All these things go to show that the man was endeavoring to make a visit to the lower levels unknown to any one. Had he used the giraffe, he being alone in the mine, it would have been known that he was in that place contrary to instructions, as will appear from the evidence. The cause of his death was doubtless suffocation, caused by the warm and bad air which was in the drift. The blowers had been stopped and there was no compressed air on the level that day. The thermometer was about 115 and a candle would not burn in the face of the drift. This tells the whole story.

THE INDIAN CYCLONE.—Indian correspondents are forming theories concerning the late cyclone in East India, by which 215,000 lives were lost. *Nature* says: The storm wave swept over the islands to a depth in places of 20 feet, surprising the people in their beds. The country is perfectly flat, and therefore trees were the only secure range. Almost every one perished who failed in reaching trees. A strange fact about the disaster is that in Dakhin Shahabazpore and Hattiah most of the damage was done by the storm wave from the north sweeping down to Meghna. Several theories, the *Times* Calcutta correspondent states, have been started to account for this. One is that the cyclone, forming in the bay, struck the shore first near Chittagong, and went north for some distance, and then turned southward again. Another is that the wind blew back the waters of the Meghna, which rebounded with terrific force when the pressure relaxed. A third supposition is that there were two parallel storms with a center of calm between them. The first or third theory seems most probable, as in Sundep and Chittagong the destruction came from the south.

Bleaching Cotton.

Some of our readers may find it a great convenience to be able to bleach a few hanks, or short pattern warps, in order to get samples round quickly; therefore we give the following safe method, from the *Textile Manufacturer*:

Boil well your twist, having first put in the water two ounces of soda ash to the gallon of water; wash off in cold water. Mix one pound of fresh chloride of lime in two pints of water, crushing all the lumps, and then add 43 pints more water. After allowing time for the lime to settle, pour off the clear chloride liquor, and immerse the yarn for about seven hours, in a cool place. Care must be taken to keep the chloride solution and the yarn from contact with iron. Wring out and wash in cold water, and do not allow the yarn to remain in the air very long. Then immerse in a well mixed solution composed of 26 drachms of double oil of vitriol to 45 pints of water. Allow the yarn to remain in this acid solution 10 hours, then wring out and wash off in cold water. In order to thoroughly remove the acid, work it well through a good white soap bath, and to this add a little marine blue to give the yarn any desired tint. Finally wash through warm water to clear away the soap. These proportions will do the least possible injury to the strength of the yarn. The solutions may be used stronger if it is desired to shorten the length of time of the processes. If soft mule yarn has to be bleached, the solutions may be used about one-third weaker; but if doubled yarn, the strength of the solutions must be increased according to the perfection desired in bleaching.

A NATURAL CURIOSITY.—The *American Manufacturer* says: In the great valley between the North and South mountains, in Pennsylvania, commonly called the Eastern ridges, a well was dug some years since in Franklin, and another in Cumberland county, 30 or 40 miles from the former, which led to a discovery affording a subject for interesting speculation. After proceeding in each instance to the depth of about thirty-six feet, the bottom of these wells gave way (but fortunately when the workmen had retired) and a torrent of water rushed up. A lead was sunk with fifty fathoms of line without finding the least obstruction. They remain at this time untouched and of unknown depth. The presumption is, that there is a subterranean lake in that quarter, and how far it extends under the base of the vast primitive mountains situated between the Susquehanna and Pittsburgh, will never be ascertained, unless by some terrible convulsion of nature they should be precipitated in the tremendous abyss.

FINE CUTLERY.—We read in an exchange that a silversmith and electro-plater, of Sheffield, England, has been favored with an order for the manufacture of 20 swords and scabbards, intended for presentation to an Indian princess. At the commencement of this year a durbar will be held at Delhi for the purpose of proclaiming Her Majesty, the Queen, "Empress of India." On that occasion the weapons referred to will be presented to the princess, as well as a number more which are being manufactured in the country. The sword blades are made of the finest Damascus steel, treble tried, and they are mounted on hilts of solid silver, with handles of carved ivory. Each blade is beautifully etched, and upon the hilts are embossed the national emblems. On each of the scabbards is the locket of Lord Lytton, and on each of the hilts is emblazoned his lordship's coat of arms in enamels. The straps, tassel, etc., are enriched with bullion mountings, and the whole work is such as reflects great credit on the manufacturer.

AN IRON TORCH.—The *Iron Age* says: "The combustion of iron in air is a chemical phenomenon now made comparatively easy to the experimenter. The most practicable method is to take a straight bar magnet of some power, and sprinkle iron filings on one of its poles. These filings arrange themselves in accordance with the lines of magnetic force, and, however closely they may appear to be placed, of course no two of the metallic filaments are parallel, and consequently a certain portion of air is enclosed as in a metallic sponge. The flame of any ordinary spirit lamp or gas burner readily ignites the finely divided iron, and continues to burn most brilliantly for a considerable length of time, the combustion being apparently as natural and easy as that of any ordinary substance, and the light normal, though vivid."

CAR WHEELS.—The *Railroad Gazette* says: Forty-two inch cast iron car wheels, we learn, are now being tested by several railroad companies. The Atchison, Topeka & Santa Fe, the Flint & Pere Marquette, the Grand Trunk roads are running a few sets each, and the Lake Shore & Michigan Southern have recently ordered several sets to test. The Pullman Company has for some time been running wheels of this size, some made of cast iron and some "paper" wheels with steel tires.

TO MAKE LEECHES BITE.—*Le Progres Medical* advises, in order to make a leech bite readily, to place it in a glass containing cold water, to wash the skin of the patient with warm water, and apply the glass containing the leech at once.

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In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc.

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Continued from page 9.

before. The first and most efficient parties in bringing about this union of forces were the large companies, who, though not yet sued and abundantly able to take care of themselves should they be assailed, generously undertook the defense of their weaker brethren who had already been attacked, and who, with their limited means, might not have been able to cope successfully with the powerful combination arrayed against them.

This association is composed wholly of companies and persons owning or interested in the various branches of gold mining in California, or in water-ditches, tail-slucies and other properties auxiliary or appurtenant to some department of this business. Already its memberships comprise all the more important companies in the State, the actual value of the property represented thereby amounting, at a fair estimate, to not less than twenty-five or thirty millions of dollars, which sum, it is highly probable, will in the end be increased to the extent of ten or fifteen millions more. The main purpose of this association will be to defend all suits brought against any of its members wherein any question of general interest or principle of common application is involved, they employing counsel and defraying all the costs attending such litigation to its issue in the tribunals of final resort, should not a satisfactory result be sooner reached. Among secondary objects will be the cultivation of friendly relations between the members, and the general advancement of this branch of mining; to which end a commodious office to serve for the transaction of business and as a place of common resort, will be maintained at a convenient locality in the city of San Francisco, it being the intention of the founders to make this a permanent and actively useful institution.

The Legal Questions and Equities of The Case.

As regards the merits as well as the questions of law involved, there is, of course, something to be said on both sides of this controversy. It certainly seems a great hardship that so much of these lands, which the present owners have bought from the Government and afterwards improved, should be rendered worthless or even have their value temporarily impaired, through the causes complained of. The injury already done is considerable, and if the flow of these tailings is suffered to go on without diversion or abatement, large additional portions of these valuable bottoms must hereafter be invaded and, for a time at least, be rendered unfit for cultivation; and the fact that this destructive process is liable to be at any time greatly accelerated by one of those winter floods that periodically occur in these mountain creeks and rivers, is one that should not be lost sight of. It is a fundamental principle of law, say these farmers, that every man shall be required to so use his property as not to cause injury or annoyance to his neighbor, and that for every intentional injury done the law provides a remedy. The injury in this instance being palpable and unquestioned, these good people are now anxious to see the remedial clause of this legal maxim practically tested. To this sort of argument

The Miners Reply:

We too have bought our lands from the General Government, paying double prices therefor under the implied assurance that we should be permitted to go on and utilize them in the manner we had been accustomed to do; our occupation and subsequent purchase thereof having long ante-dated that of the farmers, while our improvements have cost a hundredfold more than theirs. We entered upon these lands with the consent and approval of the Government nearly thirty years ago, and then and there commenced this business of gold mining, building it up and establishing it by such rules and regulations as our hard necessities suggested and our protection required; which local rules, through general adoption and long use, came at last to be recognized everywhere as law, the courts being governed by them, while Congress and the State Legislature declared that they should have the full force and authority of statutory enactments. Among these local rules, so received and engrafted upon our general code of laws, was one providing that the hydraulic miners might introduce foreign water upon their claims for the purpose of washing, and there discharge the same, allowing it to flow thence into the adjacent rivers and canyons, regardless as to what might become of it afterward. Many years after these local regulations had, through prescription, so gained universal recognition and the force of law, and in some instances even after they had received the sanction of the highest authorities, legislative and judicial, these farmers, although there was then still plenty of public land elsewhere upon which to settle, came and planted themselves right in the path of this outflowing sediment, being at the time well advised as to the existence of these usages, and the danger to which they were thus exposing themselves. They acted with their eyes open; acted with a full knowledge of the rights of the miners, the decisions of the courts, and the declarations of the Government, as well as of the manner in which this sand, gravel and sediment had already begun to lodge along these several outlets, and was likely thereafter to accumulate to a damaging extent, and that having so acted, with a knowledge of all these facts, they should not now complain, much less appeal to the tribunals of the country for relief against a trouble that they heedlessly brought upon themselves. Moreover, it is contended by the miners that this vexatious and hurtful material might easily have been converted from an agent of annoyance

and harm into one of fertility and wealth, had these thriftless husbandmen adopted timely means for distributing it over their lands, instead of suffering it to accumulate in undue quantities along the margins of the streams. These tailings, by the time they have reached the lower valleys, where the most of these alluvial lands are situated, consist of a mere silt, or at most a finely comminuted sand, all the large stones, gravel and coarser sand being left behind the boulders in the mining pits, and the balance of this stuff in the beds and along the banks of the canyons and streams above. The water, when it arrives in the vicinity of these bottom lands, being charged with this fine sediment and warmed by the sun, is in a condition highly favorable for use both as an irrigator and fertilizer of the soil, to which purposes it might in all cases be applied with great advantage.

Disastrous Effects of Closing the Mines.

The foregoing, while they cover the leading points, do not by any means embrace all the arguments employed by the miners in defense of their cause. It is urged, for example, that to stop this branch of gold mining, which is now turning out some twelve to fifteen million dollars per year, would, at this juncture, be likely to greatly embarrass the General Government, and possibly inflict serious injury upon our credit abroad; the great want of the Federal Treasury, and, indeed, of the entire financial world, being just now a fuller supply of this class of the precious metals; again, the destruction of this business would fall with crushing effect upon many other industries and callings in the State, to say nothing of the ruin that must thereby be entailed upon that large and enterprising class of citizens who, relying upon the rulings of the courts and the pledged faith of the nation, have invested so many millions in these hydraulic mines, ditches, reservoirs and other works subsidiary thereto. In this entire class of improvements there have been expended, first and last, not less than fifty millions of dollars in this State, and this not including expenditures made on account of enterprises carried out and ended, or those dead and profitless works, of which we have had so many in our day. Upon what is known as the San Juan divide, being the high ridge lying between the South and the Middle forks of the Yuba, there has been expended on and about what may be considered live enterprises, purchases and improvements all included, fully twenty million dollars, all of which with the stoppage of hydraulic washing would be extinguished at a blow. To arrest this industry, even in that one locality, would be to throw thousands of well-paid laborers out of employment, dry up vast and costly ditches and reservoirs, blot out of existence populous and thrifty towns, as if swept by fire, and in short, restore this entire district to its original solitude and desolation, no other style of mining being here largely prosecuted, and the other natural resources of the country being of limited extent.

This divide has been estimated by the U. S. Commissioner of Statistics to contain 1,820,000 cubic yards of auriferous gravel, which, at the lowest calculation, will yield, under hydraulic treatment, 30 cents per cubic yard, making the value of the gold here contained \$546,000,000—a sum which can only be extracted by the hydraulic method of washing, and which it is not to be supposed either our Government or our people will consent shall be lost to commerce and the world because of the comparatively trifling damage that would, by the process of its extraction, be inflicted upon the farming lands below. And this is but one of the many localities, almost equally important, that might be instanced in California. Such, then, are some of the arguments upon which the hydraulic miners will rely to defeat the suits instituted against them, and to justify themselves in continuing and extending still further this class of operations.

Legal Foes but Personal Friends.

It is proper to observe that notwithstanding their clashing views and interests, very little ill feeling has been manifested by the parties to this contest, which has thus far been carried on in a conciliatory, and we might almost say, friendly spirit. Each is aware that the other possesses rights in the premises that are entitled to consideration and respect, both being alike anxious for an early adjustment of their difficulties through legislative or other peaceful instrumentalities if possible and through the intervention of the courts if necessary. No intemperate charges have been made nor acrimonious spirit indulged in, nor can it be said that either party has, during the progress of this contest, shown a disposition to prejudice the claims or otherwise secure any undue advantage over its rival. So good an understanding has indeed been maintained between these two classes, that several of the larger mine owners are even now assisting the farmers of Linda township, Yuba county, in the construction of an extensive and costly levee, whereby many thousand acres of bottom land along the lower Yuba will be protected from threatened overflow, the voluntary contributions of these considerate and large hearted men in aid of this work amounting to some fifteen or twenty thousand dollars. Outside this legal fight friendly relations and the most cordial good will are, and no doubt will continue to be, cherished between the contestants, who, it is to be hoped, will yet be able to meet upon some common ground and through their joint influence and efforts procure such legislation as will admit of their differences being settled and disposed of without the intervention of the courts.

To put an entire stop to this branch of min-

ing is out of the question. In the discussion of this matter, that much may safely be assumed. To hold the hydraulic miners answerable to the extent that each contributes towards the damage done, even if just, would hardly be practicable. If attempted, this plan would lead to such an amount of litigation and strife as would necessitate its early abandonment. This question must be settled, not by recourse to temporary shifts and expedients, but upon a broad and permanent basis, and in a manner that will take it out of the province of endless and costly contention, the welfare of the Government and the community at large being consulted as well as that of the parties more immediately interested.

A Feasible Way Out of these Difficulties.

Now, fortunately, a solution of this problem, in accordance with the views above expressed, is by the best authorities deemed altogether feasible. Situate along the main arteries of our river system are vast tracts of tule swamps, upon which this debris from the hydraulic mines can readily be conducted, and in the reclamation and improvement of which it would be of inestimable value. Large portions of these marshes, even at low tide, are covered with water, and cannot therefore be drained by means of ditching, nor can the water be wholly excluded from them by levees, owing to the loose and porous nature of the soil. To effectually protect them from overflow and seepage they will have to be so filled in as to raise the entire surface above high tide level. The mass of this soil being made up of tule roots, covered with a layer of decomposed vegetable matter there will have to be added to it some material suited to give it body and substance before it can be successfully cultivated. The only means by which these several ends can be accomplished will be by running upon these swamps this muddy water from the mines, and there retaining it until it has deposited the bulk of its impacting and fertilizing freight. When recovered in this manner these will be much the most valuable lands in the State, selling for prices that would greatly exceed the cost of their reclamation. At the present time, when we are threatened with one of those disastrous drouths which at irregular intervals may be expected to occur in California, cutting short the cereal crops, drying up the grass and decimating our flocks and herds, the great value of these tule lands becomes strikingly apparent. Improved in the manner indicated, these now worthless swamps would afford millions of acres of luxuriant, self-renewing pasture, through the aid of which this immense destruction of property in seasons of drouth might be almost wholly averted. While so much would in this manner be saved, two of our most important and perplexing industrial problems would, through the adoption of the policy here recommended, find a satisfactory solution: a receptacle being provided for the hydraulic sediment, and the vast expanse of tule swamps, now the breeders of mosquitoes and malaria, would be converted into the garden lands of the world. Let, then, the farmers and the miners, instead of wasting their time and money in a strife that can in no event be determined for years, unite their strength and procure such legislation to be taken as will inaugurate this reclamationary work with the least possible delay. If the State Legislature is not competent to deal with the subject in all its aspects, then let their action be supplemented by such congressional or departmental measures as its effectual treatment may call for.

The Ashtabula Disaster.

Details of a terrible railroad accident which occurred this week at Ashtabula, on the Lake Shore railroad, have been received by telegraph. It is now known that about two out of every three passengers were killed.

The disaster occurred shortly before eight o'clock. It was the wildest winter night of the year. The train was moving at a speed of less than ten miles an hour. The head-lamp threw but a short, dim flash of light in front, so thick was the air with the driving snow. The train crept across the bridge. The leading engine had reached the solid ground beyond, and its driver had just given it steam, when something in the under-gearing of the bridge snapped. For an instant there was a confused cracking of beams and girders, ending with a tremendous crash as the whole train, all but the leading engine, broke through the frame-work and fell in a heap of crushed and splintered ruins at the bottom. Notwithstanding the wind and storm, the crash was heard by people half a mile away. For a moment there was silence; then arose the cries of the maimed and suffering.

Those who were unhurt hastened to escape from the shattered cars. They crawled out of the windows into the freezing water, waist deep. Men, women and children, with limbs broken, bruised and pinched between timbers, and transfixed by jagged splinters, begged with their last breath for aid that no human power could give. Five minutes after the train fell a fire broke out in the cars piled against the abutments at the other end. A moment later the flames broke from the smoking car, and the first coach piled across the other, near the middle of the stream, less than 10 minutes after the catastrophe. Every car in the wreck was on fire, and the flames, fed by the dry varnished work, licked up the ruins as though they had been tinder. Men, who in the bewilderment of the

shock sprang out and reached the solid ice, went back after the wives and children and found them suffocating and roasting in the flames. People living in the neighborhood were startled by the crash, and lighted to the scene by the conflagration, which made even their prompt assistance too late. By midnight the cremation was completed. The storm had subsided, but the wind blew fiercely, and the cold was even more intense.

The iron bridge structure was a single span of 159 feet, crossed by a double track, and was 70 feet above the water. The descent into the valley on either side is precipitous, and as the hill slopes are piled with heavy drifts of snow there was no little difficulty in reaching the wreck after the disaster became known. The bridge has been regarded as one of the very best of the kind in the country. It has been tried with six locomotives, and trains frequently crossed on both tracks simultaneously without causing more than a slight deflection of the structure. It is conceded, however, that the continued impact of heavy trains crossing these iron structures destroys in a measure the integrity of the iron or crystallizes it in such a manner as to weaken it; and in this case the extreme cold probably had a serious effect. The accident is one of the worst which ever occurred in the United States, but will have the effect no doubt of causing a minute and scientific examination of the railroad bridges all over the country, as the Brooklyn disaster called the attention of the police to the condition of theaters.

Too much care cannot be taken or too much caution exercised in building and keeping in repair structures on the strength of which so many lives depend, and a careful examination of the causes of this disaster may develop facts which will be of a protective nature to the traveling public. As the bridge fell the driver of the locomotive in front gave it a quick head of steam, which tore the draw-head from its tender, and the liberated engine shot forward and buried itself in the snow. The other locomotive, drawn backward by the falling train, tumbled over the pier and fell bottom upward on the express car next behind.

General News Items.

The Grand Duke Nicholas is convalescent.

The Lykens Valley colliery, near Pottsville, Pa., is on fire.

The railway operators' strike in Canada still continues.

GENERAL CROOK's campaign against the Indians has closed.

EPH. HORN, the celebrated minstrel, died in New York on Wednesday.

SILVER bullion was quotable in the London market on Tuesday at 57d per ounce.

The strike of the locomotive engineers on the Grand Trunk railway has ended.

The Sierras have never been so bare of snow, in the beginning of January, since 1849.

A TERRIFIC gale has occurred on the English and French coasts, causing great damage.

QUEEN VICTORIA was on New Year's day proclaimed Empress throughout India with great ceremony.

OVER 2,000 couples were married in this city last year, and as an offset 253 divorces were granted.

A BILL, to be soon introduced into the House, provides substantially for a national registry law.

EIGHTY THREE AND THREE-TENTHS of the predictions of the Signal Service Bureau have been verified this year.

The debt statement shows an increase during December of \$358,142; coin balance, \$95,517,418; currency, \$9,483,860.

The Government subsidy of the Pacific Mail Steamship Company for carrying the mails to China and Japan expired with the year.

The German government has ordered the Imperial bank of Germany to resume the sale of silver for account of the German treasury.

The Sutter Street wire-rope railroad commenced running on Monday, to comply with the law, and the trial was found to be satisfactory. The road will be in operation for the transportation of passengers in about two weeks.

PROMPT PAYMENT OF LOSSES.—The prompt payment of losses by insurance companies is ever considered, by insurers, a most encouraging feature in their management. In this respect we believe the Farmers' Mutual Fire Insurance Association of this city is particularly noted thus far in its history. Our attention has just been called to another instance of promptness in that company, wherein, as we learn from a "card," published by G. W. Hoag, of Jacinto, that within five days of the date on which his dwelling was destroyed by fire, Mr. J. D. Blanchard, president of the company, visited the premises, adjusted the claims, and paid \$5,000, the amount of the policy. Such instances of unusual promptness are well worthy of notice, especially when so many in all branches of business are taking advantage of every possible technicality to avoid payment of really honest dues.

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Wherever introduced, because it can be run with less power, labor and repairs, and do more work than any other Drill in the market. It has but few parts, is easily handled, being light, and has AUTOMATIC FEED, which saves labor. WE ASK FOR TRIAL AGAINST ANY COMPETITOR. For particular information regarding Drills or Air Compressors, send for circular to

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Vallejo Foundry, October 17th, 1876.
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Gents:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this year for my patent Straw Burning Threshing Engines give splendid satisfaction. They far surpass for regularity of speed any Governor that I have ever seen, and I have seen all the best kinds; I have seen the main belt fly off the pulley several times this season while threshing, and the engineer did not discover it, so perfectly was the speed maintained, until he was told of it; this I consider something wonderful; I consider the Governor absolutely perfect, so far as speed is concerned. I bought and put on to one of my engines a Shive Governor, to see which was the best, and after one season's trial I have no hesitation in saying they are far superior to the Shive or any other Governor that I have seen or used, as the Shive Governor is to the old Butterfly Valve Governor. I wish you would send me the lowest price that you can furnish 25 Governors for next season's engines.

Yours respectfully,
I. L. HEALD.

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Cost of Roasting and Chloridizing by this Process:

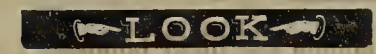
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Cost for 15 tons.....	\$44.00
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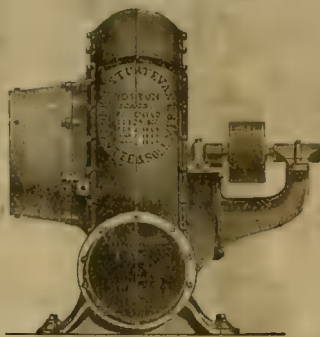
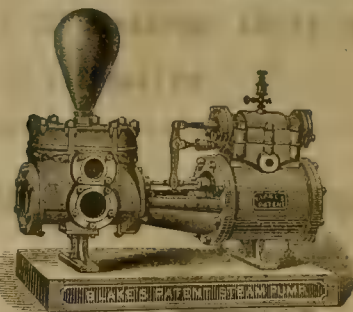
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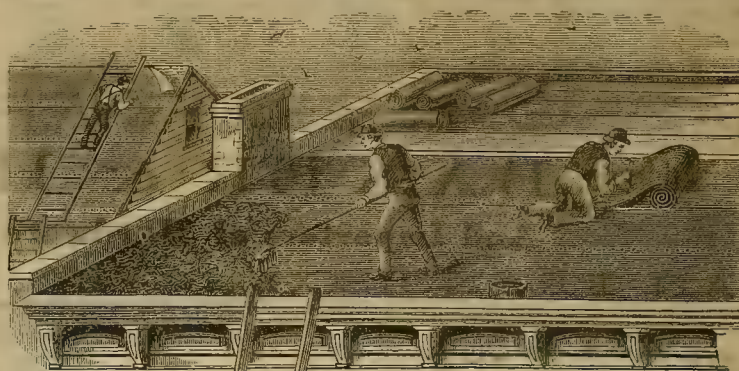
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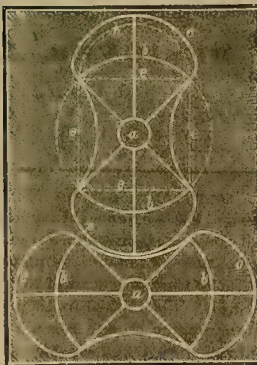
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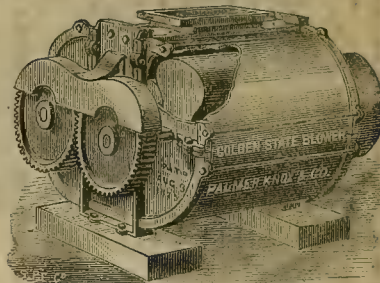
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Two (2)...	3x4 in.	9x4 in.	18x3½ in.	300	2½ feet.	5½ feet.	1280 pounds.	\$ 400
Four (4)...	4x4½	12x5	22x4	266	3 "	6½ "	2170 "	600
Six (6)...	5x5	14x6	24x5	240	3½ "	7½ "	3100 "	800
Eight (8)...	6x6	16x7	28x6	200	4 "	8½ "	3780 "	1000
Ten (10)...	7x7	20x8½	30x6½	190	4½ "	9 "	4850 "	1200
—ALSO—								
Ten Horse Power Boiler with 6 Horse Power Engine.	"	"	8 "	"	"	8 "	4260 "	1000
Fifteen " " " " " "	"	"	8 "	"	"	8½ "	4400 "	1100
" " " " " "	"	"	8 "	"	"	9½ "	6060 "	1300
" " " " " "	"	"	10 "	"	"	9½ "	6450 "	1400
Floor space for 15 Horse Power Boiler, 4 feet 10 inches.								

The Price includes Furnace, Boiler, Engine, Heater, Water Bottom, Gaug. Cocks, Safety Valve, Steam Valve, Governor Valve, Pump, Blow-off Cock, Smoke Jacket, Smoke Pipe Elbow, Steam Gauge and Glass Water Gauge. In short it is a "self-contained machine," ready to be set up and run immediately.

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Gentlemen:—My patents for the Eclipse Baling Press and for my Improved Excavator have both come safely to hand. They are entirely satisfactory in all respects, and in my judgment, fully and clearly cover all the points to which I am entitled. I thank you earnestly and sincerely for the care and dispatch you have used in both cases, but wish to acknowledge my special obligations for the patient persistence with which you pushed my claims on the excavator, in the face of the various adverse decisions of the examiner. When you advised me to appeal on a certain claim, I had grave doubts of the advisability of the proceeding, but the result justified your judgment, and I was as much surprised as gratified when I received notice from you that the examiner had receded from his position in the matter, and that the money that I had advanced to prosecute the appeal was not needed, but awaited my order. I will add also that I had some misgivings as to the cost of patents obtained through your agency when compared with Eastern solicitors, but am glad to acknowledge that my cases have been as cheaply prosecuted by you as by parties East, to say nothing of the advantage of personal conference as to claims and the saving in point of time. I have two more models nearly ready for you. Yours respectfully,
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Gentlemen:—I was very much pleased a few days ago to receive my patent in the "Pastry Bureau" case, and I take great pleasure in recommending your agency to those who may have business in that line, particularly the first time. The courteous, prompt and efficient manner in which you act as patent solicitors is certainly the highest recommendation an inventor could ask; and to this fact I am pleased to attest. Hoping that our mutual interests have not ended with this successful issue, for I shall need your services in future, I remain truly yours,
J. B. FELZER.

THOUGHTLESSNESS.—Persons sometimes return their paper, marked "stop this paper." Their name being pasted on the sheet they think that is all we need to be able to cross their names off. Now that is thoughtlessness. Your P. O. address is needed as much as your name. We have thousands of names arranged only according to locality. Our mailing clerk does not know where everybody lives.

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Because it is the largest and best agricultural weekly west of the Rocky Mountains.

That more farmers' wives and children in their isolated homes may be cheered by its weekly visits, laden with its pleasing yet moral reading, and sound instruction.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 13, 1877.

VOLUME XXIV.
Number 2.

Improved Concentrating Tables.

The illustration on this page represents an improvement in concentrating tables for ores, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by J. U. Tolles, who has been using the apparatus successfully in several places. In the engraving *A* represents a flat inclined table, provided with a surfacing of cloth of any suitable kind, and with ledges, *b*, to prevent the material from passing over the ends. *B* represents a feed box extending along the upper edge of the table, and provided in its front side with a row of discharge openings, *c*, of the form shown, each narrowing down to a point at its lower end. *C* represents a receiving trough or box extending along below the lower edge of the table. *D* represents a leaf or board hinged to the rear side of the trough or box *C*, in such a manner that it may be turned under the edge of the table, to conduct the material therefrom into the box, so that the material passing over the edge of the table will be discharged outside of the box. *E* represents a rotating tube suspended lengthwise above the upper edge of the table by endless belts, *d*, passing over pulleys, *e*, supported in the rigid frame. *F*. The tube is provided from end to end with a row of perforations, and with a hand lever, *h*, at one end, and is connected by a hose, *i*, and a reservoir or pump delivering water at a pressure corresponding to a head of from eight to twelve feet.

In operating the machine the feed box, *B*, is partly filled with rough stones, to insure an even distribution and a steady flow of the material to be treated, a steady and copious supply of water maintained in the box, and the ore, sand or tailings introduced therein. The water, escaping through the openings, *c*, flows down in a thin film or stream over the face of the table holding the material in suspension. The heavy and valuable particles are deposited upon, and retained by, the cloth surface of the table, while the light refuse particles are carried over the lower edge and discharged outside of the box *C*. After the collection of a suitable amount of metal upon the table, the supply of water to the feed box is stopped, the leaf *D* turned under the edge of the table, and water supplied to the pipe or tube *E*, by which it is delivered through the perforations upon the table in a row of fine jets, forming an almost continuous sheet or film.

By means of the lever, *h*, the tube, *E*, it is rotated and the sheet of water swept over the table from top to bottom, so as to drive all adhering particles therefrom, and wash them down into the collecting box, *C*. After this operation, these jets are stopped, the leaf turned out, and the feed water again started. By employing the cloth surface, giving the table the proper inclination and properly regulating the flow of water, the inventor finds that he can effect a rapid and thorough separation without agitating the table, and without the employment of manual labor for any other purpose than that of feeding the material; and by the employment of the fixed table, with its cloth surface, he can separate particles which cannot be retained in machines which vibrate. By the use of the feed openings, *c*, of the form shown,

the discharge of the sand, ore, or other fine material is rendered very steady and gradual, as it will be carried through the narrow portion of the openings, while the lighter water will pass over the same, through the upper large end of the openings, taking up the material gradually and distributing it evenly upon the table. It is obvious that the rotating tube may be sustained in any other suitable manner, and that it may be connected in any suitable manner with the source of water supply.

The object in arranging the perforated pipe so that it can rotate is to permit a gradual change in the direction of the jets, so that their point of impact upon the table can be advanced from its upper to its lower edge and thereby every portion of the surface subjected in turn to the direct impact of the jets in order to effectually loosen and drive forward the particles therefrom.

The flow of water can be regulated by the valves operated by the cords. The gate shown in the feed-trough *g*, will throw the

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

They have put a Blake pump in the 2,000-foot level of the Con. Imperial mine, which will throw to the pump on the 1900-foot level about all the water there is in the mine.

In the Justice a connection has been made with the 400-foot level winze and the 500-foot level upraise, which furnishes a valuable ore slope 125 feet in height.

The last clean-up of the Eureka (Grass Valley) mine was 205 ounces of amalgam.

The last letter from the Raymond & Ely mine says: "The raise which was being carried up from the west drift on the 11th level has been

Portable Engines.

Messrs. Baker & Hamilton, of 15 and 19 Front street, in this city, are agents for a number of different varieties of small and portable steam engines, adapted for all classes of work. Of late they have made a specialty of this class of machinery, and have the largest variety in the market. The Bigelow portable engine we described in detail some time ago. It is built for a low-priced portable engine, having no bright and polished work, but is of unexcelled workmanship. These engines are made 50 at a time, so as to be made cheap, and are fitted complete, ready for running, except the smoke-stack. The boilers are built on the most approved plan and from the best iron. These engines are made from four up to 15-horse power, and are fixed up and tested before being put on the market.

The Baxter portable steam engine, manufactured by the Colts Arms Company, is so well-known as to need no description. It has no special novelties, but is a steam engine and boiler, plain and simple. It is largely in use all over the United States in all branches of business in which a small motor is desirable.

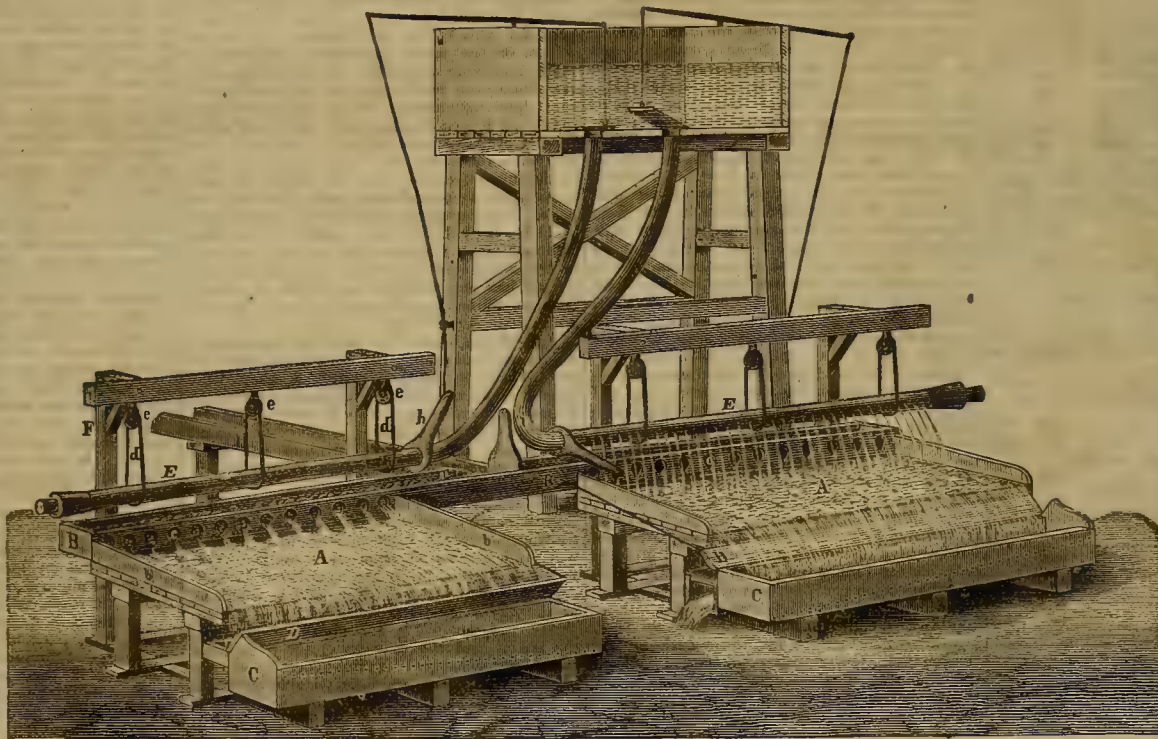
The Bookwalter engine is intended for processes requiring light power and is especially adapted for those purposes. The manufacturers confine themselves only to two sizes. All parts are made in duplicate. The engine, bed plates, pump, governor, etc., are made and attached to the boiler in the most simple and firm manner, so that the heat from the boiler does not by expansion change the relations of the working parts to each other. Every boiler and engine is tested by hydraulic pressure to twice the working pressure and is in perfect working order when sold. These engines are furnished at a low price.

The "Hero" vertical engine and boiler is a new style of semi-portable, both efficient and durable, economical in fuel as well as in space occupied and is thoroughly constructed and serviceable. The base or foundation is perfectly tight and secure, making it as safe as an ordinary stove. Two sizes are made and the engine and boiler are furnished complete with governor, safety valve, pumps, gauges, etc.

The portable engines made by the Ames Iron Works are made in various styles and are principally known on this coast as in use for threshing engines. The engines are superior in design, workmanship, and material, as well as economical in use of fuel and running expenses. Eleven sizes of these engines are made, from three to forty-horse power. Every piece of these engines is fitted to a standard gauge, and duplicate parts can therefore be procured.

Messrs. Baker & Hamilton are also agents for the Shive governor, of which we shall shortly give illustrations with a detailed description. This governor is made on scientific principles and is highly recommended by those who have used it. The advertisement of Baker & Hamilton will be found in another column.

VULCANITE.—The Supreme Court has rendered a decision in the vulcanite case, in which all the dentists of the country are interested. The rights of the patentee of the vulcanite are sustained by the decision.



TOLLES'S IMPROVED CONCENTRATING TABLES.

water into either feed-trough as desired.

Mr. Tolles, with this apparatus, does not profess to do what many others claim to do, but he is running many of them where everything else has failed. He has been running a good many of these tables on the Comstock for nearly two years and is now building more. Persons at a distance can build and run them, by first obtaining license and instructions of the inventor, John U. Tolles, at Eureka, Humboldt county, California, or W. S. Tolles, his authorized agent at Virginia, Nevada.

THE LICK ESTATE.—It is stated that a compromise has finally been effected between the different relatives of the late James Lick and the trustees of the estate, by which an amicable settlement will be made. The compromise involves the payment of the sum of \$383,000 in addition to the sum of \$150,000, left to John H. Lick, but the two societies who will have to pay this money have yet to be heard from. The residue, after certain specified bequests are paid, goes to the Academy of Sciences and California Pioneers, and as the compromise money comes out of their share, the consent of these societies to the compromise must be gained before the matter is finally settled.

run through and connected with the winze sunk from the 10th level, furnishing a good circulation of air, and we are now engaged in pushing the main drift westward, and a reasonable hope may be entertained that the favorable vein matter found on the west drift on the 10th level may improve as depth is attained, and may possibly develop ore between the end of this drift and the west cross-drift. The water in the main shaft is up within 20 feet of the 11th level, and before the pump is in operation again it will have reached the point where it was first encountered in the shaft."

The chloriders are still operating in the old abandoned levels of the Meadow Valley mine, but the ground has been worked over so often that what little ore there is remaining in the old levels is of rather low grade.

The average assay value of the ore mined at the Chollar last week was \$29.50 per ton.

The rock encountered in the west drift from the 1,650-foot level of the C. & C. shaft is said to be harder than any ever before encountered on the lode.

The ventilation of the Best & Belcher mine has been materially improved by enlarging the main drift on the 1,500-foot level.

The average of the Manhattan ores worked for the past week is \$246.60 per ton, showing an increase of \$30.62 per ton over last week.

Review of the Pig Iron Market.

Messrs. Jeffray & Harrison, metal and coal brokers, have issued the following annual review of the pig iron market of San Francisco for the year ending December 31st, 1876:

The monthly quotations, as given below, will show that soft iron has ruled more uniformly in price during 1876 than for some years past. The heavy stock in importers', jobbers' and foundrymen's hands at the opening of the year, combined with the extremely low rates of freight from the Eastern States, and from England, caused low prices to rule the entire year. Importers, availing themselves of the low rates of freights, sold large quantities "to arrive" at the then ruling low prices. During December our quotations will show a marked advance, caused by a corresponding advance of freights; still our outside prices of spot lots for December are to some extent nominal, few sales having been effected at our extremes. White iron has been more fluctuating during the year than soft, caused by a concentration of the stock on hand early in the season. It was anticipated the consumption this year would have been much greater than the results show, as the foundrymen had large contracts for the first six months; but the last half of the year the consumption has been extremely limited; still the outlook for 1877 is very encouraging for an increased demand. In estimating the amount of stock on hand, we have included all the pig iron in the interior and State of Nevada; also 1,400 tons of Salisbury iron. The following will give the month's quotations for the year 1876:

Month.	Scotch, soft. Per ton.	Am'n white. Per ton.	Am'n soft. Per ton.
January.....	\$31 00/33 25	\$30 00/31 00	\$30 00/31 00
February.....	30 50/33 00	30 00/32 50	30 50/33 00
March.....	31 20/32 50	32 50/32 75	32 00/32 50
April.....	32 00/32 50	33 00/34 00	32 00/32 50
May.....	31 00/32 00	45 00	31 00/32 00
June.....	31 00/31 50	40 00	30 00/31 00
July.....	30 00/31 00	35 00/37 00	30 00/31 00
August.....	30 00/31 00	35 00/37 00	29 00/30 00
September.....	30 00/31 00	30 00/32 50	29 00/30 00
October.....	29 00/30 00	30 00/31 00	29 00/30 00
November.....	29 00/30 00	30 00	29 00/30 00
December.....	31 00/34 00	30 00/33 50	30 00/32 50

SALES "TO ARRIVE."

Month.	Scotch Soft. Per ton.	White. Per ton.
January.....	\$31 00/32 00	\$30 00
February.....	31 00/32 00	29 00/30 00
March.....	32 00/32 50	29 00/30 00
April.....	30 00/31 00	29 00/29 00
May.....	29 00/30 00	28 00
June.....	29 00/30 00	28 00
July.....	29 00/30 00	28 00
August.....	29 00/30 00	28 00
September.....	29 00/30 00	28 00
October.....	29 00/31 00	28 00
November.....	29 00/31 00	28 00
December.....	31 00/32 50	28 00/29 00

We find the stock of pig iron on hand January 1st, 1877, in all, 15,456 tons, as per statement given below, being 3,906 tons in excess of the stock on hand January 1st, 1876.

	Tons.
Stock of Pig Iron on hand January 1st, 1876.....	11,550
Imports of 1876—Scotch, soft, tons.....	10,704
do do American, soft.....	8,564
do do American, white.....	425
do do English, white.....	2,294
do do French.....	321
do do Oregon.....	1,006—23,225
Total.....	34,775

DETAILED ACCOUNT OF STOCK ON HAND JANUARY 1ST, 1877.	
Importers' hands, Scotch.....	4,900
do do American, soft.....	1,870
do do White.....	180—7,110
Foundrymen's and Jobbers' hands, Scotch, soft.....	2,915
Foundrymen's and Jobbers' hands, American, soft.....	3,796
Foundrymen's and Jobbers' hands, white.....	1,755—8,446
Total.....	15,456

Consumption of 1876, white.	
do do American, soft.....	5,983
do do Scotch, soft.....	10,510—16,493
On the way, as per latest dates received:	
From Scotland and England.....	2,476
From United States.....	1,643—1,419
Stock on hand.....	15,456
Total.....	19,575

The above figures show an increased consumption this year over last of 1,439 tons, viz.: 206 tons of soft, and 1,233 tons of white. The importations of 1876 show a decrease of 4,821 tons as against the importations of 1875.

The Salinas Quicksilver Mine.

We continue to receive the most encouraging reports from the Salinas quicksilver mine, all of which is very gratifying, as several of our citizens are largely interested in the property. The tunnel is now in 230 feet, 139 feet of which distance from the face backward towards the mouth is on a fine body of metal. At a point 166 feet from the mouth of the tunnel an incline shaft is being sunk on the lode, which dips at an angle of about 45 degrees. This incline is now down 40 feet, at the bottom of which the vein is four feet in width, with eighteen inches of solid metal and steadily improving as they go down. The face of the tunnel is 170 feet below the surface, the entire depth being a well defined vein of antimony and quicksilver—at least such is thought to be the case, as it shows well both on the surface and in the face of the tunnel.

Sixty per cent. ore is worth \$50 per ton delivered in San Francisco, and this is the kind being shipped by the company at present. After paying all expenses it leaves a profit of about \$35 per ton. From the mine to Hollister, the shipping point, there is a good mountain road, over which four animals can without difficulty haul 3,500 pounds of ore.

As soon as the mine is properly opened they will commence stopping out the ore on an extensive scale. It is estimated that there is at least

\$30,000 worth of ore in sight, besides which they have 100 tons of 20 to 60 per cent. ore on the dump, which will be smelted as soon as the company get their own furnaces in operation, for which they are now cutting the wood to burn the brick, which will be manufactured on the ground at a saving of \$20 per thousand in the price of them.

Superintendent Shriver has erected seven new buildings at the mine this fall—a blacksmith shop, three dwellings, barn and stable, lodging house for the men, and a store-room.

In addition to the mine which they are working, the company own 235 acres of mineral bearing ground in the immediate vicinity, on which there is an abundance of wood growing, which can be utilized as fuel to run the furnaces and as timber for the mines.

There are 40,000 shares in the incorporation, owned principally by men who intend to develop the property, and are confident they have a good thing. A few months ago the stock was selling at \$1 per share, but on the strength of recent development, it has now gone up to \$3.83, some having been sold at the latter price a few days ago.—*Salinas Index.*

A Rich Country.

The pressing want of the people of the country to-day is more gold. Political matters are badly muddled, and everybody is interested to know what will be the outcome, but how to get coin is a subject of more vital importance to every one than who is to be President. We can all live whether Hayes or Tilden controls the helm of State if we have plenty of money. How and where to get it is, therefore, the question of paramount importance, and the one which we propose to answer in this article. The surest way to get gold is to go where it exists in large quantities and dig it out. The place where it can be found is almost anywhere in Nevada county. At present, developments which are being made on the upper part of the San Juan ridge, show that that section contains the precious treasure in almost unlimited quantities. We have obtained some information from Surveyor Fen Miller, who has, during the past two years, been running lines in that vicinity, which we propose giving to our readers. It has long been known that the Blue Lead, or ancient river channel, in Sierra county, crossed the Yuba river and run over into Nevada county and along down the San Juan ridge. The channel leaves Sierra county at a point near Minnesota, and is again discovered on this side the river in Nevada county at Snow Point. Mr. Miller has surveyed on the supposed line of it from Minnesota down to North Bloomfield. The natural descent of the channel for that distance is 190 feet to the mile. It falls from Woolsey's Flat to Malakoff about 1,000 feet.

The gravel and the character of the gold in the lead is the same in both counties, and those familiar with the country have no hesitation whatever in declaring that the two leads are identical. The ground on the line of the channel is laid off and claimed nearly the whole distance to French Corral, over 15 miles. The richness of the lead the whole distance is beyond dispute, as it has been prospected and worked at intervals all along between the two points for years, but recent developments show that even the most sanguine never dreamed of the wealth lying hidden there. Mr. Miller informs us that the claims owned by Cowger & Co., at Snow Point, the first entrance of the channel into Nevada county, are proving to be remarkably rich. For want of water there are but two men employed in the claims at present, but they are taking out all the way from 50 to 80 dollars each per day, and the gravel grows richer as they follow the lead into the hill beyond. This claim was worked in early days, but the owners ran too far to the east and lost the channel. On returning to the old bank on the west side of the claim, some time since, they struck good dirt, and by following it into the hill they have discovered what was always supposed existed there. We are informed by Mr. Miller, that from the pitch of the bed-rock and the direction the channel seems to be running, there is no longer any doubt that the theory of those who have located on the line between the Point and Bloomfield was correct, and that there is between the two places the richest field of gravel in the world.

The North Bloomfield company, after years of labor and the expenditure of over \$2,000,000, have got their claim thoroughly opened and have washed down to bed rock, where they find gravel of surprising richness. The bottom of the channel at that point is over 400 feet in width, and about 350 feet in depth. It prospects astonishingly well, and good judges think the company will in a few years get back all they have expended, and will have but barely opened up the mine for extensive work. These developments at the two points, a distance apart of about seven miles, and the known richness of the Blue Banks, the Boston and other claims at Woolsey's and Moore's Flat, supposed to be feeders, or a part of the same channel, located midway between the two points, prove conclusively the wealth of the whole region, which is as yet but barely touched. To the southwest of the North Bloomfield company, at intervals of a mile or more, clear down to French Corral, extensive and rich paying claims have been opened and are being worked, and are yielding rich returns. Compared with the wealth of this region, the famous Comstock lode of Virginia sinks into insignificance. There is between 15 and 20 miles of this channel yet untouched. It

is a field for the investment of capital not to be found anywhere in the world. The gold does not exist in chimneys as it does in quartz veins, but is evenly distributed the whole distance, and wherever a mine has been opened on the line the developments prove it. The majority of the claims are owned by men of small means who have been, thus far, unable to run tunnels and open a mine, but men of means own some of the claims, and we are informed that the work of developing their property will be started up at once. Each development made on the line of the channel enhances the value of adjoining claims. It is reasonable to suppose that the gold hidden away in the sands of that section will not always be allowed to remain there when it is so badly needed and we anticipate seeing in the future a continued line of paying mines along the whole length of the channel. This is the section where gold in paying quantities exists, and the way to get it is simply to go work for it.—*Nevada Transcript.*

Mining in Arizona.

The main industry of Arizona has always been, still is, and always will be, mining. Although our agricultural and grazing resources are not by any means to be despised, yet their consideration is small when our vast mines of coal, iron, lead, copper, silver and gold are considered. The agricultural and grazing interests of the Territory will be entirely subservient to the mining interest, and the graziers and farmers will always depend on the miners for their support.

Many people are in the habit of thinking that mining is not a permanent industry; that the mines are easily worked out, or at least worked in a few years to a depth beyond which work is impossible—at least unprofitable to work. That this is a fallacy is proved by the mines of Mexico and South America, which have yielded their millions annually for over 300 years, and are still turning out an undiminished supply of bullion.

Mining on the Pacific coast is still in its infancy. Even on the Comstock, where they are now down over 2,000 feet, they are as yet only "scratching among the roots of the sage brush." Hardly a day passes, scarcely a paper comes along, that has not a notice of some new appliance for the better and cheaper working of mines, or the more economical and therefore more profitable reduction of ores, and here in Arizona we can hardly say that we have hitherto done any mining at all. A few "coyote holes" have been dug here and there and a few tons of ore have been shipped or reduced in an astra or rattletrap of a mill, and we are only beginning to realize from the little we have done, what a marvellously rich Territory we have. And meager as the showing in work and yield has been, I will here venture to say that although many thousands have been uselessly and foolishly sunk in Arizona mining, yet more bullion has been shipped out of the Territory than money has been brought into it. I write advisedly.

And if the result has been so encouraging before any real mining has been done, what are we to look for in the future? A short time since nothing was doing. All were waiting for something to turn up. Now in every county in Arizona systematic mining is going on. Complete mills are at work, turning out their thousands daily, and adding in a quiet way to the wealth of the land.

For years Arizona has waited for outside aid—capital, capital, was the cry. At last, tired of waiting, her miners went to work in an humble way, and now the Territory is before the world as a great bullion-producing country and a self-developed one at that. We have to thank no California or Eastern capitalist for our prosperity, but we owe it entirely to the patience, the energy and the industry of the prospector and miner, whose only capital generally consists of dauntless courage and indefatigable industry.

Arizona is in future destined to be the great metal-producing State of the Union. We have not only wonderfully rich mines of gold and silver, but we have apparently exhaustless mines of iron, copper and lead, which in time will not be second in consideration to the mines yielding the precious metals. Patience and a willingness to wait a short time longer and the reward is assured.—*Arizona Citizen.*

Royal Way to Find Rich Mines.

The man with a forked whalebone is operating down at Brown's valley, in Yuba county, and he is showing the people there how to find rich quartz ledges. The people dig where the man with the whalebone points out. That same thing is periodically tried in Grass Valley, but we have never heard of any good mines being discovered by any such agency. We hope the Brown's valleyites will have better luck with that easy way of finding mines than the Grass Valleyites have. The Marysville Appeal tells about the thing in this way:

"Some time ago a singular man named E. Frizell visited that locality, who claimed he could look into the ground and see gold ledges and water leads. He earned the name of 'the Water Witch,' and created some excitement among the credulous. There are two or three companies prospecting for ledges about Brown's valley, who have great faith in the richness of the mines. 'The Water Witch' pointed out the lines to dig upon and some of the miners found ledges as designated by him. In pros-

pecting this man held a small piece of whalebone horizontally from one hand to the other. In one end was placed a small quantity of gold dust, which was covered with buckskin and confined to the end of the whalebone. 'The Water Witch' in passing over the ground with whalebone held in his two hands found that when he reached rich deposits the whalebone would bend in the middle, and often break."

We do not know that the whalebone broke when the man held it in Grass Valley district, but we have heard of one or more companies that were badly broken by digging after the indications of the whalebone. Some people delight to try to cheat hard work and get rich at the same time, but whalebone is not the thing to do it with. It is a singular fact that the whalebone men remain impecunious while having such a key to the secrets of nature. A full kit of miner's tools, well and industriously handled, and with good judgement withal, are the instruments to disclose where the gold is hid in the bowels of the earth.—*Grass Valley Union.*

Mining Outlook in Calaveras.

The Calaveras Chronicle has the following to say of the mining prospects in that county:

The outlook for the mining interests of the county in the future are encouraging and satisfactory, notwithstanding the fact that the progress of development is not so rapid as it could be desired. A fair degree of activity is being displayed in the prosecution of mining enterprises, however, resulting in a steady and healthy growth of the importance of that interest. A notable circumstance connected with this subject is the fact that a greater number of quartz ledges is now being worked in Calaveras than at any time since the inception of that species of mining. Prospecting is also being vigorously prosecuted, which will undoubtedly lead to a steady increase of the number of permanently paying claims. True, operations in some instances result in failures, but in nine cases out of ten the cause is traceable to "financial weakness" or bad management on the part of the owners. The successful development of a quartz ledge requires the employment of capital, as well as a knowledge of the science of mining, and as there are instances where both those requirements are wanting, there is nothing surprising in the fact that there are failures to record. Generally speaking, however, the quartz interests of Calaveras are in better hands to-day than at any period in the past, and operations are assuming that permanent character that augurs well for a better degree of development in the near future. Another noticeable feature of the quartz mining interest is the resumption of work in claims formerly abandoned. Parties relocating claims of that character are enabled to reap the advantage of the labor performed by their previous owners, and very frequently, by the outlay of a small amount of capital in putting up the requisite machinery, develop valuable mines. In a great majority of instances where mines have been abandoned lack of funds to work them properly compelled their desertion, and for that reason relocation is preferable to taking wholly unprospected ledges. Some of the best mines in this county have been obtained in that way, and there are further opportunities of that character yet to be improved. In fact, Calaveras offers better inducements to those wishing to engage in mining pursuits than any other portion of the mineral belt. The county is absolutely covered with a network of ledges, and notwithstanding the great number of claims taken there are yet abundant opportunities for location. Partially or wholly developed mines can be purchased at reasonable figures, if preferred, and in truth any one wishing to engage in quartz operations can suit himself in every particular in this county. It is a knowledge of the superior advantages offered by Calaveras in these respects that is bringing the county into such prominence as a favorite mining locality and giving so great a degree of vitality to operations in quartz. It is clearly evident that Calaveras is rapidly approaching the first place in the ranks of quartz mining counties, and that the importance of that interest is becoming overshadowing.

Gravel mining is a pursuit second in magnitude only to the quartz interest. The hydraulic method of working is almost universally adopted where its employment is practicable, although there are still extensive tunnel claims that cannot be mined by any other method. Gravel mining is really one of the most flourishing industries of the county, and its extent is only limited by the water supply. It has grown rapidly in importance during the past few years, measurably increasing the annual gold product and materially assisting in arresting the decadence that followed the exhaustion of the placers. On the whole we regard the mining outlook as extremely favorable, and the encouraging aspect of that interest is having its legitimate influence in other avenues of business.

A CHINESE TELEGRAPH.—Materials are now on their way out from England for the erection of a line of telegraph from the Imperial Torpedo college, at Tientsin, China, to the Viceroy's Yamen. The line, which will be about five miles in length, to be put up entirely by the students in the college. Once this line is up it is hoped to see telegraphs introduced by the Chinese government, the great objection to their use having hitherto been that foreign engineers had to be employed both for their construction and maintenance.—*Journal of Telegraph.*

MECHANICAL PROGRESS.

New Rock Crusher.

The London Mining Journal says that stone crushers, as at present constructed, are considered by Mr. R. Gardner, of Liverpool, to be complicated and cumbersome; he has, therefore, designed certain improvements with a view to making a machine as simple, strong and compact as possible, combining in the same machine either crushing or breaking. In carrying the invention into practice he makes a very strong iron or steel box or frame, usually forming a parallel-sided rectangular chamber, without top or bottom. Horizontally through two opposite walls of this, through bosses cast sufficiently strong to form bearings, he bores a hole large enough to insert the bearings of the shaft. This shaft is turned eccentric in the middle portion and larger in diameter than at the journals, and the bearings are slid in from the outside after the shaft has been placed in position, and secured with set screws, keys, or other fastenings. In the rectangular chamber, and extending entirely across it, is a movable jaw. This is hinged on the shaft, the eccentric portion passing through it in the hole bored for the purpose, and usually lined with brass. The movable jaw and the side of the rectangular chamber facing it which forms the stationary jaw can be fluted or have projections on indentations cast thereon in any desirable manner. He usually makes these wearing surfaces of separate very strong forgings, or malleable castings of iron or steel, so as to be replaced when worn. The back of the jaw and the side of the rectangular chamber facing it are grooved with a series of horizontal grooves. A stout distance piece or strut of iron or steel has each of its ends so shaped as to fit into one of these grooves. The mode of working is very simple. The shaft being rotated by a strap, or in any convenient manner, the eccentric gives both a vertical and horizontal movement to the top of the jaw, and in front of the distance piece a varying motion depending upon the length and angle of the strut, and direction of rotation. The stuff being inserted between the two jaws by means of a hopper or otherwise, the working of the movable one breaks or grinds the stuff against the stationary jaw. The apparatus will be found applicable to the crushing of slag, chemicals and other substances as well as rocks.

The Swiss Frightened at American Progress.

The speech delivered in the amphitheater of the Primary College of La Chaux-de-Fonds, on the 14th ult., by M. Edouard Favre-Perrot, is a remarkable tribute to American enterprise and ingenuity. M. Favre-Perrot is a Swiss watch manufacturer, who served as a member of the International Jury on Watches at the Centennial, and as one of the Swiss Commissioners to the United States. While in this country he gave careful and intelligent attention to American watches and the methods employed in their manufacture, and he now goes home to tell his countrymen the unwelcome news that vigorous measures are necessary to save the watch-making industry of Europe from ruin. Among other things he said: Had the Philadelphia Exhibition taken place five years later, we should have been totally annihilated without knowing whence or how we received the terrible blow. We have believed ourselves masters of the situation, when we really have been on a volcano. And to-day we must actually struggle if we do not want to encounter in all the markets that rival manufacture. Did we not sneer at Besancon at the outset? And now Besancon suffices for France, and, beside, she exports her surplus of manufacture. We ask ourselves if, in reducing the price of watches, we can increase their sale in the same proportion? And if the sales do not increase, what will become of us? We shall have an enormous stock of goods and a permanent stagnation. The custom duties, you know, amount to 25 per cent. For a long time hopes have been entertained that they might be reduced. We cannot count on it. America needs all her resources, especially in the present situation; and, whether Democrats or Republicans be in power, we cannot hope for a reduction in import duties. We must, therefore, make up our minds to lose the American market!

It has been said, and it has been complacently repeated, that the Americans do not make the entire watch, and that they are dependent upon Switzerland for several parts of the watch. This is a mistake. The Waltham Company make the entire watch—from the first screw to the case and dial. It would even be difficult for them to use our products, so great is the regularity, so minute the precision with which their machines work. They arrive at the regulation of the watch—so to say—without having seen it. When the watch is given to the adjuster the foreman delivers to him the corresponding hair spring, and the watch is regulated. Here is what I have seen, gentlemen! I asked from the director of the Waltham Company a watch of the fifth grade. A large safe was opened before me; at random I took a watch out of it and fastened it to my chain. The director having asked me to let him have the watch for two or three days, so as to observe its motion, I answered: "On the contrary, I persist in wearing it just as it is to obtain an

exact idea of your manufacture." At Paris I set my watch by a regulator on the Boulevard, and on the sixth day I observed that it had varied 32 seconds. And this watch is of the fifth American grade; it costs 75 francs (movement without case). At my arrival at Locle I showed the watch to one of our first adjusters, who asked permission to "take it down"—in other words, to take it to pieces. I, however, wished first to observe it; and here is the result which I noted. Hanging, daily variation one and a half seconds; variation in different positions, from four to eight seconds; in the "heated room" the variation was but very slight. Having thus observed it, I handed the watch to the adjuster, who took it down. After the lapse of a few days he came to me and said, word for word: "I am completely overwhelmed; the result is incredible; one would not find one such watch among 50,000 of our manufacture."

This watch, gentlemen, I repeat to you, I took at hazard—out of a heap, as we say. You understand from this example that the American watch may be preferred to the Swiss. I have finished, gentlemen, and I have told you of things such as I have seen them. It remains for us to profit from this sad experience, and to improve our manufacture. Competent men are not wanting among us; they must go to work at once.

ANOTHER NOTE ON TEMPERING.—The quality of steel should be uniform throughout; indeed, it is always better to have them tempered rather too hard than soft, for use will reduce the temper. If at any time it is necessary to perform the operation yourself, the best method is to melt a sufficient quantity of lead to immerse the cutting part of the tool in. Having previously brightened its surface, plunge it into the melted lead for a few minutes, till it gets sufficiently hot to melt a candle, with which rub its surface; then plunge it in again, and keep it there till the steel assumes a straw color; but be careful not to let it turn blue. When that is the case, take it out, rub it again with tallow, and let it cool. If it should be too soft, wipe the grease off, and repeat the process without the tallow, and when it is sufficiently hot, plunge it into spring water, or water and vinegar mixed. By a proper attention to these directions, and a little practice, every workman will have it in his power to give a proper temper to the tools he may use. If a saw is too hard, it may be tempered by the same means; but as it would be not only expensive, but, in many cases, impossible to do it at home, a plumber's shop may be at hand, where you may repeat the process when they are melting a pot of lead. But here observe that the temper necessary is different to other cutting tools; you must wait till the steel begins to turn blue, which is a temper that will give it more elasticity, and, at the same time, sufficient hardness.—Furniture Trade.

A NEW FIRE ESCAPE.—We read of a new portable, strong, simple and inexpensive apparatus to enable persons to descend or lower others from the windows of the highest dwellings, under complete control and with perfect safety. It consists of a small friction pulley block with four fixed sheaves, having a central movable sheave riveted through slots in the cheeks of the block, to a shackle, having a short chain and ring attached, for the purpose of suspending the block, or weight to be lowered, so that when a person is suspended the weight causes the movable sheave to close on the nearest fixed sheaves, nipping the rope and sustaining the principal portion of the weight. To rescue others the block is hung up by the ring, the person to be lowered is secured by the bag or belt to short end of rope, and the descent controlled as if lowering by an ordinary block, each end of the rope being used alternately until all are lowered. To lower oneself, the short end of the rope is hung up by the ring to the wall hook, the person descending attaches himself by the bag to the ring of the block; his weight causes the block to be drawn down the ropes and he descends as if lowering himself by a simple rope, the block holding the weight and reducing the friction on hands to a minimum. When no wall hook is provided, the apparatus may be securely suspended around both sashes.

PETROLEUM IN METAL WORKING.—Sturtevant's Ingenieur says: The application of petroleum as greasing material in turning on the lathe very hard metals is of great advantage, since cutting tools continually wetted with petroleum may easily attack and work the hardest sorts of steel, which it would be almost impossible to work without the application of this means. It has been shown that a very hard alloy of seven parts of zinc, four parts of copper and one part of tin, which even with the best hardened chisel could not be worked, could be turned with the greatest ease on a lathe, if the tool was moistened with petroleum. With the now more and more frequent use of steel, this discovery is of no mean importance.

AMERICAN WALL PAPER.—The successful exportation of American paper hangings from New York, promises to open up another and profitable line of manufacture. It is found that we can successfully compete with any of the European countries in their own markets in these goods, both in price and quality. Machinery has been applied to the manufacture in this country, while the European manufacturers do the work by hand.

SCIENTIFIC PROGRESS.

Inventors Should Study Science.

At a late engineers' meeting in England, Mr. Alexander Smith read a paper on the need of science in invention. We quote a paragraph: It has been far from an uncommon thing for ingenious and clever men to waste their time and money in trying to discover or accomplish impossibilities which a knowledge of physics or natural philosophy would have entirely prevented. We have read of the search for the philosopher's stone, and later on of perpetual motion. In these days of advanced scientific knowledge men often strive to attain ends which are equally ridiculous. A few years ago many of us were invited to see a deep mine pump, which the inventor said would raise immense quantities of water, with only sufficient power or force exerted to overcome friction. We found he had two rising mains or columns of water, with a piston pump at the bottom, and when working he fancied that the weight of one column of water acted upon the piston and lifted the other, forgetting that it had lowered itself a distance equivalent to the height the other had been raised, and that he could simply establish an equilibrium. Labor and expense were lavished upon this pump, of course to no purpose, and a description of it, with an engraving, actually appeared in one of the London scientific papers. The cleverest thing I ever knew attempted was a man trying to lift himself in two milk cans with the yoke over his shoulders. He managed very well till the bottoms came out of the cans, and the cylindrical portions flew up his legs. Unfortunately for themselves a large portion of those engaged in engineering (mining, civil, and mechanical) and other scientific pursuits never begin low enough—i. e., with the study of natural philosophy; or they disregard it as being of no moment, or too elementary, whilst others are only practical men without theory, and, consequently, strangers to the facts. Practice can feel its way a considerable distance without theory, but theory is of very little service without practice, as ten minutes of the latter will sometimes upset ten years of the former. The two together are valuable, and is the happy medium we want. In the instances I have related had those interested known and kept in mind the fact that under no circumstances whatever is it possible to create power or force, they would have saved themselves much trouble.

I would urge, upon young members especially, to closely study natural philosophy, and to keep in mind the following facts: It is impossible to create matter, and it is equally impossible to destroy it. Power or force is exactly subject to the same conditions as matter in these respects, and when effect is to be gained an equivalent power has to be exerted, or, in plain words, the work done by any machine is the same as the work applied. The discovery that power is indestructible is one of recent date. Count Rumford found that in boring cannon by horse power sufficient heat was given off to boil water; heat, in fact, is nothing more than another form for motion, and whenever you exert power heat is generated. Dr. Joule brought this discovery to a practical basis, for he determined the mechanical equivalent of heat, which is that a weight of 772 pounds falling through a space of one foot will generate sufficient heat to raise the temperature of one pound of water 1° Fahr. Gravity acts separately upon every particle of matter, and consequently equally upon all bodies, so that a weight of lead and a feather if dropped from any height would reach the earth together if it were not for the resistance of the atmosphere. I have known the peculiar properties of water or other liquids often puzzle even mining engineers, who could not understand how they communicated pressure. Any bulk of water presses equally downwards, upwards, and sideways, according to the head which is connected with it, and this equivalent to 433 pounds per square inch for every foot in depth. I will not trouble you further, but if my remarks induce young members to study the important laws and conditions of nature I shall be extremely gratified.

OIL FROM WOOD.—In Sweden the manufacture of illuminating oil from wood has become a large and successful industry. The roots and stumps of trees are employed for the purpose. The wood is subjected to dry distillation, with exclusion of air, and a variety of products are formed which are of value in the arts. Among these may be mentioned turpentine, creosote, tar, acetic acid, charcoal, oil of tar and oil of wood. The wood oil cannot be burned in an ordinary lamp, but a camphene lamp can easily be adapted for the purpose. It is not explosive and is remarkably cheap. The pine tree is the best adapted for distillation, and there are 15 establishments in operation in Sweden, three of which produce 15,000 liters (887 gallons) of oil annually.

QUICKSILVER FIRE ALARM.—A fire signal, to indicate the breaking out of a fire, which has lately been patented in France by Angelin, operates as follows:—When the temperature of the apartment rises above a predetermined point, a quicksilver thermometer is caused thereby to break, and the quicksilver runs into a dish, where by its weight it sets in motion a clock work. This last is made to operate an alarm bell.

The Latest Arctic Expedition.

Iron says: It is a pity that the Admiralty have not thought fit to publish fuller details of the expedition. A number of documents, such as the sledging journals, have indeed been printed, and even circulated, but amongst a very limited coterie. It would almost seem as if it were wished to suppress the painful details—tragically painful they are described in a well-informed medical journal, which says that the sufferings of the men engaged on the sledging expeditions were frightful. "Before they were out a week or a fortnight they were ravaged by scurvy; their limbs swelled; their teeth fell loose; the blood was effused in patches; one-half of them became prostrate, fetid, miserable beings, whose existence was intolerable to themselves and those around them. Every sledge party, without exception, broke down prematurely from scurvy. Not only so, but the disease seems to have taken all the commanders of sledge parties by surprise; each in turn expresses his astonishment, horror and terror of this affliction when, its full force being felt, he can no longer shut his eyes to its nature, and each bewails pathetically his want of lime-juice." Nothing like this has befallen any maritime expedition since the days of the ancient navigators, to whom the anti-scorbutic virtues of lime-juice were unknown. It is evidently not to the officers of the expedition that this lamentable breakdown is to be attributed; they appear to have been fully aware of the virtues of the prophylactic so strangely neglected; but it is rumored that the Whitechapel land at Whitehall sent out the ships, otherwise splendidly provided and manned, with a short supply of what is by common consent, and from about a century's experience, considered an almost perfect preventive of one of the gravest dangers of long voyages. Mr. Clements Markham and other defenders of the Admiralty have been insinuating that lime-juice is not so effective as it is generally believed to be, but that fresh meat is the only remedy, forgetting that even the long acclimatized Eskimos are often affected by scurvy, although they live exclusively on meat, and never use salt. In such cases they apply to scurvy grass, the well-known anti-scorbutic.

Mine Signals.

At the late Brussels exhibition two appliances for mine signals were exhibited by Messrs. Siemens and Halske, the eminent electricians of Berlin, whose stand, superintended by Herr Ran, of Brussels, was one of the most crowded during the exhibition. An appliance for giving bell signals between the bottom of a shaft and the several heights of workings, is quite independent of batteries, and consists of a magneto-electric induction machine producing alternate currents, and connected by a special cable with induction bells. The inductor contains six permanent magnets, between which a Siemens armature is made to revolve by means of a handle, thus generating currents which act upon the bells. This system does away with the difficulties and shortcomings of bells worked by batteries, as the magneto apparatus is of constant and unchangeable power, is portable and protected against damp, and is not so liable to be damaged by rough handling as battery arrangements are. To give a signal to the distant bell, it is only required to turn the handle of the inductor at the place from which the signal is sent. When two instruments are connected, signaling can take place from both ends; but, in cases where signaling is required only towards one end, the alarm bells can be separated from the inductor and placed at the receiving point while the inductor stands at the sending end. This appliance, entered in class VI., Germany, was exhibited by the government administrative of the Saarbrück mines, in which none but electro signals are allowed to be used, and also none but machines for signaling which are independent of batteries.

SIPHON.—A new siphon is described by M. Antolke, in Poggendorff's Annalen. The modification consists in furnishing the shorter arm with a valve. This arm terminates at about the middle of a short wider tube, in which it is held by a cork stopper, reaching just as far and having grooves on its lower surface. Further down in the enclosing tube is another stopper, with aperture a little wider than that of the siphon; and in the interval between the stoppers is a glass disc, free to move up and down. In using the apparatus you simply move the shorter arm up and down several times in the liquid, which then rises up to the head and flows over. The phenomenon depends on the inertia and adhesion of the liquid. With this siphon it is not necessary to draw out the air by suction nor to apply the finger to the aperture of overflow.

PIPES AS ELECTRIC DISTRIBUTORS.—Cast iron pipes of several feet in length, and with collars nearly three times the diameter of the pipe cast thereon, like the pipes used for heating purposes, have been used with good results as distributors, deep in the earth, of electricity brought down by lightning conductors. A length of copper pipe about four times the diameter of the lightning conductor being fixed in the top of the iron pipe, stands some distance therefrom, and partly above ground. Below the distributing flanges a pointed and perforated cast iron pipe is attached, the length of the whole of the pipes being about 30 feet, and the conducting rod penetrating nearly to the bottom of the lower pipe.

Table of Highest and Lowest Sales in
S. F. Stock Exchange.

Name of Company.	Week Ending Dec. 21.	Week Ending Dec. 28.	Week Ending Jan. 4.	Week Ending Jan. 11.
Alpha.	344	301	221	191
Alfa.	3	2	2	1
Andes.	3	2	2	1
Baltimore Con.	2	2	2	1
Belcher.	134	10	94	8
Belmont.	3	2	2	1
Best & Belcher.	512	40	27	18
Bullion.	10	10	13	11
California.	12	10	13	11
California.	50	47	47	45
Challenger.	86	11	80	72
Chollar-Potosi.	13	11	10	8
Confidence.	2	2	2	1
Con Imperial.	2	2	2	1
Crown Point.	46	44	35	33
Cose Con.	20	74	51	61
Dayton.	3	2	2	1
Eureka Con.	11	10	11	10
Exchequer.	13	11	10	9
Gold & Belcher.	50	50	50	50
Grand Prize.	624	450	600	700
Gila.	2	2	2	1
Golden Chariot.	2	2	2	1
Gould & Curry.	152	12	11	12
Hale & Norcross.	8	7	5	5
Hussey.	6	4	4	3
Justice.	25	23	23	21
Jackson.	4	3	3	2
K K Con.	10	9	9	8
Knickerbocker.	750	800	500	624
Kossuth.	12	11	11	11
Lady Bryan.	20	24	624	500
Lady Wash.	5	4	4	3
Leopard.	18	14	12	11
Leviathan.	18	14	12	11
Leeds.	34	30	22	19
Modoc.	14	13	13	13
Manhattan.	14	13	13	13
Mansfield.	14	13	13	13
Meadow Valley.	400	300	500	400
Mexican.	21	19	16	14
Northern Con Virginia.	110	90	80	70
New York.	110	87	80	70
Niagara.	32	30	28	26
Northern Belle.	32	30	28	26
New Cose.	3	3	3	3
Occidental.	36	30	27	23
Ophir.	119	104	115	110
Overman.	119	104	115	110
Pacific.	2	2	2	1
Phil Sheridan.	2	2	2	1
Panther.	300	250	500	350
Pooman.	300	250	500	350
Prospect.	874	750	500	500
Raymond & Ely.	874	750	500	500
Rock Island.	874	750	500	500
Sage.	11	10	9	8
Seg Belcher.	864	80	74	72
Sierra Nevada.	12	11	10	9
Silver Hill.	750	624	874	750
South Chariot.	750	624	874	750
Succor.	750	624	874	750
Trojan.	11	10	9	8
Union Con.	16	14	12	11
Wells-Fargo.	16	14	12	11
Woodville.	14	13	13	13
Yellow Jacket.	18	16	15	14

Sales at S. F. Stock Exchange.

FRIDAY, A. M., JAN. 5.	620 Ophir.	194	20
315 Alpha.	18	19	20
1030 Best & Belcher.	7	8	9
610 Belcher.	10	10	11
500 Bullion.	50	50	51
585 California.	11	11	12
1325 Con Imperial.	18	18	19
340 Crown Point.	64	64	65
3495 California.	40	40	41
2100 Con Virginia.	80	80	81
70 Confidence.	70	70	71
190 Chollar.	77	77	78
1475 Exchequer.	67	67	68
250 Gould & Curry.	10	10	11
780 Hale & Norcross.	5	5	6
4415 Justice.	15	15	16
1565 Julia.	360	360	361
100 Kentucky.	7	7	8
330 Mexican.	17	17	18
925 Ophir.	20	20	21
375 Overman.	108	108	109
900 Savage.	81	81	82
665 Sierra Nevada.	12	12	13
330 Succor.	75	75	76
225 Utah.	13	13	14
705 Union.	14	14	15
780 Yellow Jacket.	14	14	15
435 Yreka Con.	14	14	15
130 Alta.	10	10	11
275 Andes.	18	18	19
1230 Belmont.	4	4	5
245 Best & Belcher.	4	4	5
275 Bullion.	10	10	11
215 California Con.	11	11	12
1385 Caledonia.	12	12	13
5765 Con Virginia.	35	35	36
1185 Eureka Con.	10	10	11
100 Gila.	50	50	51
1220 Golden Chariot.	24	24	25
385 General Thomas.	24	24	25
300 Grand Prize.	14	14	15
815 Justice.	14	14	15
530 Knickerbocker.	750	750	751
50 Kossuth.	11	11	12
730 Leopard.	15	15	16
925 Lady Wash.	36	36	37
100 Leviathan.	75	75	76
1250 Modoc.	80	80	81
550 Manhattan.	13	13	14
705 Northern Belle.	24	24	25
750 New Cose.	3	3	4
750 New York.	30	30	31
30 Ophir.	16	16	17
380 Prospect.	130	130	131
30 Raymond & Ely.	3	3	4
400 Rock Island.	37	37	38
50 South Chariot.	60	60	61
200 Barcelona.	1	1	2
400 Trojan.	50	50	51
225 Union Con.	9	9	10
100 Wells-Fargo.	15	15	16
100 Woodville.	75	75	76
100 Ward.	15	15	16

SATURDAY, A. M., JAN. 6.	30 Alta.	11	12
100 Andes.	18	18	19
175 Alpha.	12	12	13
400 Best & Belcher.	38	38	39
570 Belcher.	10	10	11
475 Bullion.	15	15	16
110 California Con.	37	37	38
650 Caledonia.	11	11	12
215 Con Imperial.	18	18	19
100 Confidence.	70	70	71
1385 California.	40	40	41
385 Con Virginia.	80	80	81
550 Crown Point.	64	64	65
30 Chollar.	79	79	80
320 Eureka Con.	16	16	17
385 Exchequer.	11	11	12
350 Gould & Curry.	11	11	12
400 Hale & Norcross.	5	5	6
2035 Justice.	14	14	15
445 Julia.	360	360	361
100 Kentucky.	7	7	8
25 Leopard.	15	15	16
1475 Lady Wash.	36	36	37
650 Mexican.	17	17	18
2000 Niagara.	27	27	28
345 Northern Con Virginia.	11	11	12
330 Northern Belle.	25	25	26
270 Overman.	110	110	111

2770 Yellow Jacket.	13	13	14
AFTERNOON SESSION.			
100 Alta.	12	12	13
300 Andes.	18	18	19
515 Best & Belcher.	38	38	39
1185 Bullion.	15	15	16
250 Belmont.	3	3	4
550 Baltimore Con.	24	24	25
700 California.	43	43	44
700 Caledonia.	10	10	11
865 Con Virginia.	37	37	38
20 Confidence.	70	70	71
1770 Eureka Con.	20	20	21
975 Exchequer.	11	11	12
220 Gould & Curry.	10	10	11
230 General Thomas.	24	24	25
175 Golden Chariot.	24	24	25
215 Gila.	75	75	76
200 Grand Prize.	14	14	15
485 Hale & Norcross.	5	5	6
100 Hussey.	35	35	36

SALES OF LAST WEEK AND THIS COMPARED.

THURSDAY, A. M., JAN. 4.	270 Alpha.	21	22
100 Alta.	12	12	13
300 Andes.	18	18	19
110 Bullion.	15	15	16
775 Best & Belcher.	40	40	41
325 Belcher.	10	10	11
180 Baltimore Con.	24	24	25
215 Crown Point.	64	64	65
60 Confidence.	70	70	71
630 Caledonia.	12	12	13
825 Con Imperial.	17	17	18
100 Chollar.	79	79	80
1180 California.	40	40	41
3495 Con Virginia.	37	37	38
710 Exchequer.	11	11	12
220 Gould & Curry.	11	11	12
215 Hale & Norcross.	5	5	6
2070 Julia.	360	360	361
4450 Justice.	14	14	15
240 Kentucky.	8	8	9
300 Knickerbocker.	750	750	751
60 Kossuth.	11	11	12
100 Lady Wash.	36	36	37
100 Leviathan.	75	75	76
265 Mexican.	17	17	18
350 North Con Virginia.	11	11	12
270 Ophir.	20	20	21
135 Overman.	113	113	114
120 Pacific.	14	14	15
650 Prospect.	50	50	51
100 Phil Sheridan.	9	9	10
20 Rock Island.	37	37	38
90 Savage.	81	81	82
305 Sierra Nevada.	12	12	13
5 Seg Belcher.	91	91	92
70 Silver Hill.	18	18	19
500 Succor.	75	75	76
1000 Trojan.	50	50	51
230 Utah.	13	13	14
480 Union Con.	9	9	10
100 Wells-Fargo.	15	15	16
290 Yellow Jacket.	15	15	16

Pacific Board—Latest Sales.

WEDNESDAY, A. M., JAN. 10.	35 California.	43	44
270 Caledonia.	12	12	13
290 Bullion.	10	10	11
90 Belcher.	9	9	10
535 Best & Belcher.	35	35	36
150 Crown Point.	64	64	65
200 Eureka Con.	16	16	17
755 Con Virginia.	37	37	38
100 Chollar.	79	79	80
425 California.	40	40	41
185 Gould & Curry.	11	11	12
90 Hale & Norcross.	5	5	6
130 Mexican.	14	14	15
1065 Ophir.	16	16	17
455 Savage.	81	81	82
235 Sierra Nevada.	12	12	13
345 Yellow Jacket.	13	13	14

California Board—Latest Sales.

WEDNESDAY, A. M., JAN. 10.	130 Union.	54	55
400 Baltic.	23	23	24
100 California Con.	37	37	38
90 Belcher.	9	9	10
107 Best & Belcher.	38	38	39
65 Bullion.	10	10	11
100 Cosmopolitan.	27	27	28
50 Con Virginia.	10	10	11
150 Caledonia.	12	12	13
130 California.	12	12	13
1160 Con Imperial.	15	15	16
300 Gila.	75	75	76
80 Exchequer.	5	5	6
125 Gould & Curry.	11	11	12
150 Gila.	75	75	76
185 Hale & Norcross.	5	5	6
200 Panama.	10	10	11
120 Justice.	11	11	12
100 Knickerbocker.	750	750	751
100 Kossuth.	11	11	12
125 Lady Wash.	36	36	37
200 Leviathan.	75	75	76
75 Leopard.	14	14	15
250 Mexican.	15	15	16
10 Sierra Nevada.	12	12	13
100 North Con Virginia.	11	11	12
50 New York.	30	30	31
275 Ophir.	17	17	18
100 Overman.	113	113	114
100 Pacific.	14	14	15
300 Superior.	10	10	11
3800 Trojan.	51	51	52
50 Trenton.	7	7	8

HERMANN SCHUSSLER, the accomplished hydraulic engineer of the Spring Valley Water Works, has received an invitation from the West Side Irrigation District Company, at Grayson, to take the place of consulting engineer there. He has, however, felt himself compelled to decline this honorable compliment, owing to his professional engagements in this city.

UTAH has more miles of narrow-gauge road in operation than any State or Territory in America.

MINING SHAREHOLDERS' DIRECTORY.

[Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.]

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'TY.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alps S M Co	Ely District	10	50	Dec 16	Jan 15	Feb 9	O D Squire	331 Montgomery st
Adams Hill Con M Co	Eureka	3	25	Dec 7	Jan 12	Feb 2	W W Traylor	309 Montgomery st
Amazon Con M Co	Nev	1	1	Nov 23	Jan 4	Jan 25	J A Reichart	330 Pine st
American Flag M & M Co	Ely District	9	25	Dec 19	Jan 29	Feb 23	G R Spinyne	320 California st
Alta S M Co	Washoe	5	50	Jan 5	Feb 5	Feb 10	W H Watson	302 Montgomery st
Crown Point Ravine M Co	Washoe	4	15	Dec 15	Jan 22	Feb 20	M W Mifflin	309 California st
Con Imperial M Co	Washoe	2	25	Dec 19	Jan 24	Feb 14	W E Dean	419 California st
Baltimore Con M Co	Washoe	13	50	Dec 7	Jan 10	Jan 30	C A Sankey	331 Montgomery st
Belmont M Co	Nev	10	50	Nov 22	Jan 10	Jan 30	C Swift	419 California st
Florida M Co	Washoe	7	25	Dec 6	Jan 15	Feb 8	L Hermann	220 Sansome st
Glacov G & S M Co	Washoe	4	15	Dec 5	Jan 10	Jan 31	J A Reichart	330 Pine st
Gould & Curry S M Co	Washoe	1	100	Nov 15	Dec 23	Jan 16	A K Durbow	309 Montgomery st
Julia Con M Co	Washoe	2	100	Jan 4	Feb 8	Feb 28	A Noel	419 Montgomery st
Lady Bryan M Co	Washoe	14	50	Nov 2	Jan 5	Jan 28	W H McClinton	419 California st
Black Hawk Coal M Co	Cal	5	5	Nov 16	Jan 17	Feb 17	L H Powell	220 Sansome st
Mansfield M Co	Cal	6	50	Nov 28	Jan 23	Jan 24	J M Buffton	31 California st
Niagara G & S M Co	Nev	4	25	Dec 4	Jan 5	Jan 29	W R Townsend	Nevada Block
North Con Virginia M Co	Washoe	6	50	Nov 21	Dec 22	Jan 16	J Maguire	419 California st
Prospect M Co	Washoe	3	25	Dec 6	Feb 5	Feb 7	F P Moore	426 California st
Raymond & Ely M Co	Pioche	6	100	Dec 5	Jan 19	Feb 17	J B Holburn	418 California st
Rocky M Co	Washoe	25	100	Nov 25	Dec 28	Feb 5	E B Holmes	309 California st
Superior G & S M Co	Washoe	4	10	Dec 15	Jan 17	Feb 5	J Tyson	411 California st
Trojan M Co	Washoe	4	1	Dec 14	Jan 15	Feb 5	D Wilder	328 Montgomery st

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

MINING NOTES.—Amador Ledger, Jan. 6: The Volunteer has recently passed into the hands of wealthy men of San Francisco, who are determined to give it a thorough testing. The Volunteer joins the Kennedy. It has been prospecting to a depth of 130 feet. The rock from the surface down has been of a paying character, ranging from \$8 to \$15 per ton. Since the purchase was completed, preparations have been pushed forward for getting the mine into working shape. A wagon-road has been constructed from the mine to the main road, to facilitate shipment of ore. A substantial building has also been erected over the shaft, to contain the machinery for hoisting purposes. In the rear of the main building is a blacksmith shop. A "donkey" engine was actively at work during the time of our visit hoisting water from the shaft. The shaft will probably be drained by the end of the week, and the miners will commence operations immediately thereafter.

MAHONEY.—Reports from the Mahoney mine, at Sutter Creek, are encouraging. A. D. R. Stewart, with capitalists of San Francisco, have the control of the property and are working it with vim. To show the improving prospects, we may state that a short time back only between 20 and 30 men were employed; now the number reaches between 50 and 60. Until lately the ore extracted was equal to keeping only 10 stamps of the Lincoln mill running, now the full power of the mill—40 stamps—is being crushing the rock.

LINCOLN.—Appearances tend to show that the mine will be started up at an early date.

GOOD HOPE.—C. Peters, the principal stockholder in this mine, is having timbers and lagging hauled on the property, with a view of resuming work as speedily as possible. The mine, on the main quartz belt, just inside the limits of the Lincoln. The prospect is favorable for a good mine. A shaft is down over 100 feet, the ledge at the bottom being six feet wide, apparently getting deeper and wider as depth increases. The last crushing at the Volunteer mill, we are told, paid upward of \$6 per ton, without taking the value of the sulphurets into consideration. The mine is incorporated, with a capital stock of \$500,000, divided into 500 shares of \$10 each. The articles of incorporation provide that no assessment shall be levied for more than five cents per share at one time. Only about 600 shares have been disposed of—not sufficient to justify the levying of an assessment to provide working capital. Peters is desirous of selling at least 10,000 shares, so as to be able to work the mine straight along.

CALAVERAS.

WHAT CHER.—Calaveras Chronicle, Jan. 6: We learn that work has been resumed in the well-known What Cheer claim, Chile gulch, by some parties who have been relocating the ground. There are a number of other abandoned claims in this vicinity that will yet be relocated and successfully worked.

LYNN COURTESY MINING JOURN.—Mr. M. Cary is erecting a 10-stamp mill on the Doyle mine at West Point. The machinery will be ready for operations shortly. F. C. Hall, of Lone City, is preparing to put a mill on the well-known Zacator mine. The machinery will be on the ground in a few days. The new hoisting works at the Sanderlin mine, Mosquito district, are working splendidly. The work of sinking the shaft has been recommenced, the ledge developing very favorably. Rich rock continues to be taken from the old Holmes mine, Grisswald & Co., proprietors, Mosquito district. A small quantity of rock—about 17 tons—from the Greenhorn mine, Mosquito, crushed in Harris's mill, yielded \$80 per ton. Messrs. Potter & Rodgers are the lucky owners.

EL DORADO.

GRIFFITH CONSOLIDATED.—Mountain Democrat, Jan. 6: Last Monday, at the Griffith Consolidated mine, a large slab, weighing several hundred pounds, was taken out from the grand bonanza, which was noticed in a former issue of our paper. This slab is sprinkled and permeated all over with free gold, and about midway of its depth, running through it from end to end and from side to side, is a belt about two inches thick, composed wholly and in about equal parts of black sulphurets and fine free gold.

EXTRAORDINARY ORE.—We have been permitted to inspect a few samples of ore taken from the 830-foot level in the St. Lawrence mine within a few days. It exceeds anything previously seen from the exceedingly rich bonanza in that mine. Explorations upward from the point where this bonanza was first struck, composed wholly and in about equal parts of black sulphurets and fine free gold.

INYO.

INYO CONSOLIDATED.—Coso Mining News, Jan. 6: We understand that Wm. Walsh, an old-time mining man, who has been with us for the past week or two, has succeeded in purchasing the interest held by several parties here in the Inyo Consolidated mines, and has gone below to make arrangements to commence work upon them at an early day.

TEN THOUSAND.—The Modoc mining company celebrated Christmas by making her ten thousand bar of bullion. Both furnaces are running well, water plentiful. The value of the bullion shipped for December amounted to \$88,090.

LIDA VALLEY.—Inyo Independent, Jan. 6: Things are now distressingly quiescent out at Lida. The mill stands in idleness, with little prospect of resuming business within any definite period. But there are men we know of who maintain that the camp will yet at no distant day flourish with the best of them.

TO-DAY.—The entire property of the Silver Sprout mining company, including the mines, mill, ranch, water-right, etc., will be sold by the sheriff to-day, in the suit of Harris & Rhine. The company will doubtless redeem long before the six months' term has expired.

MARIPOSA.

MARIPOSA TUNNEL.—Mariposa Gazette, Jan. 6: In one of our late issues we mentioned that the vein had been struck by the main heading. The good news then published to the people was a mere idea of what was in store, when this bonanza was first struck, composed wholly and in about equal parts of black sulphurets and fine free gold.

NEVADA.

KENTUCKY RIDGE MINE.—Grass Valley Union, Jan. 6: Work at this mine is progressing well, and all the indications there show that the undertaking will pay. Sixteen tons of ore have been taken out of the incline on the larger ledge, and from that ore specimens have been culled and worked in a hand mortar, and the red dirt clinging to the ore has been washed through a rocker. From this mortar and rocker working gold to the value of \$421.10 was realized. Then four loads were taken from the ore that had been culled, and worked by mill process, yielding \$19 to the load. The shaft has more than doubly

paid for itself in its sinking. The bottom of the shaft is in light galling ground and has a strong ledge of 18 inches in thickness. The upper tunnel is into the ledge, and drifts from it. On the ledge, have been run 120 or 70 feet in drift ore. This tunnel gives over 500 feet of backs. The Kentucky Ridge will soon have a mill of its own.

MALTMAN'S CHLORINATION WORKS.—Nevada Transcript, Jan. 7: We found Oscar Maltman busily engaged with a crew of workmen yesterday, putting up extensive additions to his already extensive chlorination works. When the present improvements are completed the establishment will be the largest and most complete in its department in any in the State. Mr. Maltman was one of the first who practically worked sulphurets by the chlorination process, and is, we believe, now considered the most successful manipulator of sulphurets. He started in with a 12-foot furnace in 1860, and has made gradual additions until it is now 70 feet. The main building now used is 44x30 feet. The chlorination room is 30x20 feet. There is an assay room and several other rooms connected with the establishment. Five thousand pounds of sulphurets is considered a fair day's work, but if necessary the amount can be increased. The ore is mostly obtained from the mines in this district. There is also a miniature quartz mill connected with the works, with which small lots of ore can be tested by mill process. It is run by steam, and is the only one of the kind in the country. To those engaged in prospecting it is very convenient, as it can readily be determined by it what rock will pay by mill process before great expense has been incurred. As soon as the improvements now being made are completed, his works will be capable of reducing all the ore brought to it, with dispatch, and of giving the most satisfactory results.

WATER.—San Juan Times, Jan. 6: Water for mining purposes is becoming very scarce, and unless we have a plentiful supply of rain very soon, many of the mines on this ridge will have to close down before the end of this month. We learn that the Milton company contemplate closing down on some of their mining operations, within the next ten days, for want of water. The summer weather we have been experiencing for the last six or eight weeks is hard upon the miners, since the above was put in type we learn that the Manzanita mine at Sweetland and the Milton company's mine at the Corral shut down on Thursday last.

PLACER.

ALTA.—Placer Herald, Jan. 6: The mining interests of Alta have received a new impetus through the energy displayed by Andrew Larson, who has been prospecting for the blue gravel lead a long time. Mr. Larson ventures an opinion that the lead is a continuation of the noted Hidden Treasure at Danacuss, as its course is in the same direction.

IRON SMELTING.—Fitzhugh, the gentleman who made a strenuous effort about a year ago to open the iron deposits near the line of the railroad, above Clipper Gap, and erect smelting furnaces thereon, was again in Auburn during the early part of the present week, on business, we understand, connected with the same project. What encouragement he is meeting with we did not learn, particularly, though a gentleman whom we noticed in conversation with Mr. Fitzhugh, more or less, said to us: "The thing will very likely be go this time."

THE MINES.—Placer Argus, Dec. 30: The St. Patrick is doing well. Sinking the main shaft has been suspended for the present, and the 620-foot level is now being run. This level is yielding good ore in sufficient quantity to keep the mill steadily running. The mill is answering the expectations of its owners fully. The satisfaction of the prospectors for the great bonanza, with 100 inches of water they have all the power needed. As run now, the profit and operations will be much larger than formerly, the saving of expenses alone being enough to pay a fair dividend on the cost of the mill. The Good Friday is taking out some good ore and have a large lot on their dumps. Shurtliff has sunk a new shaft east of the one at the top of the hill, and has now reached a level now drifting west to connect. The Julian is running out a large quantity of low grade ore, and the working pays very well. There is more than the usual amount of prospecting going on, the fine weather permitting work in the mines to proceed without interruption. Rich developments are expected. The Eclipse mill is running steadily and doing good work. Just below it Cooper is prospecting for the gold, which he has been in operation. This is a mill of a new pattern, in which heavy pestles, with a sliding and rocking motion, are used to crush the quartz. It was begun about a year ago, but work was suspended until lately.

IRENS.—Dutch Flat Forum, Jan. 6: There is but little change to note in mining matters since our last. The various claims in this and Gold Run districts are all quiet, and are quietly waiting for water. The ditches of the South Yuba canal company and Miners' ditch company are dry. The ditch of the Cedar Creek company still has a small head running, sufficient to wash in the Baker claim part of the time. The Baker is the only claim in this section that is washing. The work of opening is progressing remarkably well. The pit is rapidly reaching, and the shaft below which the ore is in drifted ground to interfere, and is now in condition for a successful winter's working, provided we have rain.

SANTA CRUZ.

PLACERS.—Santa Cruz Courier, Jan. 5: The gold discovery reported on the lands of Hames and others, has been confirmed. In the section alluded to there is a stratum of auriferous gravel, in which gold can be found anywhere. Last May a woodchopper in the employ of J. J. Boyle, observing the formation and appearance of the country, prospected for gold in a gulch, and found color upon every trial. The depth of the gravel deposit is not known, as it has never been sunk upon; but we would not be surprised to hear of rich deposits of gold being found in this section.

SIERRA.

FOREST CITY.—Cor. Mountain Messenger, Jan. 6: The Bald Mountain Co. have laid off most of their crew until water comes, and the famous pioneer engine is quickly waiting for some mud below, but trying it, it must be that it is too low down to demonstrate that it was a success, and solve the Chinese problem, for Forest City at least. The North Fork Co. are steadily forcing their way, at a heavy expense, toward their pay. They have dump, shop, flumes, reservoir, etc., all completed, so that they lack nothing but the tunnel and water to wash, before the shareholders get back some of the Irish dividends they are paying in now. The South Fork Co. have not been doing much since they sunk their last shaft. This company have sunk two shafts in their tunnel, and shown the presence of a rich and well defined channel running through the claim, and nothing is wanted but a drain tunnel to make it a paying mine. There is a good chance to drain by starting below the old Live Yankee, and nothing is wanted but a drain tunnel to make it a paying mine.

LEDOZ.—The workmen in the Brush Creek mine, at the Mountain house, have struck a ledge of nice looking rock in the mine.

GETTING READY.—The China company are getting ready to work off their Williams place, having just got their drift ground in order.

TUNNEL.—Wm. Meserve is running a tunnel under the court house lot. Good pay was got there in days gone by.

SONOMA.

NEW FURNACE.—Sonoma Democrat, Dec. 30: We are informed that the new furnace at the Cloverdale mine for working fine dust and gravel is a perfect success under the superintendence of B. C. Hughes. It was started on Saturday, the 10th inst., and up to Thursday cleaned 100 tons of fine dust. This mine has been producing metal for two years from February 12th next, steadily from thirty-three to thirty-five flasks a month, with the old Knox & Osborn condenser. The new 10-ton furnace will largely increase the yield. There is metal enough out to run the furnace for eighteen months, and enough in sight to run it for two years. The Cloverdale is undoubtedly a great mine. We are indebted to William Ray, of the

mine, for these interesting particulars.

TRINITY.

ALTONA QUICKSILVER MINES.—Dutch Flat Forum, Jan. 3: Mr. C. A. Lawrence, a former resident of Dutch Flat depot and Gold Run reports the following from the Altona quicksilver mine, now worked under his supervision: It is located twenty-four miles northeast of Trinity Centre, Trinity county, about twenty miles of ground in the vicinity of the ledge, having an average depth of ten feet of soil, is being removed by hydraulizing, and the decomposed cinabar found therein yields six flasks per day. The ledge, along the surface of the bedrock, has a width of four feet, but a shaft which is now sunk sixty feet, shows it to be thirty feet in width, and with this increase retains its richness, which is 10 per cent. quicksilver. A tunnel 700 feet in length is being run, and when completed will take the ledge at a depth of 140 feet. If the present prospects in the opening of this mine continue as they promise to do, it will in a few years eclipse any cinabar mine on this coast. This valuable property is owned by Mark Zellerbach, of San Francisco, with the exception of what Mr. Lawrence owns, which is enough to be considered quite valuable.

TUOLUMNE.

NEW ALBANY.—Tuolumne Independent, Jan. 4: The miners at the New Albany are down on the vein (passing through the fissure on the way), 520 feet in a perpendicular shaft. This is the deepest cinabar shaft, or the most expeditious from the time the company commenced, of any that has been sunk in the county. The result of this experiment, we are confident, would prove that depth in such ledges as the New Albany is all that is required to make mining property lasting and paying institutions beyond a doubt. However, the depth they have already obtained in pay rock will have a marked effect in this direction.

PHILADELPHIA DIGGINGS.—These gravel diggings, in the mountains above Columbia, are being rapidly put in readiness for active work. The 15-inch pipe, 1,430 feet long, put together on the ground, is completed and is being put in place. The company are now at work with fifty men, placing flume and building ditches—having about seven miles of ditches surveyed. This claim has an extent of four miles, six hundred feet in width, with all the defined lines of an ancient gravel deposit.

Nevada.

WASHOE DISTRICT.

BEZCHER.—Gold Hill News, Jan. 10: Opening the 1800-foot shaft will be commenced in three to four days. Sinking the main incline is making fair progress, notwithstanding a strong flow of water. The daily yield of ore is about 10 tons, the assay value is \$23 to \$30 per ton. The Eureka mill has been stopped, and the ore is now being crushed at the Santiago.

JULIA.—The face of the west cross-cut from the main south drift on the 1800-foot level is still advancing in quartz, giving low assays but steadily improving in value. A south drift has been started on this body of quartz, the full size of which is in depth of shaft, 316 feet below the 400-foot station, with the bottom in very favorable quartz, with streaks of porphyry and clay. A shift of men are put to work clearing out the main west drift at the 400-foot level in order to ascertain if the west wall of the ledge has been reached at that point.

UNION COX.—The prospecting on the 1300-foot level is being pushed ahead as fast as possible, and so far with very encouraging results. The main north drift on that level, driving forward through the center of a fine vein of quartz, is showing steady improvement. The winze, sinking on the same vein farther to the southward, is making good progress and gives good assays in both gold and silver, improving in value.

YELLOW JACKET.—The face of the cross-cut at the north ledge, on the 1340-foot level, is in quartz, carrying some pay ore. At the 2040-foot level the cross-cut west is in 250 feet north from the south winze, face in quartz and porphyry with seams of good ore.

MEXICAN.—The mine looks very favorable in all the prospecting sections. The main north drift on the 1700-foot level is steadily advancing along the west wall of the ledge, the face in spar and millstone, which, during the week, has shown a slight though steady improvement in the value of the ore assays.

LADY WASHINGTON.—The drift north from the main east cross-cut at the 850-foot level is now in 82 feet, still following the excellent and very promising ore vein heretofore mentioned, and which still holds out well in both width and appearance.

CALIFORNIA.—Daily yield, 500 tons of ore. The ore stops on the 400, 1500 and 1600-ft. levels continue to yield the usual fine character of ore, and show no signs of depletion. The yield of bullion for the month of December was \$1,278,648.21. The usual dividend of \$2 per share, aggregating \$1,080,000, was declared yesterday, leaving a balance of \$198,648.21 with which to pay the running expenses for the month. The main south drift on the 1000-foot level has shown a steady advance in the ore, and is rich. The south drift on the 1650-foot level from the deep winze is steadily advancing to connect with the drift from the C. & C. shaft, the face still in very rich ore. The west drift from the C. & C. shaft is making the best of progress. The new ore dump at the C. & C. shaft is completed and connected with the shaft by a trestle work, ready for the shipment and millinery of ore. The completion of this drift and the battery mill at that shaft will shortly enable the shipping and crushing of a largely increased quantity of ore, and thus necessarily greatly increase the bullion production of the mine.

CHOLLAR-POROS.—The main incline shaft is now down thirty feet below the 1700-foot level. At the 1700-foot level a station has been put in. Sinking the Combination shaft is making best time for progress. There is no occasion whatever yet for running the pumps. This shaft is now down a little over 1,000 feet. Daily yield, 100 tons of ore, the assay value of which is \$20.50 per ton.

JUSTICE.—Daily yield, 340 tons of ore. The ore stops extending from the 400 down to the 800-foot levels are all yielding the usual amount of good milling ore, and at no time in the usual downward progress of the mine is there a poorer lot than now. Good ore is found on every level yet opened, and the bottom of the winze extending downward from the 800-foot level is showing as fine ore as that has yet been discovered in the mine. The yield of bullion for the month of December was about \$280,000, leaving a handsome profit over all expenses.

SIERRA NEVADA.—The north drifts on both the 1500 and 1250-foot levels are each making good progress, and are both showing a much more favorable mixture of quartz in the face as they advance. The prospects of a concentration of the ledge and ore to the northward on the 1000, 1250, 1550-foot level is growing better every day. The large new air-blower recently erected greatly facilitates work.

SAVAGE.—The pumping, since the insertion of the new piston, is making a fine time for progress. The water did before. It now lifts water from the 1800-foot level with just as great ease as it did from the 1700-foot level before the insertion of the new piston. During the stoppage of the engine to put in the piston the water rose a considerable distance in the shaft, but was lowered again with the most perfect ease as soon as the engine was started up. The 1800-foot level is now very clearly of water, but the heat at that point is intense.

BALTIMORE AND AMERICAN FLAT.—The face of the northeast drift on the 1400-foot level is showing a steady improvement, more quartz appearing every day. The face of the upraise from the 1050-foot level is showing some very rich ore some of the ore assays up into the thousands. The main winze being sunk below the 1650-foot level is still showing a strong bonanza below the 1650-foot level.

ORISKANY.—The yield of ore at present is very light, and the quality not so good as heretofore. The prospecting work in every quarter of the mine is being pushed ahead as fast as possible. The main incline is being pressed downward, to reach the 1800-foot level at the earliest moment possible.

ARGENTINA.—The drift from the ravine is completed to its connection with the shaft, and sinking is resumed. This drift is a very judicious arrangement,

adding much to the facilities for opening and working the mine. It not only gives splendid ventilation, but will save nearly 100 feet of hoisting or pumping.

LIBERTY CONSOLIDATED.—During the first part of the week a disarrangement of the pumps at the 2000-foot station occurred, causing a slight delay in the work on the lower levels. Everything has been repaired, however, and is again in the best of running order.

NORTH CONSOLIDATED VIRGINIA.—A strong flow of water was encountered on the 1100-foot level during the fore part of the week, which created a delay in the pump work, however, kept busy, and last night the water was again drained to the bottom of the shaft and work resumed.

NIAGARA.—Driving the prospecting drift on the 680-foot level is making excellent progress. During the week a fine vein of ore, ranging from three to eight feet in width, has been opened upon by this cross-cut. The ore in this vein is rich and will to all appearances mill from \$50 to \$80 per ton.

COX VIRGINIA.—Daily yield, 275 tons of ore. The ore stops are looking well. The enlargement of the drifts connecting with the Gould & Curry, on the 1500-foot level, is making good progress, and is greatly benefiting the air circulation on the lower levels. The dividend for the month of December was passed, there not having been a sufficient amount of bullion to produce a dividend. The main west drift from the C. & C. shaft must soon cut the ore vein at that point, when there is but little doubt that the regular amount of bullion product on dividends will be resumed.

GOULD & CURRY.—The pumping compartment of the shaft has been repaired throughout and the entire shaft is now in better condition for use than it has been for years past. The erection of the new pumping machinery is making the best of progress.

OVERMAN.—The new pumping engine and pumps are now ready for active use down to the 1400-foot level. The prospecting drift at the 1300-foot station is gradually draining the flow of water at that point and lessening the pressure of the head.

WALKER & HAZEN.—The enlargement of the drifts on the 1500 and 700-foot levels has greatly improved the circulation of air, and will soon enable the development of both of those levels in a much more perfect manner than ever before.

CALADONIA.—The north drift on the 1150-foot level, running to connect with the south drift of the Overman, is advancing in very favorable ground, and has about 150 feet yet to run to complete the connection.

SOUTH COMSTOCK.—The fine quartz vein developed by the main drift east at the 300-foot level shows a width of 14 feet, with no east wall yet. Some streaks in it assay as high as \$40 to the ton.

NEW YORK.—The third or pump compartment of the shaft is being pushed forward to completion as fast as possible, although considerable work remains yet to be done.

SILVER CITY.—The lower level from the bottom of the incline is opening out finely, with plenty of good ore in sight and being developed. Under the former management these lower workings were being opened in a workmanlike manner, and were left in good shape when the great influx of water and insufficient pumping machinery compelled the abandonment.

FLORIDA.—The north drifts on both the 700 and 500-foot levels continue to show better every day. The chances for the development of a paying body of ore in that portion of the mine at no distant day are very encouraging.

SILVER HILL.—The east cross-drift on the 650-foot level is steadily advancing, the face in very favorable vein matter.

BRYAN.—The erection of the new pumping machinery is making the best of progress.

SUCCESS.—The water has been drained from the shaft. The new pumps work admirably.

TRIOAN.—The ore developments in both the north and south drifts on the 300-foot level were never more promising than at this time.

KOSMUTH.—Work is progressing splendidly on both the 500 and 700-foot levels, with steadily increasing prospects of the development of a splendid body of paying ore on the 600-foot level.

COSMOPOLITAN.—The ore-producing sections continue showing well and yielding their usual amount of ore.

AMAZON & GLASSBORO.—Work in this noted mine was resumed yesterday under the most favorable auspices, and will be pushed forward hereafter with renewed energy.

BRYAN.—The Hope mine has been started up on ore from this mine. The ore yield from the 350-foot level is gradually increasing.

BALTIMORE.—Face of north drift in favorable working vein matter, with streaks and bunches of low grade ore.

SUPERIOR.—The tunnel from the ravine is now within 40 feet of its point of connection with the shaft.

HALE & NORROSS.—The pumps are gradually and successfully reducing the flow of water at the bottom of the shaft. The drift connecting the Hale & Norross and the Savage on the 1000-foot level is being cleaned out and repaired as rapidly as possible, in order to get a circulation of air between the two mines, and thus allow the heat.

ANDES.—The appearances are that a paying body of ore is about to be opened up in the east cross-cut on the third station level.

EUREKA DISTRICT.

STRIKE.—Eureka Sentinel, Jan. 2: An immense strike has recently been made in the Hamburg mine. The ore body, which is principally molybdate of lead and rich in silver, was found in the 80-foot level of the Pacific shaft. The bonanza has been drifted into 12 feet without any sign of a wall, and from other explorations in contiguous portions of the mine, it is probable that 20 or 30 feet further will be run before striking the limit. Other bodies of ore of considerable magnitude have, during the last few months, been discovered in the Hamburg, but nothing approximating in extent to the latest strike, which will doubtless prove the most extensive ever made in the district, outside of Ruby Hill.

CONDITION OF MINES.—Eureka Sentinel, Jan. 7: Since our last general review there have been some developments of importance that have given a cheerful stimulus to the business outlook. The railroad facilities, open winter and good roads have enabled the mines to receive supplies without interruption, and, as a consequence, instead of the usual cessation of work, there are rumors of furnaces starting up, important ore bodies found, the development of which will insure an increased demand for labor and supplies. The most important mining news of the week is the strikes in the Consolidated and Jackson, and the firing up the furnace at the former.

ETREKA COX.—We incorporate the official letter of the superintendent, Jan. 6th: A body of ore has been discovered on the 6th level, and so far as developed prospects favorably, showing a good quality of ore.

CLARK & BENTLEY.—The pumps are gradually sinking and sinking to ascertain the extent of the furnace run, with almost certain guarantee of continuance during the season.

RICHMOND.—Hoisting 200 tons per day. Branch railroad completed to furnace and ready for operation.

ATLAS.—Main shaft nearly completed. Drift from old works in 500 feet. Ten men prospecting and cross-cutting. Plenty of smelting ore in sight.

CLARK & BENTLEY.—Important developments during the week. Drift penetrated ore body 10 feet. Ore assaying \$35 gold and silver. It is impossible to give the extent or value of the discovery, as all connected with the mine are very reticent.

K. K.—Fine body of ore in the mine and plenty on the dump; furnace running well. The deposit in this mine is increasing daily in proportions. There is an immense amount of ore in sight, one of the largest bodies in the district.

HOUSAC.—Four men employed retimbering and cleaning out the old stopes and putting the mine in order.

ORANGE.—Extracting ore of high grade and shipping to Silver West furnace.

CLARK & BENTLEY.—Taking out 25 tons daily, assaying \$30 per ton. Mill crushing 10 tons per day and will increase the quantity very soon. The new ore development increases in quality and extent. First shipment of

Moonlight on the Susquehanna.

What a legacy of beautiful names the Indians have left us! Strike from our geographical nomenclature all of Indian origin, and you eliminate from it almost all it has of grace and beauty. Compare the Wachusett, Juniata, Suwanee, Mississippi, Shasta, Tacoma, of the Red Men, with the "Bald" mountains, "Black" rivers and "Goose" creeks of the white settlers. And think of "Susquehanna!" Does not the very name breathe beauty and poetry, almost tempting us, without further knowledge, to believe with Buchanan Read,

"None half so fair as that broad stream whose breast
Is gemmed with many isles, and whose proud name
Shall yet become among the names of rivers
A synonym of beauty—Susquehanna."

"It is difficult to imagine," says another, "a more continuous line of beauty than the course of the Susquehanna, a river whose mild grace and gentleness, combined with power, render it a message of nature to the affections and to the tranquil consciousness. This trait of mildness, even in its proudest flow, seems to hover upon its banks and waters as the genius of the scene. No thunder of cataracts anywhere announces its fame. It is mostly the contemplative river, dear to fancy, dear to the soul's calm feeling of unruffled peace."

This is the poetic aspect, and from this aspect should the "moonlight scene" upon this page be viewed to be fully appreciated. But the Susquehanna has other associations than those of beauty. It has been made an historic stream by deeds of blood and massacre exceeding all others in the darkest pages of colonial history. Wyoming and Cherry Valley are upon its banks. It marked, too, the limit of rebel invasion into the North. Never did a Grey coat succeed in crossing its waters, though they several times reached its western bank.

A peculiarity of Pennsylvania geography is that the rivers have not the same direction as the mountains, but generally run at angles to them. Instead of gliding quietly between or along them, they seem to decide which is their shortest route to the sea, and then push boldly forward for it, let what obstacle come that may. Of this eccentricity, as it may almost be called, the Susquehanna is chief representative. Numberless seem the mountain ridges and hills through which it has cleft in its

course to the Chesapeake. In some places it passes through as many as five of the so-called "gaps" or "narrows" in the distance of 20 miles. Almost its entire course is through the mountains, and it has all the characteristics of a genuine mountain stream, being usually broad, shallow, and rapid, with here and there long stretches of calm, deep water. Its bed is very rocky and in many places is studded with beautiful little islets. In the lower portion of the river's course its general width is about a mile, narrowing occasionally to half a mile or even less.

For purposes of commerce the river has little value, owing to its shallowness. In the summer it can be forded almost anywhere. But in the winter and springtime, when its banks are full, it opens a road to market for the vast quantities of lumber in the densely wooded regions about its headwaters, and many are the thrilling adventures of the strong-armed, steady-nerved men who pilot the great rafts down its turbulent current and successfully "shoot" all its rapids and "dodge" all its islets and sunken rocks on their way to the lower country.

DRYING APPARATUS.—In the apartment of the new and magnificent structure erected in Oxford, England, allotted to the experiments in electricity of high tension, an apparatus of remarkable ingenuity has been provided for keeping the air of the room dry. This apparatus consists of a heated copper roller, over which passes an endless band of flannel; the roller is heated by means of gas lights within it, which, being constantly burning, cause every part of the flannel to become hot. The vapor which arises from the heated flannel is carried off by the current of air which supplies the burners inside the roller. The flannel, when thus dried and cooled, passes into the open air of the room, when it again absorbs moisture, and thus the air of the room becomes so dry that the electrical instruments are preserved in a highly insulated condition, thus admirably meeting all the requirements of the case.—*Ex.*

The American Mine.

On Tuesday last we made a visit to the American mine and made a brief examination of the works. At the time of our visit the pipes were in full blast, throwing a body of water on a bank of blue cement, large enough to turn an overshot wheel to a grist mill. The cement is very hard, requiring to be broken by the use of sledge hammers. Several men were employed at that work, while others again were employed in breaking rock in bedrock cuts, preparing them to be washed away through the sluices. The American company are utilizing 1,000 inches of water daily, using two monitors in piping. The ground they are now washing lies directly in the channel and pays immense. The company have over forty men employed on their works and there is not a Chinaman among them. The company recently constructed a splendid blacksmith shop, which contains two forges. John Bach is the boss of that establishment and works one of the forges and Samuel Lisson works the other. In the shop is a room supplied with telegraph apparatus, the wires from which extend into the tunnel 180 feet beneath the surface, where another similar apparatus is placed with Frank N. Morris as operator; Samuel Lisson being operator in the shop. This telegraph is very useful in the way of giving notice above or below when any article for use is desired. The shaft through which the gold-bearing earth passes is situated only a few

The Isthmus Canal.

Those California farmers who are looking to the cutting of the isthmus for quick shipment of produce to the European markets, may find encouragement for the realization of the project in this week's news. During the week a dispatch was received from Washington stating that the commission appointed by President Grant to examine the three proposed routes for connecting the Atlantic and Pacific by means of a canal, have reported in favor of the Nicaragua route. The *Call*, in commenting on this announcement, makes the following statement: "The commission consists of Gen. A. A. Humphreys, C. B. Peterson, of the Coast Survey, and Daniel Ammen, of the Navy Department; all gentlemen well qualified for the task assigned them. The report they have made was anticipated by the general opinion of professional engineers and non-professional experts who have examined the different routes. We have not the reports of the former commissions before us at this moment so as to give actual estimates in detail, but these reports left little doubt that the Nicaragua route would be finally selected as the most feasible. Still, the work is one of gigantic proportions, and will rank, with the construction of the Suez canal and the building of the Pacific railroad, among the great engineer-

mation concerning the most feasible route was then gathered, has been at the service of the present commission. Thus, if they have changed the route materially they have done so in consequence of the discovery of a better one. The objections which the British government interposed at that time are now overcome by making the work international in its character, by the equal participation of the great commercial powers in its construction and subsequent management. The United States Government is now in communication with the several European nations in regard to the enterprise, and it is expected that the President will soon be in possession of documents which will justify him in submitting the question to the consideration of Congress.

CONTRACTION OF THE HOOF.—A very interesting veterinary operation was performed by Dr. Dunbar, at the stables, 842 and 844 Howard street, in this city, on Tuesday afternoon. A valuable stallion, owned by Judge Green, was severely afflicted by contraction of the hoof. As is usual in such cases, the contraction of the horny hoof had forced the frog up from its normal position, and the pressure upon the joint above had given rise to much inflammation and a bad sore was formed. Dr. Dunbar's operation consisted in cutting away a portion of the hoof and in fitting thereto one of his shoes, contrived

for the special purpose of expanding the foot. This shoe has the sink for the nail holes within the circle of the shoe, which bears the weight, instead of outside it, as in the common shoe. The nail holes slant toward the exterior and thus the "draw" of the nails is outward. The improved shoe has nail holes in the toe and at the inner and outer toe. It has also nail holes at the "heels," but the "quarters" (between the toes and heels) are left without nailing. In the present case the Doctor set the nails in toe and heels of the shoe, and then applying a screw between the heels, he expanded the shoe, and with it the hoof, nearly three-quarters of an inch. This expansion was done in the cold iron, after the shoe was nailed to the foot. The operation will relieve the pressure upon the joint of the foot, and will allow the frog to settle down to its proper place. Now the feet of the stallion will be submitted to a poulticing with flaxseed meal, and it is expected that all inflammation and soreness will disappear and the horse be sound of foot again. Judge Green's horse is a valuable one, lately imported from Maine, and he promises to inform us of the further results of the operation.

SONOMA COAL.—Numerous coal miners of long experience and several gentlemen of considerable scientific knowledge, who have made examination, have expressed the opinion that vast bodies of coal are buried beneath the surface of Sonoma mountain. Prospecting on a limited scale has been prosecuted at times for several years, but only a small amount has been expended in any one place. The indications in most cases have been good, and in several places coal nearly or quite as good as any that has been discovered in the State, has been found in small quantities. One of the most promising of the several mines is on the ranch of A. W. Overhiser, which is situated near the summit of the mountain and about nine miles north of this city. Mr. Overhiser has run a tunnel in the side of the mountain 100 feet, at the end of which he has sunk a shaft 12 feet. The indications are everywhere good, and in several places small pieces of coal that burn readily, and are said by experts to be of excellent quality, have been taken out. The large inflow of water into the shaft caused a suspension of operations, and it was found impossible to go further without the use of an engine. Mr. Overhiser has full faith in the value of his mine, and to the extent of his means will prosecute the work. He invites the attention of miners and capitalists to his property, and a thorough inspection of it.—*Petaluma Argue.*

A NEW SOLVENT FOR COPAL.—Oleic acid is said to be an excellent solvent for gum copal. On heating a small quantity of oleic acid it will dissolve a considerable quantity of copal. It is always a good means of distinguishing genuine amber from the imitation amber which contains copal.—*Druggist's Circular.*



MOONLIGHT ON THE SUSQUEHANNA.

yards from the rear end of the blacksmith shop and so arranged with pulleys and ropes that tools for the workmen in the tunnel can be raised and lowered in a few moments. The shaft is 180 feet deep. It has two compartments, one for passing into it the gold bearing gravel and the other, parties to descend and ascend from the tunnel. The descent and ascent is made by means of a long ladder, which reaches from top to bottom and which stands perpendicular. In this compartment is placed another kind of telegraph with rope and tackle, which notifies the party at the top of the shaft the condition of the sluices in the tunnel, whether running full or otherwise. This is an ingenious contrivance and very useful. The American mine is in tip-top condition and gives promise of paying its owners well for their expenditures. George C. Spooner is the superintendent of the mine and he makes a first-rate one, too. The American company, though not a corporation, is managed precisely as if it was. It has its President, Secretary, Board of Trustees, Superintendent and Foreman. Nearly all the owners are employed in the mine, consequently nearly every gang of workmen has one of the owners with them. We doubt much whether there is a hydraulic mine in this State better arranged and managed than the American mine on Manzanita hill.—*San Juan Times.*

COST OF ENGINES FOR ARMOR-CLAD SHIPS OF WAR.—The contract price to be paid by the Admiralty to Messrs. Penn & Sons, of Greenwich, for the engines, shafting and propellers, boilers, etc., of the twin screw armor-clad *Northampton* is, we understand, £95,500. For the supply of the engines and machinery of Her Majesty's ship *Agamemnon*, the contract for which has just been obtained by the same firm, the cost is to be £90,000. Messrs. John Elder & Co.'s contract price for the engines, boilers, and other machinery of the *Invincible* was fully £120,000, which is, we believe, the largest sum ever paid for the engines of a single ship.

ing triumphs of the age. The Isthmus of Suez connects Asia with Africa, and separates the waters of the Mediterranean from those of the Red sea. Commerce required that this barrier of earth should be removed that ships might pass from sea to sea, and the work has been done. Commerce now requires water communication between the Atlantic and Pacific oceans, and it is only a question of time as to when this work shall be done. The State of Nicaragua does not offer so narrow an obstacle between the two oceans as other points on the southern coast. The width of the State varies between 120 and 240 miles. Lying in the interior of the State, a few miles from the Pacific ocean, is the Lake of Nicaragua, a sheet of water from 30 to 40 miles broad, and only 128 feet above the waters of the Pacific. This lake will be utilized in the construction of a canal. Its depth varies from 30 to 90 feet. The great obstacle to be overcome in constructing the canal is a volcanic range running near the western coast, and rising between the Pacific and the inland lake to a height of 10,000 feet. This State is supposed to show a separation of the great chain of the Cordilleras into two divergent ranges, having a less average height than the main ridge, and being subject to partial interruption. The commission doubtless find favorable passes in these broken ranges which render feasible the project they have in view. The report estimates the cost of the work at \$100,000,000, which our dispatches state to be less than former estimates. There seems to be an error in this. In the year 1849 a contract was entered into between the Republic of Nicaragua and the Atlantic and Pacific Ship Canal Company of New York, by which the latter party undertook to construct the canal for \$20,000,000. The contract was never carried out, owing to the interference of the British government; but the terms were then considered fair by competent judges. We do not know if the present commission follow the exact route the New York Canal Company had selected, but presume that whatever infor-

San Benito County Mines.

Antimony and Quicksilver.

We made this week, says the Hollister *Enterprise*, a general exploration of the mines in the Coast range within the boundary lines of San Benito county. These mines are situated at distances of from 10 to 16 miles from Hollister, on and near the summit of the mountains dividing San Benito and Fresno counties, at an altitude of 3,350 feet above the valley level. The first and most important are

The Stayton Mines.

Antimony was discovered upon the ground by the Stayton Bros., 19 years ago; but as this metal had but little, if any, commercial value at that time, they did not then make any effort to develop their discovery. Thinking, however, from its appearance that the ore might contain a good percentage of galena, some years later they did a little work on one of the claims, in which they unearthed a deposit of cinnabar. Further prospecting soon disclosed the fact that this latter metal also abounded in paying quantities all over the hills. The Staytons went energetically at work to develop their claims. Although for years working under numerous disadvantages, which would have disheartened men of less pluck and energy, they in time made manifest the value of their property. Two years ago the claims, 17 in number, embracing about 460 acres, were covered by a United States patent; the owners being the Stayton Bros., Frank Smith, of Gilroy, and others. After this a small furnace was erected for the reduction of cinnabar, but owing to limited means but little progress was made, further than larger developments of quicksilver ore, which soon commenced to attract to some extent the outside world. The property was negotiated through agents in the London market, and it was believed to be and reported sold three or four times, but the transactions failed and it was not until the present summer that any portion of it changed hands. In July, a company composed of John H. Moore and S. A. Bishop, of San Jose, W. M. Lent, John F. Boyd and Mr. Harper, of San Francisco, men of large wealth and extensive mining experience, bought an interest and immediately set to work putting the property in shape. A large force of hands were employed, the mines opened, two splendid furnaces, ore houses, etc., built, and everything now looks promising for the future prosperity of the works. The demand for antimony being more active, the furnaces are being run on this ore exclusively, and there is enough of it in sight of a high grade to keep five more furnaces continually glowing for months to come. The deposits, of which 50 at least are uncovered, show large bodies of fine metal, and contrary to the accepted theory regarding this class of mines, instead of being found in chambers and deposits, it seems to be in continuous veins which grow wider and better as they go down. Considering the immense quantities of ore, both cinnabar and antimony, the ease and comparatively light expense with which it can be transported to the railroad, the abundant wood and water facilities with which they are surrounded, there can be no question that this is one of the most extensive and valuable mineral locations on the Pacific coast. The description of these mines will apply in a great measure to the other locations on the range, when they are developed to an equal extent, of which the next in prominence is the

Consolidated Wonder Group.

Adjoining the Stayton claims on the north, comprising some 20 promising discoveries. These mines have been incorporated and the stock mostly owned by residents of Hollister and San Francisco. Considerable work has been done in the way of tunnels and shafts, all which disclose good prospects of high and low grade ore. A kiln of brick has been made and burned on the ground, and we understand it is the intention of the owners to erect a competent furnace soon as the necessary arrangements can be made. This is no doubt a very valuable property, and as none of the stock is on the market for the purpose of raising funds with which to build furnaces, etc., a better chance does not offer for profitable investment. A large portion of the pool put up has already been sold, and next spring will see these mines turning out plenty of ore. Still further north and adjoining the Consolidated Wonder is what is known as the

Salinas Mine.

It is also an incorporated company, nearly all the stock being owned in Salinas City. This claim has been worked continuously for several years, and the showing in the tunnels looks splendidly. It has produced a great deal of good ore and has yielded more profit to its owners than any mine in the range. Contiguous to the Salinas mine is the Comstock lode, owned, we believe, principally by Watsonville men. The prospects of the Comstock are now flattering indeed. A large vein of fair ore computed to be 30 feet in width has been cut in the main tunnel, and the proprietors believe they have nothing short of a veritable bonanza. Beside the mines mentioned, there are the Quisen Sabe, Consolidated Ralston and several locations which, as far as developed, promise equally as well as the older claims. There is a world of ore in these hills, and the day is not far distant, if the judgment of experts is not greatly at fault, when San Benito will take rank with the most profitable mineral producing counties of the State.

USEFUL INFORMATION.

The Catalpa Tree.

We notice that prominent railroad men are discussing the value of the catalpa tree for furnishing timber most suitable for railroad ties. We find in the *Railway Age* several letters, from which we make extracts to show the value of the wood to the mechanic and indirectly the advantage which it would be to our tree planters to grow it:

In the spring of 1871, in conversation with Wm. R. Arthur, formerly superintendent of the Illinois Central railroad, he stated that catalpa trees would last forever; that it was easily cultivated, was of rapid growth, and when planted in groves grew straight and tall as any forest tree; that he had several groves then growing on his farm that had been planted but four years and were 20 to 30 feet high; that he had planted them for fence posts, but had subsequently learned that they would hold a spike as well as oak and would not split. Hence their value for cross-ties.

Three years ago I cut from a catalpa tree, that had been cut down after growing 30 years as a shade tree, two railroad cross-ties, and placed them in a track over which trains pass every hour, one under a rail joint. The spikes show no signs of loosening. The catalpa does not hold a spike as well as oak, but sufficiently well for all practical purposes. It does not split easily. While not as tough as some woods, it should not be termed brittle, as stated in Millikin's essay. I subjected pieces of catalpa, oak and ash, one inch square, to a breaking pressure twelve inches between supports. The catalpa broke under a pressure of 703 pounds; ash 890 pounds; one piece of oak at 577, one at 709, and one at 1,141 pounds. The catalpa deflected three times as much as the oak or ash before breaking.

This handsome and valuable tree is native in all the southwestern States, but is everywhere rare. It is distinguished by its silver-gray, slightly furrowed bark, its wide-spreading head, the fewness of its branches, and the fine, pale green of its very large heart-shaped leaves. It is a very profuse bloomer except in wet summers. The flowers are very showy, large, bell-shaped, white, slightly tinged with violet, and dotted with purple in the throat. They are succeeded by long bean-shaped seed pods, which hang till the next spring, when they open, and the small, thin, broadly-winged seeds are borne away on the winds. The "Farmers and Planters' Encyclopedia" says the rapid growth of the catalpa in almost every situation in which it can be placed in the Middle States, and the adaptation of its wood to fence posts and other useful purposes, make it deserving the attention of farmers. The wood, though light, is very compact, of fine texture, and susceptible of the most brilliant polish, its fine straw color producing a fine effect in cabinet work and inside finish for houses.

Those wishing to propagate the catalpa should gather the seed pods this or next month; put in a dry place secured from mice. They may be found hanging from the catalpa tree, planted as a shade tree in most of the cities and towns in Ohio. There are fifty or more seeds in each pod. Plant in spring, in good soil, in rows three or four feet apart, six inches in the row, and thin down to one foot. Keep the ground clean and let them grow three years; then transplant, placing them in rows ten feet apart north and south, and six feet apart east and west. In from six to eight years remove each alternate tree in rows running north and south for fence posts and telegraph poles, leaving the remaining trees ten feet apart one way and twelve the other, 363 to the acre. In from six to eight years more these will be large enough to make four to eight railroad ties each, if they have been planted in good ground. They should be split or sawed through the middle and the round side placed on the ground. The catalpa has only a film of sap one-sixteenth inch thick.

Each acre and a half of ground, thus planted and properly cared for, will furnish enough fence posts and telegraph poles in from eight to twelve years to pay for the land and all expense of planting, care and protection, and in from fifteen to eighteen years furnish railroad ties for one mile of track, which at fifty cents each (cheap considering their quality) will pay \$50 per year on each acre of ground for each year they have been growing. Can a farmer make a better investment for himself and family than to plant ten or twelve acres in catalpa trees? A railroad once tied with catalpa would find its annual expenses for repairs diminished \$200 per mile, a saving that would add 10% to the value of the property.

WALRUS-HIDE MACHINE BELTING.—The specimen of gigantic machine belting, says the *London Mining Journal*, which has recently attracted so much attention at the Leeds Corn Exchange, is manufactured by Mr. Joseph March, of that place, the material used being the skin of the walrus or sea horse. It is stated that this belting cannot be equaled by any yet introduced for strength and durability for heavy work when used upon large drums such as main driving. The thickness of the walrus hide is from one-half inch to one and one-quarter inch, so that belts of that substance can be made of all solid leather, and the fibers thereof being longer than any other hide used in strap

making, it is remarkably tough and lasting. There are walrus-hide belts in this country which are still running, and which have been in constant use as main driving belts in forges, saw-mills and other large works for 15, 18 and 20 years, yet they are in good running order, and giving the utmost satisfaction. It is frequently observed that in ordinary double belting a great strain takes place on the outside lap of the belt, which, of course, cannot be the case with the walrus-hide belt, owing to its being of one thickness only. It is remarked, moreover, that they run very slack, and do not require to be worked tight as some belts do; indeed, the bight on the drum is marvelous. For example, a 14-inch belt 90 feet long will drive 100-horse power with great ease. Mr. March is now having six 18-inch belts finished for a firm for main driving; they are made in lengths of from six feet to nine feet, the joints being cemented and put under great pressure for 48 hours, and then sewn with one-half inch laces one-eighth inch thick, and riveted with extra strong copper rivets, and the last joint when in use is made with steel plates and bolts. The price is lower than that of the best double belting, and the great drawback is that walrus hides are now and then very scarce and high in price; four years ago they were 5s 6d to 6s per pound in the rough, but there is now a better supply of them, though how long this will last cannot be determined.

Economy in Engine Wiping.

The *Railway Age* shows a point of economy in railway management. It says every railway company pays thousands of dollars annually for the mere service of cleaning and polishing its locomotives in order to make them look well. Is it not possible that this is a useless waste of money? The idea is a new one. We do not know that it has ever been suggested in print, but we do know that it is being seriously considered by one or two managers at least.

The superintendent of the Philadelphia and Reading railroad is the first, so far as we are informed, to put the idea to practical test. That great road employs 410 locomotive engines, and the superintendent estimates that by dispensing with wiping them, he is saving no less than \$235 a day, or say \$85,000 a year. If this has heretofore been a needless expense, what an immense amount of money has been thrown away by this company alone—how many millions have been wasted by the railways of the country!

The idea that locomotives must be showy as well as useful is almost peculiarly an American one. Every American traveler in Europe has been struck by the plainness of railway engines abroad—plain black, serviceable machines, without brass or gilt or polished steel ornaments, often with the machinery out of sight—ugly indeed as compared with our glittering engines, but splendid specimens of mechanical skill, and wonderful for power and speed. This idea of utility rather than beauty has been adopted in our own country of late years, and polished brass bands, gilt letters and showy stripes have given place to sober, hard-working black, requiring little labor for the sake of looks.

Injury from Manufactory Smoke.

It seems odd that, in a country like England, where bituminous coal smoke penetrates almost everywhere, any one should think of recovering damages on account of its deleterious effects. But it seems this has not only been attempted but actually done, as is shown by the following:

At the Stockport county court, Mr. Benjamin Whitman, nurseryman, Reddish, claimed from Mr. Obadiah Stafford, contractor, Guide Bridge, the sum of £20 for damage to plants caused by smoke from the engine of a mortar mill belonging to the defendant. The plaintiff's nurseries comprised forty-two acres of land, nine green-houses, and amongst other valuable stock over 20,000 camellias. The defendant, for the purpose of executing some contracts in the township of Reddish, had erected a mortar mill about 40 yards from the nurseries, and the smoke from the engine had destroyed a large number of plants, the damage being assessed at £81. Defendant denied that the damage was caused by the small quantity of smoke emitted from his six-horse engine, and attributed it to the railway traffic, the manufactories, and dwellings that have increased very rapidly in the district of late. The case was submitted to a jury and they gave a verdict for the plaintiff for £25 and costs.

GOOD HEALTH.

Dyspepsia.

The nervous energy is the motive power of the whole man, spiritual, mental and physical. When that power is equally distributed the body is well, the brain is clear and the heart is buoyant. If the brain has more than its share, it burns itself up, and makes the "lean Cassius,"—the restless body and the anxious countenance.

As there is a given quantity of nervous influence for the whole body, if the brain has more than its natural portion, the stomach has less, consequently the food is not thoroughly assimilated, or, as we call it, "digested." This being the case, the requisite amount of nutriment is not derived from the food, and the whole body suffers, doubly suffers; for not only is the sup-

ply of nutriment deficient, but the quality is imperfect. These things go on, aggravating each other, until there is not a sound spot in the whole body; the whole machinery of the man is by turns the seat of some ache or pain, or "symptom." This is a common form of aggravated dyspepsia.

Such being the facts, some useful practical lessons may be learned.

1. Never sit down to a table with an anxious or disturbed mind; better a hundred-fold intermit that meal, for there will then be that much more food in the world for hungrier stomachs than yours; and besides, eating under such circumstances can only, and will always, prolong and aggravate the condition of things.

2. Never sit down to a meal after any intense mental effort, for physical and mental injury is inevitable, and no man has a right deliberately to injure body, mind or estate.

3. Never go to a full table during bodily exhaustion; designated by some as being worn out, tired to death, used up, done over, and the like. The wisest thing you can do under such circumstances is to take a cracker and a cup of warm tea, either black or green, and no more. In ten minutes you will feel a degree of refreshment and liveliness which will be pleasantly surprising to you; not of the transient kind, which a glass of liquor affords, but permanent, for the tea gives present stimulus and a little strength, and, before it subsides, nutriment begins to be drawn from the sugar and cream and bread, thus allowing the body, gradually and by safe degrees, to regain its usual vigor. Then, in a couple of hours you may take a full meal, provided it does not bring it later than two hours before sundown; if later, then take nothing for that day, in addition to the cracker and tea, and the next day you will feel a freshness and vigor not recently known. No reader will require to be advised a second time, who will make a trial as above, while it is a fact of no unusual observation among intelligent physicians, that eating heartily, under bodily exhaustion, is not an infrequent cause of alarming and painful illness, and sometimes of sudden death. These things being so, let every family make it a point to assemble around the family board with kindly feelings, with a cheerful humor and a courteous spirit; and let that member be sent from the table in disgrace, who presumes to mar the ought-to-be blest reunion, by sullen silence, or impatient look, or angry tone, or complaining tongue. Eat in thankful gladness, or away with you to the kitchen, you graceless churl, you ungrateful, pestilent lout that you are. There was grand and good philosophy in the old time custom of having a buf-foon, or music, at the dinner-table.—*Hall's Journal of Health.*

Carpets and Disease.

Is it true that carpets are a fruitful source of disease? that organic particles from the sick become entangled in them?

We answer emphatically, yes, and we quote Prof. Tyndall, in "Fragments of Science," who says, in regard to a case of scarlatina of apparently spontaneous origin: "But then the question arose, how did the young lady catch scarlatina? She had come there on a visit two months previously, and it was only after she had been a month in the house that she was taken ill. The housekeeper at once cleared up the mystery. The young lady, on her arrival, had expressed a wish to occupy a nice room in an isolated tower; and in this room six months previously a visitor had been confined with an attack of scarlatina. The room had been swept and whitewashed, but the carpets had been permitted to remain. This is one case in many. So long as the seeds of disease are kept alive epidemics must occur, and so long as certain habits and customs prevail, then seeds must be kept alive. Imperfect sewerage, unrenovated walls, uncleaned floors and carpets, are among the leading causes of retained disease.

Sewerage in these days is receiving a fair share of public and private attention, and the walls of houses, where contagious diseases have been, are very generally cleaned, whitewashed or newly papered; but carpets are too often overlooked as the carrier of disease. The truth is that they, more than any article of furniture, more even than the walls of the room, gather and retain dust; and this dust, though chiefly inorganic, and comparatively harmless, contains organic germs, which only need to be raised into the air and taken into the human economy to develop into active disease; creating, under favorable circumstances, an epidemic.

Do we believe this? Any careful physician or nurse knows that it is true. Again, the dust, which we spoke of as "comparatively harmless," is a most fruitful source of catarrh and consumption. The irritation of the mucous membrane of the nose, throat and lungs, becoming chronic, leads to serious disease, that undermines health and destroys life. Can we deny this?

Again, how many women say: "If it were not for the sweeping of my carpets I could get along with housekeeping very well." Many women know from experience that sweeping is one of the great trials of the housekeeper's life; and that it causes much of "the weakness" among women.

"Fore-warned is fore-armed." When we see the need of change in any direction we are ready to accept the better methods. What shall these better methods be in relation to carpets and disease?—*Herald of Health.*

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SAN FRANCISCO:

Saturday Morning, Jan. 13, 1876.

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TAX ON INCORPORATIONS.—The proposition now pending for licensing professions, companies, etc., not heretofore taking out licenses, is creating quite a stir in this city. The tax on incorporations, if adopted, will yield no inconsiderable revenue. Any company doing business in this city, either in mines or mining, telegraphing, furnishing gas or water, depositories of treasure, money or other valuables, whose gross receipts are less than \$2,500 per month, \$10 per quarter; less than \$10,000, \$25; less than \$20,000, \$45; less than \$30,000, \$60; less than \$50,000, \$125; less than \$75,000, \$200; less than \$100,000, \$300 per quarter; more than \$100,000 and less than \$500,000, \$400 per quarter; over \$500,000, \$500. Under these two latter heads will come the principal banks, mining companies, gas and water companies, real estate associates, and other corporations doing a large business. Another section is as follows: Each person, firm or corporation liable to procure a license shall, upon application for a license, render to the license collector a sworn statement of the amount of business done and transacted by such firm or corporation during the preceding quarter, which statement shall determine and be the rate at which the license shall be issued for the succeeding quarter.

BULLION SHIPMENTS.—Since our last issue shipments from the prominent mines have been as follows: Modoc, January 3d, \$11,280; Washington, 3d, 293 ounces bullion; Northern Belle, 3d, \$10,337.60; K. K. Con, 2d, \$5,000; total for December, \$60,000; Tybo Con., December 31st, \$9,276.27—total for date, \$69,299.77; Con. Virginia, 5th, \$99,711.39—total for December account, \$357,716.87; California, 5th, 22 bars, \$92,151.19—total to date, \$889,784.82; Northern Belle, 5th, \$9,797.09; Modoc, 5th, \$5,600—total to date, \$53,200; Gila, 4th, \$9,806; Leopard, 3d, \$4,152.51; Belcher—total for December, \$112,000; Manhattan, 6th, \$13,100; Modoc, 7th, \$11,500—total to date, \$46,700.

Working Deep Diggings.

In almost every mining country, and especially on the Pacific coast, there are extensive beds of auriferous earth, sand and gravel that have not heretofore been made available simply because no efficient system and apparatus have been devised for working them economically. In many instances the upper strata of earth have been worked off to a considerable depth, at a fair profit, by existing imperfect methods and devices, but the expense of handling, removing and washing the material at a greater depth became so expensive that the mines were abandoned, even in the face of the well-known fact that the richest deposit of gold is found in the stratum nearest the bedrock. Although it has been suggested that earth, sand and gravel could be raised through a pipe or tube by means of hydraulic force, up to the time of the experiments of Geo. W. Cranston, of this city, the plans and apparatus suggested were incompetent to accomplish the object. The method recently patented through our agency by this gentleman not only consists in providing an improved arrangement, by which he is able to raise the auriferous material to the required height by means of hydraulic force, but also in a combination of apparatus by which he accomplishes the separation of the gold from the earthy matter, all by means of one continuous operation.

He first excavates at some place on the surface of the gravel bed a depression in which to locate the machine, so a sluice can easily be constructed away from the points where the earth is being taken out, which will convey the auriferous material to the machine. The improved machine consists of a ground pipe, which is composed of two or more sections, a sluice, a grizzly, regulating gate, elevating spout, flume, pipe and nozzle, etc. The two ground sections are preferably in two sections—or in one longitudinal section if desired—but in either case the sections are made in two halves. Each half is provided with a flange along each side, so that when the upper half is placed upon the lower half, the two can be permanently fastened together by bolting the flanges together. By this means the lower half, upon which the greatest wear comes, can be renewed without renewing the upper half.

One section is bent upward with a gradual curve towards the ends opposite the attachment of the other section, and the lower end of the spout is secured to its upward bent end. These sections are made of cast-iron, but the spout is made of wood. This spout can be of any desired length, according to the height it is required to raise the material from the excavation. The flume is attached to the upper end of the spout and is supported at an inclination downward, so that the water and material raised through the spout will be carried down through the flume. This flume can be made of any desired length, and is provided with riffles like an ordinary mining flume, so that the gold in the material raised will be caught in the flume.

A hydraulic pipe leads from some elevated water source or reservoir, and has a nozzle which passes at an angle through the top of the ground section and into the interior of the section so as to terminate at or near its center, the nozzle being pointed towards the wooden spout. The water coming through the hydraulic pipe with a velocity and pressure in proportion to the head or fall, will drive through the ground sections and up through the wooden pipe and thence be carried off down the flume. It is evident, therefore, that this stream of water will draw into it by suction and carry along with it by force any material, such as earth, sand, gravel or even large stones, that may be introduced into the rear end of the ground section, upon the well-known injector principle.

The other section is preferably an elbow, and this elbow is attached to the rear end of the ground section by a swivel joint, so that it can stand at any desired angle to the ground section, to conform to the inequality upon which it will rest, or it can be turned entirely round, as desired.

By means of this elbow or bent section, a hole can also be excavated by standing the ground section upon end, so that it will rest upon the elbow. A stream of water is then driven through the ground section and spout, by means of which the earth, gravel and water directly around the lower end of the elbow is drawn into the stream and carried up the spout. By rotating the elbow when in this position it is possible to sink a well or accomplish the work known to miners as "bottoming," with great speed.

Between the lower end of the sluice and the elbow, is constructed a one-sided box, in which is placed the "grizzly" or grating, so that the water and material from the diggings will pass over and through the "grizzly" before it enters the elbow. A gate is arranged to slide up and down between the "grizzly" and elbow, so that the inflow of water and material into the elbow can be regulated, but will be more frequently used as a valve to close the space above the incoming stream and thus prevent the entrance of air into the elbow with the water and material, as a free entrance of air with the material, behind the nozzle, creates "foaming" and impairs the force of the stream.

The auriferous material thrown into the sluice

will be carried down it and over the "grizzly," thus separating the large stones and allowing only the finer portion—in which the particles of gold are held—to pass through and go to the stream. The "grizzly" is constructed on an incline, towards the sideless side of the box, so that the large stones that cannot pass through will roll off to one side out of the way. To prevent the elbow from being clogged by the material, a branch pipe or tube is led from the hydraulic pipe and introduced into the bend of the elbow and directed towards the nozzle. This pipe will carry a small stream of water and will not only serve to keep the elbow clear but will materially assist the suction in forcing the material into the main stream.

The ground section, where the nozzle enters it, is made larger than the other section, so as to form an interior chamber around and in front of the nozzle of sufficient area to admit the material on all sides of the stream and nozzle. This interior chamber gradually contracts towards the section, until the passage corresponds with the passage in that section, thus giving a gradually decreasing space on all sides of the stream and nozzle, which the material will fill and be subject to the suction of the stream, and the incoming material at the rear will force the material in this chamber into the stream, thus giving the most positive action.

It will be evident from the above description, that the greatest amount of wear upon the sections and spout will be upon the bottoms of the sections, and to be able to renew this portion of the pipes economically, is one of the objects in making them in halves, so that the lower section can be replaced when it is worn out; but wearing plates or false bottoms could be applied if desired. A very economical plan would be to cast the lower halves of the sections with a longitudinal recess and fill this recess with wooden blocks, which would receive the wear.

This inventor is perfectly aware that it has been attempted to raise tailings from excavations in mines by placing a straight box or spout against the bank and introducing the hydraulic nozzle into its lower end, so as to lift the material directly in a straight line. This, however, is extremely difficult to do. It requires the sweep of a curve at the lower end of the spout, so that the material to be lifted will be thoroughly mingled and in moving action with the water before the upward motion is given. Mr. Cranston's combination of a gold-saving flume with the spout enables him to accomplish at a single operation and with the same stream of water, both the raising of the material and the separation of the gold and heavy metals, thus rendering the process economical, simple and complete.

Public Health.

In comparison with several of the years last past the death rate in this city is alarming, and it is feared that if the present dry weather continues, a still further proportionate increase may be expected. The epidemic of small-pox, which has prevailed for some months in San Francisco, has of course materially increased the death rate, and now for some time the equally, if not more, dangerous diphtheria is committing its ravages. This is by no means confined to the city, as it extends all over the coast, varying, however, in degree in different localities. This scourge is principally confined to the little folks and is not considered dangerous to grown persons. Throat affections of different kinds are prevalent, however, among grown people also.

Diphtheria has now become so dangerous to children that parents all over the coast are greatly alarmed and every remedy is tried. No specific has yet been found, however, and physicians disagree as to cause as well as to treatment. Although this is no uncommon circumstance, the treatment varies so greatly that the opinion prevails that the profession knows less about the disease than its importance warrants. To many diphtheria is more alarming than small-pox itself, usually considered the most disagreeable and dangerous of diseases. For it, however, vaccination furnishes a preventive; for diphtheria there seems to be none, and what is worse, the chances appear less favorable for recovery from the former than the latter.

In some families as many as four, five or six children have been taken away in the space of two weeks. Every precaution is taken by careful parents to prevent catching the disease, but it appears to be in the form of an epidemic and one which the physicians are unable to check. The old theory that it owes its cause to defective sewage seems exploded, as it appears in all localities, whether well sewered or not; and the interior parts of the State are by no means free from it. Of course the ravages are more apparent in the city, owing to the density of population.

It is hoped that after a few good rains the epidemic will cease, though no medical expert has publicly given any reason for the expectation. The ravages now being committed by diphtheria are such as to call to it the most searching and scientific attention of the medical profession, for unless some sovereign remedy is discovered and applied it will doubtless continue, periodically at least, to decimate the ranks of the children of this coast. The public naturally look to the physicians for aid, but in this case, sad to say, the profession seems deficient, and the societies throughout the country should give the disease the most unceasing attention in order to discover a remedy.

The Silver Mines of Jefferson City and Boulder, M. T.

EDITORS PRESS:—The mining of this portion of Jefferson county is confined at present principally to two districts, the Colorado and the Boulder—distant from Helena from 20 to 30 miles. A few mines in these districts have been sufficiently developed to establish for each a character for richness as well as for stability and permanence, giving as far as opened the characteristics of true fissure veins and likely to hold out as greater depth is attained.

The leading mine in Colorado district, and ranking among the best in the Territory is

The Consolidated Gregory.

It is located within four miles of Jefferson City, and worked by an incorporated company, Seligman & Co., of New York, as also of your city, being among the number of the principal stockholders.

Besides much work previously done it has been steadily and profitably mined since it became the property of the company. The mine is opened by one main shaft to the depth of 170 feet, by a tunnel 525 feet, and by two levels east of the shaft 250 feet each, with one on the west of 50 feet.

The average width of fissure is six feet, and the ore vein from 18 inches to two feet, widening in places to five feet, where the ore is usually purer than in the narrower portions. The walls are of trap, although granite seems to be the prevailing country rock of the neighborhood. They are smooth and beautiful, nearly perpendicular, with but a slight dip to the north, the direction of the lode being east and west. The character of ore is argentiferous galena, and shipments to New York averaged \$175 per ton in silver, and give from 60 to 65% in lead. The cost for freight to New York and for sacks is about \$54 per ton, leaving a good margin for profit.

The company shipped last year 550 tons, and had on hand about 150 tons, besides some 4,000 tons of concentrating ore, held for future treatment, and valued at from \$15 to \$25 per ton. New steam hoisting works will be erected the ensuing season, the water and ore being at present raised by a whim.

It is under the management of Mr. L. R. Nettre, a gentleman of much practical experience, besides having had the advantages of a good mining education at Freiberg, which may account for its systematic working, and to some extent perhaps for its success financially. The ore body is said to hold in quantity and richness as greater depth has been attained.

The Gregory (Proper).

And discovery claim, next adjoining on the east, although not as well developed, is thought by its friends as little inferior to its neighbor. One level, 300 feet, shaft 90 feet. Has yielded, working process, \$125 per ton, and from 50 to 65% lead.

The Nelson, a few thousand feet further east, is opened by two tunnels, one of 312 feet in length, and reaching a depth from the surface of 180 feet. The lode varies in width from 12 inches to four feet, and the ore samples on an average \$100 per ton.

The Belle, of Belleville, some distance south of the Gregory, has a fissure from six to eight feet and a vein of solid galena, worth, in silver, \$105 per ton.

The Montana Company.

Mr. P. M. Saunders, superintendent, is at present working on one of its lodes, the North Pacific, believed to be both valuable and promising, but the large

Concentrating and Reduction Works

Recently erected by the company are of such importance and magnitude as to require a description somewhat in detail.

The building for the concentrating works is 100 feet in length by 33 feet in width, and four stories high, besides having a tower of three stories, and is provided with a 60-horse engine and two 40-horse boilers for driving the machinery. The reduction works are also large and substantial. The amount of lumber used for both was 260,000 feet, 1,200 perch of stone, 150,000 brick and 15,000 fire-brick. The main stack 50 feet high and 36-inch flue. The ore is introduced from the ore shed on the hill in the rear to the fourth story, where it passes, first, through Blake's rock-breaker; second, into Krom's drying furnace, where it is kept in a constant motion, dropping slowly from shelf to shelf for 30 minutes, when it is thoroughly dried; third, into a set of Krom's rollers, similar to the Cornish, and thence into screens, where it is sized, the finest passing into an elevator, and the coarser into a pair of similar rolls to be further crushed before being carried to the elevator. It is then conducted to a bin, and afterwards weighed on a pair of Marvin scales.

It is now carried by a second elevator to the top of the tower (70 feet) and made to pass, on its way down, through four of Krom's patent revolving screens, for the purpose of sizing it.

The ore thus sized is passed through eight concentrators (Krom's) to the third floor, and from thence to the second floor to be re-concentrated through four concentrators. The

concentrated ore is roasted in Bruckner's cylinders and in two reverberatories, after which it is converted into base bullion by a water jacket smelter. All the dust of the works is collected by a Sturtevant exhaust fan and carried into bins outside of the building for treatment by Bruckner cylinders, and finally reduced by pan and settler process to bar silver. Daily capacity of concentrating works, 50 tons. The construction was committed to Mr. Rodgers, a gentleman thoroughly conversant with the Krom process, and sent out for the purpose, so that a full and fair test of its workings on the galena ores in this and surrounding districts may be expected to be made, and the question as to its merits, as compared with wet concentration, fully settled.

Drs. Parker & Brooks are running a tunnel with the view of tapping and working five parallel leads, 80 feet apart, the location being between the North Pacific or Argentinum mine and the concentrating works.

Wherever opened, as in many cases near the surface, well-defined veins of argentiferous galena make their appearance, the ores represented as giving sample assays from \$110 to \$340. The Silver Plate, adjoining the North Pacific on the east, is owned by Seales & Co. Shaft 120 feet; lode 5½ feet in width; 2½ feet of manganese, running from 80 to 95%, and most of remaining ledge matter made up of galena.

The Alta California, 3,000 feet east of the Argentinum. Incline 165 feet; 9 feet of galena, worth \$50 per ton silver and 27% lead; 2,200 feet owned by Col. J. A. Viall, of Helena.

The C. C. lode, A. Street owner, is said to be six feet from wall to wall; ores both milling and smelting, and giving some assays as high as \$250. Situated near the road from Jefferson City to the Gregory. The Byron, Paymaster, Gray Eagle and others in the same vicinity, are represented as more or less promising. Messrs. Sites & Duges, in addition to a quartz mine of milling and smelting ore, worth about \$50 per ton, have a very valuable gravel claim in Homestake gulch, five miles from Jefferson City, that pays \$30 to the man. The bank is 12 feet deep and is worked by hydraulic.

We pass next to

Boulder District.

Which can well boast of having some of the finest mines in the county; the lodes generally large, well defined, and yielding ore in considerable quantity, and some of it of very high grade. The two at present attracting most attention are the

Rumley and Comet,

Lying like twins, side by side. It is to be hoped that they may ever thus lie lovingly in each other's embrace, drawing a wise lesson from the history of Esau and Jacob.

The Rumley, Mr. I. I. Lewis, superintendent, has a discovery shaft 90 feet, a shaft on claim No. 1, of 180 feet, and on claim No. 2 of 52 feet. A tunnel to strike No. 1 at the bottom of shaft and the discovery at 200 feet below surface, has been extended 390 feet, showing a stratum of galena from three to five feet, the whole carrying metal of more or less value. There is also a level on No. 1, east and west 190 feet. The ore thus far shipped has run from 70 to 190 ounces, equivalent at current rates to from \$85 to \$240 per ton. The vein lies wholly in the granite, giving evidence of increasing value as well as of permanence. The

Utsch Automatic Jig

Has been tried with success on the ores of this mine by A. M. Hatter & Bro., of Helena, who have recently introduced the invention, holding the right for the Territory. It is said to have a capacity for concentrating 50 tons in 10 hours, and separating as many of the different minerals as may be desired, providing their specific gravities are sufficiently distinct. The whole work is done in one operation, needing but rarely any human intervention.

The Comet mine

G. B. Russell, manager, is opened by tunnel 300 feet; shaft 70 feet; greatest depth from surface 90 feet. Lode averaging 8 feet, in some parts having 14 feet of solid argentiferous galena, that runs \$70 per ton for the whole vein. First class ore gives \$150 in silver and sometimes as high as 75% lead—50% being a fair average for the whole. One thousand of first class were shipped the past year, and there are now nearly 4,000 tons on the dumps. As those most interested were awaiting the returns of about \$20,000 worth of ore, at the time, in the market, they may be excused for being a little jubilant. Finer walls one could not wish to see, and a more suitable width of lode for convenient working is seldom found.

The Molly McGregor,

One mile south, has produced some of the finest smelting ore in the district, and its future is looked upon by its friends as exceedingly flattering. Shaft 75 feet—seven feet between walls, averaging two feet of galena.

The Australia,

Three-fourths of a mile east of the Rumley & Comet, and on the same belt, has a discovery

shaft 34 feet, from which 63 tons paid \$170 each. A tunnel is being run to tap lode at the depth of 250 feet, now, within 50 feet of vein, which has a slight dip to the north. There is also a shaft 100 feet deep on the same lode, 800 feet west, which shows five feet of solid ore, thought to average \$60 per ton.

About two miles further east, on the same range, there are several locations.

The Yellow Jacket,

Owned by Messrs. Jones, Rice & Co., is opened by two shafts, 34 and 48 feet, and drift from the foot of one of them has been run the distance of 50 or more feet across the lodes, passing all the way through ledge matter, finding a body of argentiferous galena and oxides, at least 15 feet in width, estimated to average \$30 per ton in silver, saying nothing of the lead.

On the authority of Mr. Jones, one of the principal owners, and also on that of a gentleman of standing who assayed it, ore taken from different portions of the mine runs from \$40 to

The Stock Boards.

The annual meetings of the San Francisco and Pacific Stock and Exchange Boards took place this week. The election of the San Francisco Board resulted as follows: President, John W. Coleman (re-elected); Vice-President, C. W. Bonyage (re-elected); Chairman, B. H. Coit, (re-elected); Treasurer, H. Schmiedell (re-elected).

President John W. Coleman made an extended report, embracing partially the increase of the business from the organization of the Board up to the present time. We shall refer more fully to this address in an "Annual Review" next week.

The annual meeting of the Pacific Stock Exchange was held on Tuesday and the following officers were elected: E. J. Baldwin, President; C. L. Weller, Vice-President; A. J. Moulder, Secretary; J. Tilden, Chairman; G. C. Hickox, Treasurer; T. C. Van Ness, William H. Wright and Paul F. Beardsley, Trust Fund Committee. Mr.

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Mechanical Ore Concentration and Separation—No 17.

(Written for the PRESS by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.)

Stamps and Pulverizers.

Before continuing further with the department of the subject under consideration in the last article, a further notice of crushing and pulverizing machinery is necessary, although this more properly belonged to a portion printed in an early part of the treatise:

If of anything, the "Great West" may boast of multiplicity and variety of stamps; but with all that it remains a fact that stamps constitute the least economical and the least rational as well as the most clumsy and the most awkward contrivance for ore breaking. What crusher

and roller can do, therefore, should never be attempted by stamps. Among all the different patterns in use of late, the introduction of stamps deprived of the feature of cams have been tried. They differ only in the motion, but not in the effect of the blow, from older patterns. The so-called steam stamps have a steam cylinder and pitman to each head. The "atmospheric stamps" move by a curved shaft and have air cylinders to temper the blow.

Howland's rotary pulverizing and amalgamating quartz mill (illustrated herewith) will be found to answer all purposes best where stamp mills will be needed, for a reserve action in mineral dressing, and possesses many advantages which others do not, of which not the least is that its work is reduced to a rotary motion in a higher degree than with any other kind of stamp mill.

Pulverizers, whether on the ball or burr principle, do not do the kind of work required for concentration, because they equalize the shape of particles too much and destroy a quality (cleavage) which has to assist in concentrating sizes of very small dimension.

Wet or Dry Breaking.

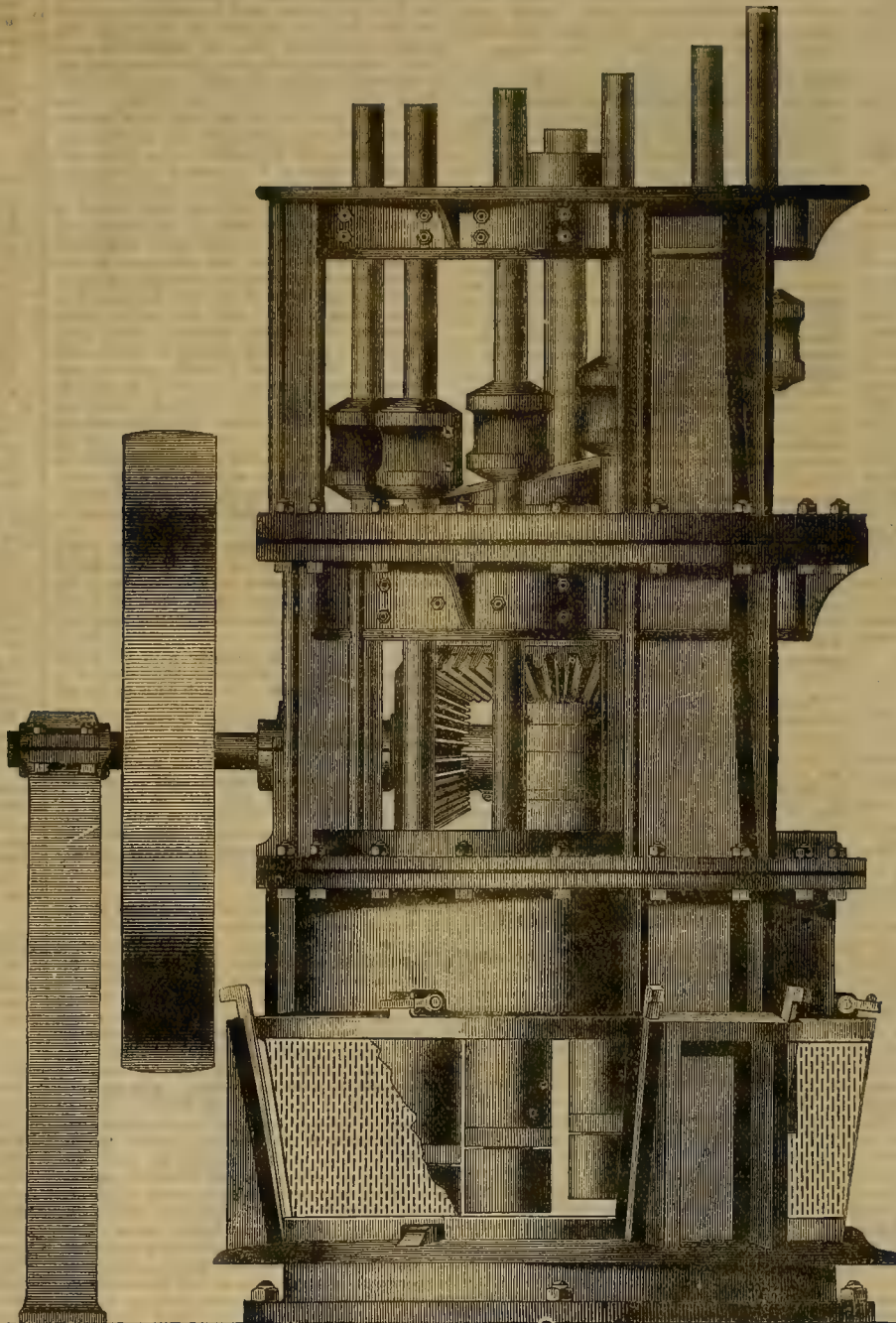
Whether it will be more advantageous to crush, roll or stamp dry or wet for the purpose of mineral dressing, must be decided entirely by local circumstances.

Unless the ore, when brought to the crusher, be at least dry enough with the assistance of the dust produced by the crushing itself, not to clog, it would be advisable to add water, but if the ore is not clayish or of a clogging nature, dry crushing is preferable, and the same is the case for rollers. All the sizing which should be done between crusher and rollers, so as to withdraw from further action what does not require it, and also all sizing after rolling, so as to retain what requires further breaking, can be done dry, and is indeed done dry with better advantage.

The further particulars concerning sizes will be determined on in the following section.

LIFE OF GENERAL CUSTER.—A very interesting book entitled, "The Life of Major-General George A. Custer," has been compiled by Captain Frederick Whittaker, and is for sale for \$4.50 by A. Roman & Co., in this city. The work is a very interesting and exciting one, and describes in a vivid manner the numerous daring exploits of the "gallant Custer." It gives a complete history of his life from his boyhood, with a detailed account of his fighting during the civil war, and also of the Indian campaigns, in the last of which he lost his life, fighting to the last. The portrait drawn seems like that of a knight of romance, and after reading the history of this dashing soldier one feels inclined to take him as an ideal hero. He is so looked upon by thousands in the nation for which he fought and died, and a history of this brave young officer should be on the shelves of all who admire patriotism, bravery, skill and other qualities which go to make a successful soldier. The book is well illustrated and comprises about 650 pages.

DESERT LANDS.—A dispatch from Washington says: "House reported a bill for the sale of desert lands in California, Oregon, Nevada and the Territories. It provides for the filing of a declaration with a register and receiver of a land district in which the desert lands are situated, that the persons intend to reclaim the tract of desert lands, not exceeding one section, by conducting water upon the same within periods of three years thereafter, and upon subsequent proof of such reclamation and payment of \$1.25 per acre for such tract, a patent therefor shall be issued. All mineral and timber lands are excluded. Lands that will not, without irrigation, produce some agricultural crop, are to be deemed desert lands. The bill was passed."



HOWLAND'S ROTARY QUARTZ MILL.

\$150 by assay. The indications on the surface are excellent, and a depth of 200 feet will probably reach a rich chimney. The same parties own two other claims on the same lodes.

In the same neighborhood is the Virginia Belle, owned by Dr. Brooke and Mr. B. P. Mason, incline 40 feet, crevice 8 feet, vein of galena 3 feet; ore sold as high as \$122 per ton, pronounced by some to be a true contact vein, as it has granite on one wall and either porphyry or trape for the other. The Paul Jones is similar in character. The Amazon, the Emmett, the Spencer, in this locality are said to be looking well, as also the Bismarck, Terre Haute, Silver Gem and others in other portions of the district.

MEXICAN CONSUL PRITCHARD regards the filibustering talk as of sufficient importance to justify him in addressing an official letter to Governor Irwin calling attention to the startling condition of society on the frontier of Lower California, and asking for the preservation of peace.

Baldwin congratulated the Exchange on its success during the past year—during which time sales of stock to the amount of \$125,000,000 have been made—and predicted even brighter fortunes in the future. He pledged his hearty co-operation and earnest efforts to advance the interests of the Exchange. Financially the institution has been a great success, having paid to each member during the year 1876 dividends to the amount of \$1,800.

ALTHOUGH a great many men are preparing to go to the Black hills in the spring, the fact is there are just as many men who are willing to swear positively that the Black hills country is the worst place a man can go, as there are those who are lauding it up to the skies.

AN action has been commenced in the District Court at Salt Lake between A. G. Hunter and J. N. H. Patrick, to determine who is the rightful manager of the Flagstaff mine, Little Cottonwood, owned by an English company.

THE ENGINEER.

The New York and Long Island Bridge.

The plans of the bridge which is to be built across the East river from New York to Blackwell's island, and thence to Long island, says the *Iron Age*, are completed, and have been sent to the Board of Consulting Engineers—General Bernard, General Gilmore and O. Chanute. Plans were designed by 40 competitors from all over the country and from Canada, and the most feasible and inexpensive design will be adopted. The plan selected by them will be considered afterward by the directors. A prize of \$1,000 will be given for the best plan, \$500 for the second, and \$250 for the third in merit. It is the intention to afford, through the bridge, quick and direct communication with the center of Brooklyn. The bridge will be erected at Seventy-seventh street, and although the present charter only allows it to begin its approach at Third avenue, arrangements are being made to extend it to Fourth avenue, thus connecting with the rapid transit trains of the Harlem railroad. From this point the approach will ascend until it reaches Third avenue, where it will be 15 feet high, so as to reach the proposed line of rapid transit along that avenue. It will then be carried over to Blackwell's island, and from there to Long island, the height at that point being 150 feet. The route will be along Graham avenue, the foot of the bridge being at Woodside. A steam railroad will run the whole length of the bridge. From Fourth avenue to the river two tracks will be laid, and over the two spans, one 600 and the other 700 feet long, there will be only one track. Over Blackwell's island and along the route to Long island there will be a double track, having its terminus at Woodside, where it will connect with the Long island railroad. The distance between this railroad and the South Side railroad at that point is less than a mile and a half. A connection will be made with the latter railroad, which runs to Brooklyn, and thus a direct communication will be had between Yorkville and Brooklyn. The extent of the route will not exceed seven miles, and it is proposed to run the distance in 29 minutes. As soon as the plans are decided upon by the Board of Consulting Engineers, it is the intention of the directors to have the work begun as speedily as possible, and have it completed in two years. The cost, it is stated, will probably not exceed \$2,000,000.

HYDRAULIC PROPULSION OF TRAMWAY CARS.—About midway on a line or network of tramways, or at any other point of the same line, a motive-power engine is, according to the invention of Mr. L. Rousseau, C. E., of Brussels, mounted and arranged in combination with pumps and apparatus in a similar manner to those employed in ports, docks or warehouses, where the lifting apparatus are actuated by hydraulic pressure. For this purpose a pipe or tube for conducting water under pressure is laid down along the whole of the line of tramway or its branches, and in communication with a reservoir or receiver. At suitable distances apart valves or taps are placed in the said pipe or tube in order to supply water under pressure to the carriages of the train, which are placed at certain stations in communication with the reservoir or receiver above mentioned. At these different points or stations each carriage completes or renews and stores away the necessary quantity of water under pressure which is required to enable it to act automatically in the distance comprised between two hydrants for taking in the water. In order to maintain the water under pressure stored in each carriage, a receiver is fixed either horizontally or vertically under the floor of the carriage. This receiver is composed of one or more cylindrical metallic vessels containing compressed air at high-pressure (from 20 to 30 atmospheres), according to the power required. The compressed air contained in each receiver acts by its elasticity similar to a spring, either direct or by means of a piston, on the water supply contained also in one or more cylindrical vessels. The water under pressure in the reservoirs or receivers puts in motion the mechanism, and thereby gives rotary movement to the wheels of the carriage. In order to put the mechanism in motion, an ordinary hydraulic capstan is employed, or the well-known multiple cylinder apparatus of Brotherhood or West, or the well-known cyclo-dynamic machines of Mathon, or any other suitable mechanism, in order to obtain the same result. —*Mining Journal*.

ENGINEERING ITEMS.—The East River bridge has now nine wire ropes in position stretched from the New York to the Brooklyn anchorage, over the two towers, preparatory to the construction of a foot-bridge and other facilities for putting together the cables. Chile has 1,000,000 acres under cultivation by irrigation, it being estimated that one-third of the value of the entire farming land of the republic is expended in the enterprise. Wherever irrigation has been introduced the land has increased in value threefold. —*Eng. News*.

The Great Mexican Railway.

The building of the great railway from Vera Cruz to the City of Mexico was a colossal feat in constructive engineering. The intervening country was superbly beautiful, and crossed at right angles by the great Sierra range, through which is one continued panorama of beauty.

The railway is 267½ miles long, has 18 lengthy tunnels, and many fine iron bridges. It cost the grand sum of 40,000,000 Mexican dollars; and is undoubtedly the finest constructed railway on the American continent.

The first 40 miles is straight, and on a gentle grade, rising slowly from the sea; then for a distance of 75 miles it crosses over three distinct ranges of mountains, each of which stand up like a colossal stair-case. This section is very crooked. Winding around the numerous canyons in the mountain, the train runs for many miles over the brink of precipices, almost perpendicular, 3,000 feet. The grades are 400 feet per mile; and the ordinary American locomotives find the greatest difficulty in crossing unencumbered. But the company use an English engine—known as the Fairlie patent—which carries ten loaded cars with ease. It is a double engine, or two engines connected, with their heads turned together, and 30-inch drivers.

At the west end of this division, which is at Boca del Monte, the road bed reaches its greatest elevation, which is 13,000 feet above the sea at Vera Cruz; from there it gradually declines through a continuation of broad valleys to the City of Mexico. These valleys are from three to 20 miles wide, entirely hemmed in with tall mountains. Every foot is irrigated, and in a thorough state of cultivation. —*St. Louis Railroad Journal*.

THE PARIS BUILDINGS.—Work on the buildings for the Paris exposition of 1878 is well under way. At the present time more than 500 laborers and artisans are busy on the Champ de Mars. It is intended to light the building by a monster light-house. Among the objects of interest will be international competitive concerts, a collection of coins, a number of models, and above all, the monster captive balloon. It will be 16 feet higher than the Arc de Triomphe. It will be strong enough to carry a railway locomotive and its driver; it will hold 50 persons at one time, and raise them to an elevation of more than 1,600 feet. It will be made of alternate layers of silk and india rubber, which will be joined together by more than three and one-half miles of cotton, and altogether about 21 miles of cotton will be used. The balloon will be held captive by cables capable of resisting a strain of 10,000 kilogrammes. The balloon itself will be strong enough to resist a typhoon. This, at least, is what the French papers tell us.

PERSIAN RAILWAY.—Since reversing his concessions to Baron Reuter, the Shah of Persia has thought better of it. We are informed that he has authorized the construction of a railroad six miles long to join the capital with a palace south of Teheran. It is to be hoped that this may be the forerunner of many other Persian railways, independent of any through routes that may be arranged eventually to shorten the distance in traveling from Europe to India.

Death of Commodore Vanderbilt.

Cornelius Vanderbilt died on Wednesday, January 3d, at his residence in New York. He was nearly six years older than the century, having been born May 27th, 1794. His birthplace was Staten island, within sight of which he passed his whole life, and accumulated, with possibly one exception, the largest fortune ever gathered by one man in America, as the result of his own efforts. Astor, Stewart and Vanderbilt were the three rich men of their time, and it has never been established which was the richest of the three. The former inherited a fortune and added to it, by the natural increase in the value of real estate in a growing city. Stewart and Vanderbilt were poor boys, and began life at the lowest round of the industrial ladder. It is recorded of Vanderbilt that he was averse to education, but had no difficulty in mastering the science of mathematics so far as it enters into ordinary business transactions. At 16 years of age he commenced business for himself on a sufficiently elevated plane to secure contemporaneous notice. At that age he became owner of a ferry boat, which he plied himself between Staten island and New York. Two years later he owned two boats and was captain of a third. The following year, being 19 years of age, he thought himself rich enough to take a wife and establish himself in business in New York. His accumulation at this period was not rapid but constant, and at 23 he was said to be worth \$9,000 and free from debt. About this time he formed a business connection with Thomas Gibbons, to build and run a steamboat between New York and New Brunswick, N. J. The steamboat built, Vanderbilt took command of her and removed his family to Brunswick, where his wife conducted a hotel with much profit to the twin. He continued in full control of the Gibbons line until 1829, and made it pay a yearly profit of \$40,000. Meanwhile Vanderbilt had leased the ferry between New York and Elizabethport, N. J., and everything he touched turned to gold. Between 1829, when he left Gibbons, and 1843, when he became interested in the Nicaragua route, he operated boats on the Hudson river,

on Long Island sound, on the Boston route, and on the Delaware, from Bordentown to Philadelphia. His favorite plan of operation was to build superior boats to those of the existing line, and run them in opposition until he drove the old line off or forced them to buy him off. In either case, he got the profits of the business for some years, either by virtue of a monopoly or ceasing to oppose a monopoly. In 1851 he commenced his great struggle with the "Pacific Mail" and "United States" companies for the California travel. He put three steamers on the Atlantic side and four on the Pacific, and for a time carried on a spirited opposition. Crossing the continent between Greytown on the Atlantic coast and San Juan del Sur on the Pacific, a distance of 700 miles was saved, which enabled him to beat the other line on time. A branch line from Greytown to New Orleans was a part of this enterprise. In 1853, while Vanderbilt was on a visit to Europe, C. K. Garrison and Charles Morgan managed to get control of a majority of the stock, and threw Vanderbilt out of the management. The latter then turned with his wonted energy against his former associates, and by putting on independent lines compelled them to surrender control. In 1856 William Walker, the Nicaragua filibuster, confiscated some of Vanderbilt's property, and dated his own ruin from that act. Vanderbilt, making common cause with Costa Rica, drove Walker out of the country. Soon after Vanderbilt withdrew from the California business, receiving a large subsidy as compensation. During his steamboat career Vanderbilt owned 21 steamers, 11 of which he built himself, and with steamboats his entire fleet numbered 66. He withdrew from this branch of the carrying traffic in 1864, with a fortune estimated at \$40,000,000. Long before this he had become interested in railroads, and to this branch he now directed his exclusive attention. He was a large owner in the New York and New Haven railroad, and in 1864 was said to be the sole owner of the Harlem railroad. Soon after, he secured a controlling interest in the Hudson River and New York Central railroads, and effected a consolidation of the two. In 1873 he made arrangements with the Lake Shore and Michigan Southern railroad by which that line was operated in conjunction with the New York Central; thus presenting a line 978 miles in length, with branches aggregating 2,128 miles, all under one management, and representing a value of \$140,000,000, half of which belonged to the Vanderbilt family.

If Cornelius Vanderbilt was not one of the best, he certainly was not one of the worst of the railroad magnates of this country. His management was always based upon the policy of giving the public something better than they had been having, and making money by so doing. He kept his contracts with the public and with business associates, and studied to benefit local interests. Though without the advantage of education in the schools, he became cultivated to a degree later in life, and had some pretensions to refined tastes. His illness has continued through several months, and several times he had been thought at the point of death. The event had been so long anticipated that it is not supposed it will produce any marked effect in business or financial circles in New York. His fortune is estimated at \$85,000,000.

MANGANESE ORES OF BUTTE.—When Mr. C. E. Kemp was in this city a few weeks ago he obtained from Mr. Farlin specimens amounting to several pounds of silver ore taken from the Travona lode, which were as near an average of the manganese ores as he could select. Though several of the pieces were rich in silver and would run considerably higher than the average it would in no way affect the object in view, which was to see if the silver in these ores could be amalgamated without roasting. The result of a trial test of two pounds of Travona ore gave 48 pennyweights of amalgam which yielded bullion 900 fine, to the amount of 196.67 grains, which is equal to 496.73 ounces per ton. The sample from which the test was made assayed 476.28 ozs. per ton, showing a saving by the test made, without roasting the ore, of 86% of the silver. Mr. Kemp thinks had he taken a little more time that he could readily have saved 90% of the silver. The process used in making the experiment was the same as will be used in the new mill of Mr. Davis, and as many of the finest leads in Butte are of this black manganese character, this news of the successful treatment of these ores by so simple a method will greatly enhance their value, and bring these mines once more into prominent notice. —*Butte (Montana) Miner*.

A COMPLIMENT.

PLAINSBURG, MERCED CO., CAL., June 22d, 1874.
DEWEY & CO.—Gentlemen: I herewith tender my grateful acknowledgments for the energy, promptness and efficiency which you have displayed in procuring my patent.

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H. W. RUCKER, M. D.

CAMPO, SAN DIEGO CO., CAL., July 3d, 1874.
MEERS, DEWEY & CO.—Gentlemen: To-day I received the patent and other papers of my animal trap, that you so successfully worked through the patent office for me, for which please accept my best wishes. The chances are that I will have another application for you to make for me before long. I am well satisfied with your manner of doing business, and I think inventors of this coast stand in their own light when they do not put their business into your hands. I remain yours truly,
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In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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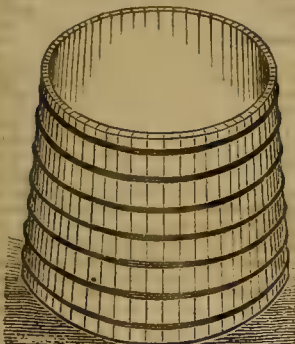
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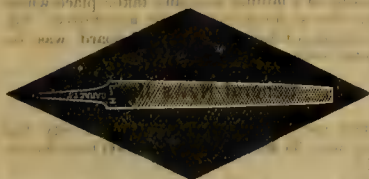
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absolutely perfect, so far as

speed is concerned. I bought

and put on to one of my engines

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was the best, and after one

season's trial I have no hesita-

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Continued from page 21.

bullion, consisting of five dore bars and valued at \$5,500, was made on the 5th inst.

GROOM DISTRICT.

WORK.—Pioche Record, Dec. 31: J. Baker Dennison, Superintendent of the Groom mining works, together with Con. Reilly, arrived in town Friday last. These gentlemen say that work is being done to have everything in active operation in a short time, and they are confident of the ultimate success of the camp. The rush to Resting Springs is pretty lively at present, many deeming that their fortunes lie there.

WARD DISTRICT.

THE MINES.—Pioche Record, Dec. 31: We interviewed one of the parties returning from Ward City yesterday, he informing us that it was snowing very heavy there when he left, but it gradually grew pleasanter after the Prairie ranch was reached. The winners of the law suit in the Paymaster mine have gone to San Francisco to have the mine incorporated. Some miners and coal-burners have been knocked off from the Martin White company, and a notice is posted up in the office of the company that no checks would be issued until further orders from San Francisco.

Colorado.

FAVORABLE.—Colorado Miner, Dec. 30: During the past week a number of the miners have been enjoying their annual holiday, but work has been kept up in all the mines, although in some instances with slightly reduced force, owing to the reason alluded to. From Democrat, Sherman, Brown, Republican and Leavenworth mountains reports continue highly favorable in respect both to quantity and quality of ore. The new year starts out most encouragingly for our staple production.

THE PELICAN MINE.—After steadily hammering and roasting away for two years upon silver ores, this successful silver mill requires a little repainting, and the proprietors have determined to give it a thorough overhauling. Workmen are busily engaged putting in new and massive foundations for the cylinders, building new furnaces and will have when the work is completed, one of the most solid and substantial mills in the State. C. Hanson is superintending the work, which will probably occupy six or eight weeks.

Idaho.

THE MINES.—Owyhee Avalanche, Jan. 6: Unless heavy falls of snow occur soon, the placer mining prospects for the coming season will be rather dubious. Pat White says he has been in this camp nearly 12 years and that he never saw richer rock than that taken from the Empire recently. The prospects of the Belle Peck are improving daily. The ledge at the bottom of the shaft, about 180 feet from the surface, which is being worked now is turning out splendid ore. Operations are being prosecuted with vigor, and plenty of gold bars will be turned out in the coming few months. We understand that Mr. Crutcher has retired from the superintendency of the South Chariot, and is succeeded by M. A. Baldwin, Esq., of the Golden Chariot. Simonds melted a bar of bullion yesterday from Belle Peck crushing. The value of the bar is \$5,501.81, the proportion of which in gold is \$3,081.17. The Potosi mine, near town, is turning out much richer rock than ever it did before.

Montana.

SILVER.—Butte Miner, Dec. 24: For various reasons since the setting in of winter weather, work at many of the leads which were being developed has been discontinued, and as this is the present condition with a majority of the most promising mines in the camp, only a limited report of them can now be made. At the La Plata work has continued uninterrupted, and this mine to day is making the best record in Butte, taking out a large quantity of high grade ore, which, under contract, is purchased for reduction at the Dexter mill. It is principally due to the high grade of the ore from this mine the fact of the heavy shipments of bullion lately made at this mill. At the Rainbow lead the claims lately purchased by Messrs. Walker Bros. are being developed by having shafts sunk upon them; the deepest is now 75 feet from the surface, but as so little has been done that will in any way show the true character of these mines, we will defer making a more extended notice until water has been reached and levels started at this depth to connect the shafts. Some little work continues upon the Burlington lead.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

MONOCHEIFF M. Co.—January 5th. Location: Inyo county, Cal. Capital stock, \$10,000,000. Directors—John Hamill, James Morton, Louis Goldstone, A. Boqueraz and R. J. King.

PACIFIC COAST LAND CO.—January 6th. Directors—W. C. Burnett, D. W. Parkhurst, Samuel D. Miller, J. S. Lute. Capital stock, \$1,000,000, divided into 10,000 shares.

PACIFIC TRIP HAMMER BRICK CO.—January 6th. Object: To carry on a brick yard at Somerville, Contra Costa county, Calif. Capital stock, \$50,000. Directors—L. J. Craft, T. R. Porter, R. H. Newton, D. Schindler and D. M. Burns.

HENRIETTA M. Co.—January 8th. Location: Butte county, Cal. Capital stock, \$10,000,000. Directors—J. H. Ferguson, H. Newman, J. F. Atwill and H. R. West.

AURUM AND ARGENTUM M. Co.—January 8th. Location: Inyo county, Cal. Directors—R. M. Fryer, A. H. Winnup, E. C. Freeland, C. W. Smith, W. H. Smith, Joseph Perrin and Geo. Smith.

CLEAR CREEK G. M. Co.—January 9th. Location, California. Directors—Edmund Green, H. C. Bidwell, R. E. Brewster, Geo. M. Perline and L. A. Booth. Capital stock, \$5,000,000.

SILVER LAKE M. Co.—January 10th. Location: Douglas county, Nev. Capital stock, \$10,000,000. Directors—Joseph Clark, John Skae, Joel F. Lightner, George R. Wells and C. S. Frank.

THERE is talk of a contest over Vanderbilt's will. One legatee said that the relatives outside of William H. Vanderbilt's family would never let it stand as it is, unless he, William H. Vanderbilt, should avoid all causes of dispute by giving his less fortunate co-claimants liberal shares of the immense wealth left by the Commodore, which, under the will, he controls. The friends of the Commodore say William H. Vanderbilt is to carry out the plan of his father for the construction of a hospital or a home for the benefit of the employees of Vanderbilt's roads. It is also understood that the Commodore has placed a large sum in the hands of his eldest son to distribute among his most valued friends.

THE San Francisco Journal of Commerce of this week has a very comprehensive review of the commercial and industrial features of this coast for the past year. On the first page is given a very elaborate map of the coast, showing the timber, agricultural and mining regions. The annual number of this journal consists of eight large pages.

The Bonanza.**Product of the Consolidated Virginia Mine.**

The annual meeting of the Consolidated Virginia mining company was held on Thursday last, when the reports of officers were presented. As they give a comprehensive review of the operations of this celebrated mine for the year, we print them entire:

President's Report

To the Stockholders of the Consolidated Virginia Mining Company.—On the 27th day of April, 1876, Mr. Edward Barron, trustee and president of this company, resigned his position. The former secretary was elected to fill the vacancy, and A. W. Havens was elected secretary. As this report will be read by interested persons not reached by the local papers, I presume a brief history of the mine and statement of the bullion product will prove interesting. The company was organized on June 7th, 1867. The mine is located in Virginia City, State of Nevada, and embraces the Comstock lode to the extent of 710 feet. The company originally owned more ground, which was transferred to the California mining company in 1873, and seven-twelfths of one share of California mining company's stock was paid to each share of Consolidated Virginia as a stock dividend. Fifteen assessments were levied. No. 1 in April, 1869, No. 15, June 11th, 1873. Total amount of assessments, \$438,499.53.

The property came under the present management January 11th, 1872, at which time the present superintendent was elected, and systematic prospecting was commenced. The amount of assessments since collected is \$277,150.12. The first dividend was declared May 7th, 1874, and dividends to number thirty-two were continued to and including December, 1876.

The following statement shows the amount of bullion produced:

Year.	Gold.	Silver.	Total.
1873.....	\$314,983.68	\$331,293.49	\$646,277.17
1874.....	2,063,433.13	2,915,045.92	4,978,479.05
1875.....	7,035,206.54	9,182,183.22	16,217,389.76
1876.....	7,373,145.36	9,279,504.11	16,652,649.47
			\$69,002,110.45
Dividends paid.....			\$27,000,000.00

This capital stock of the company is now 540,000 shares of the par value of \$100 each. Each share has paid \$50 in dividends, besides the stock dividend of seven-twelfths of a share of California. Letters are frequently received at the office of the company from stockholders asking that dividends may be forwarded by mail or express. We cannot do this. Non-residents can draw on the Secretary through any bank or broker in the city. The Trustees have sometimes paid the dividend by overdrafts rather than force silver upon a weak or falling market. This will account for the item of interest in disbursements.

I respectfully call your attention to the reports of the Superintendent and Secretary, herewith submitted.

CHAS. H. FISH, President.

San Francisco, January 11th, 1877.

Superintendent's Report.

Mr. Chas. H. Fish, President Consolidated Virginia Mining Company—Dear Sir: The total quantity of ore which has been taken out from the Consolidated Virginia mine during the year ending at this date is 142,679 tons. There were remaining on hand in the ore house and at the mills at the beginning of the year, 2,988 tons. There have been reduced 145,466 tons, yielding bullion to the value of \$16,661,940.70; this yield being 73½ per cent. of the assay value of the ore—no deduction being made for wet ore. We have now in the ore houses and at the mills 200 tons, valued by assay at \$28,471. All of this ore has been extracted from the 1,300, 1,400, 1,500 and 1,550-foot levels of the mine.

Ore Body on the 1,400 Foot Level.

On the 1,400-foot level, on the south end of the ore body, a large quantity of ore yet remains in place, but its grade is too low to meet our present requirements and large dividends. In the northern end of this level there also remains in place a large quantity of rich ore. It is from this latter locality that all the floods of water have come into the mine, from which we have suffered so much hindrance in our operations; and by reason of this we have been compelled to work this portion of the level slowly and with great care. No ore has been taken out from this quarter since the last flow of water, which occurred some two months ago. Within the past few days work has been resumed here, and the pumps are now in condition and ready to control whatever water may be encountered, and we are not likely to be hindered from the same cause in the future.

An Unexplored Region—The 1,550-Foot Level

On the 1,550-foot level the southern portion of the mine remains unexplored. No work has been done in this quarter during the past year.

On the 1,550-foot level the ore is of better quality than on any of the levels above, and the width of the ore body is quite as great as on the 1,500-foot level. These facts give us assurance that the 1,650-foot level, now about to be opened, will prove to be of great value—quite as much so as the 1,550-foot level. The depth of the 1,650-foot level—that is the distance up to the 1,550-foot level—is really but 42 feet. That comparatively small depth of ground has yielded more ore, and of a better quality, than has been produced from any other level in the

mine. The main shaft has been sunk from the 1,500-foot level to the 1,550-foot level. The drift on the 1,550-foot level, which connects with the Gould & Curry mine, and through which ore has been transported to the Gould & Curry shaft, and through that shaft raised to the surface, has been undergoing repairs for the past month, and it will require three weeks more to complete them. In the meantime no ore can be raised through the Gould & Curry shaft. This suspension of taking out ore through this outlet has caused a great reduction in our receipts.

Below the 1,550-Foot Level.

With the exception of running the lateral drift on the 1,700-foot level, no work has been done in the mine below the 1,550-foot level. The deep winze spoken of in my last annual report as having been sunk 147 feet from this (1,550-foot) level, and as having passed all the way through and terminating in ore of a very high grade, is yet full of water and will remain so until the ore vein is reached by the 1,650-foot level drift coming from the C. & C. shaft. This joint drift is now in 555 feet from the shaft, and it will reach the ore body some time in the ensuing month. Connections will then be made with the winze spoken of above, as well as with the winze sunk from the same level in the California mine. These connections will be made as soon as possible, as but little ore can be extracted until they are made and a circulation of air is obtained. The drift would have been into the ledge five months ago, but for the large flow of water met with in sinking the C. & C. shaft, which has greatly prolonged the sinking of the shaft and consequently delayed the running of this drift and the opening and working of the lower levels.

The 1,500-foot level of the mine is connected with the C. & C. shaft by a large drift—well timbered and laid with a T-rail track—being a convenient thoroughfare through which the ore is transported to that shaft to be raised to the surface, and at the same time it gives admission to air for ventilation of the mine.

On the 1,700-Foot Level.

The drift running north on the 1,700-foot level, which at the date of my former report had advanced north 107 feet from the southern boundary of the mine, has been extended north 283 feet, making the whole distance run 390 feet. This drift lies east of the vein, and so far no cross-cuts have been made on this level. The progress of this drift has been much retarded by bad air and frequent floods of water coming from the Gould & Curry mine—causing the drift to cave—and filling it up at times for a long distance. These obstacles will all be overcome very soon, so that work can be resumed there, as the water has ceased to flow and the connections which will be made with the C. & C. shaft on the 1,650-foot level will ventilate this portion of the mine.

Several thousand feet of drifts have been run in and to the mine during the year, at a heavy expense which was unavoidable.

Average Yield of the Ore.

As shown by the production of the mine as stated above, the average yield of the ore has been \$114.50 per ton. This apparent yield is lessened by three important items of expense to which the bullion has unavoidably been subjected, namely: The transportation of the bullion, the local taxes on net proceeds—the State and county tax being one and ninety-five hundredths per cent. and the city tax one-half of one per cent.—and an unprecedentedly large discount on silver.

The C. & C. Shaft.

One year ago the C. & C. shaft had reached the depth of 940 feet. It is now down 25 feet below the 1,650-foot level, and the work of sinking is going on. In sinking this shaft we had to contend with a great inflowing of water, which has continued from two hundred feet from the surface down. This flow has ranged from 43 to 37 inches, miners' measure. All the appurtenances to this shaft, such as the main building, the ore houses, the hoisting and pumping machinery, the pumps, pump bobs, etc., are complete in every respect. Everything has been constructed on a scale and in a manner commensurate with the large future requirements of the two mines. The facilities for landing wood, timber and other mining supplies, and for shipping the ore raised through this shaft to mills, have been much improved on by the construction of a branch track from the Virginia and Truckee railroad, which passes on both the upper and the lower sides in close proximity to the works. The cost of the shaft and all its appurtenances, together with all the real estate acquired for the purposes of the shaft, amounts, up to this date, to \$820,000.

Hoisting Works and Other Machinery.

The Consolidated Virginia hoisting works, the engines, machinery, air compressors, etc. are all in perfect order. Protection against fire here, as well as at the C. & C. shaft, has been secured by a complete system of water pipes, hydrants and hose, with a plentiful supply of water under heavy pressure. The building, which at the time of my last annual report, was being constructed for an assay and bullion department, has been completed and has been equipped with all the requisite apparatus, fixtures, and materials for melting and assaying, and this work is now being done here for both the Consolidated Virginia and California mines. It has proved to be a successful and economical institution, and its capacity for assaying and melting is fully equal to what was predicted,

which was \$5,000,000 of bullion per month.

In conclusion, it gives me great pleasure to state that, as we are overcoming the disadvantages under which we have been laboring of late, and in view of the indications which we have before us in the mine, I believe that the incoming year will be one of great prosperity.

Very respectfully,

JAMES G. FAIR, Superintendent.

Virginia, Nev., Dec. 31st, 1876.

An inventory of the property at the Consolidated Virginia mining company which accompanies the superintendent's report, shows property worth \$399,904.59, the real estate, hoisting works and assay office and machinery being valued at \$336,000; coal and wood supplies, at \$49,128.44; supplies in store-room, \$9,533.79, and assay supplies, \$5,242.36. An inventory of the Consolidated Virginia and California joint shaft property shows a total value of \$394,331.98, of which \$325,000 is represented in hoisting works and machinery; \$61,346.81 in timber and coal supplies, and \$7,985.17 in supplies in the store-room.

Secretary's Report.

Secretary's report of receipts and disbursements for the fiscal year ending January 10th, 1877:

RECEIPTS.	
Gross Product.....	\$16,646,177 71
Nevada Bank, overdraft.....	569,055 83
Lumber and Timber.....	150 00
Bullion Samples.....	1,657 24
Assaying.....	27,568 67
Insurance.....	20,000 00
Hoisting.....	18,827 50
Bullion Reclamation.....	1,517 89
Ore sales.....	1,573 90
Balance outstanding last report, Superintendent, Bank and cash.....	183,573 97
Total.....	\$17,470,100 80

DISBURSEMENTS.	
James G. Fair, Superintendent.....	\$33,330 84
Bullion unsold in hands of Bank.....	568,636 27
Cash.....	2,101 51
Wood.....	22,064 72
Virginia Office.....	4,780 63
Fire Insurance.....	453,930 48
Hauling.....	3,269 23
Sutro Committee.....	1,938 00
Survey.....	850 00
Assay Office.....	65,188 50
Books and Stationery.....	1,839 90
Legal Expense.....	18,368 36
Advertising.....	314 50
Water.....	5,450 00
Real Estate.....	1,185 75
Contribution.....	205 00
Construction.....	1,949 43
Taxes.....	235,997 54
Reduction.....	1,806,286 77
Interest and Exchange.....	33,272 03
Bullion Freight.....	46,451 08
Dividends, Nos. 22 to 32, inclusive.....	11,880,000 00
C. & C. Shaft.....	208,372 23
Bullion Discount.....	1,942,035 71
Supplies.....	232,665 00
Salaries and Wages.....	486,543 75
Expenses.....	7,800 38
Total.....	\$17,470,100 80

The meeting was a very stormy one, some of the stockholders finding great fault with the management. Mr. Mackey denied the use of the diamond drill anywhere below the 1,500-foot level. S. P. Dewey very vigorously opposed the present management. At times the disputes between Flood, Dewey, Mackey and others threatened to end in a manner which all would have afterwards regretted. Never has a meeting of a mining company taken place where there was so much excitement manifested. On the election taking place the old board was re-elected without change.

General News Items.

THE net gain in population of this city last year was 35,450, or about 30,000 less than in 1875.

It is reported that parties are in Washington from California whose object it is to institute a movement for the annexation of Lower California to the United States.

The bill admitting Utah into the union is now in the hands of the House Territorial Committee. The scheme of admission will bring the Mormon question into prominence.

The severity of the financial crisis in Russia is shown by the fact that the municipality of Odessa, one of the richest in Russia, is unable to pay the salaries of its officials.

THE Assistant Treasurer of the United States at Philadelphia has filed an answer to the Centennial Board of Finance, claiming for the Government payment in full of \$1,500,000 before stockholders are reimbursed.

OUR merchandise exports last year aggregated \$31,056,200, and our treasure exports \$49,757,800, making a total of \$80,814,000, which is the largest since the opening of the port, and the amount of treasure shipped is the heaviest in ten years.

A DISPATCH from Madrid states that the extradition treaty between Spain and the United States includes crimes committed in Cuba and other colonies. The relations between Washington and Madrid are very cordial in respect to claims connected with Cuba.

GREENBACKS are actually worth more than silver coin in San Francisco at the present time. Monday gold coin was sold as low as six and one-eighth per cent. premium for greenbacks. Only once before since 1862 has this low premium been reached, which was in November, 1873. This makes legal tenders worth nearly 94½ cents, or about one per cent. more than half dollars in the market.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

Mining and Scientific Press Patent Agency.

THE MINING AND SCIENTIFIC PRESS PATENT AGENCY was established in 1860—the first west of the Rocky Mountains. It has kept step with the rapid march of mechanical improvements. The records in its archives, its constantly increasing library, the accumulation of information of special importance to our home inventors, and the experience of its proprietors in an extensive and long continued personal practice in patent business, affords them combined advantages greater than any other agents can possibly offer to Pacific Coast inventors. Circulars of advice, free.

Address,

DEWEY & CO.,

Publishers MINING AND SCIENTIFIC PRESS AND PACIFIC RURAL PRESS, 224 Sansome Street, S. F. A. T. DEWEY, GEO. H. STRONG, W. B. EWER, JNO. L. BOONE.

HAMILTON, N.Y., May 28th, 1876.

To Messrs. Dewey & Co., Patent Agents.

GENTLEMEN:—I write to acknowledge the receipt by express of the U. S. letters patent, on my invention for breech loading ordnance, and to tender you again my very sincere thanks for the careful attention you have bestowed upon my application since I first placed it in your hands, for the evident great interest you have manifested in it, and for the uniform patient and cheerful courtesy which has constantly marked your correspondence in reference to it. I have had some dealings with other agencies in the same line in times past, and I can assure you that my correspondence with yours has been more pleasant and satisfactory than with any others, and I shall always take great pleasure in recommending your agency to any and all my acquaintances without hesitation or reservation, as I should certainly prefer to entrust my own business in your hands should I have any to transact in the same line hereafter. Yours, etc., J. R. N. OWEN.

APPROPRIATION ABROAD.—We copy the following from the Mining and Monetary Gazette, of London, England: "We deemed it advisable, as affording valuable information to our readers, to publish in recent issues of The Gazette, the full text of the 'United States Mining Laws and Instructions,' by the Commissioner of General Land Office," taken from our talented contemporary, THE MINING AND SCIENTIFIC PRESS, of San Francisco. The documents have now been issued in a handsomely bound volume, by Messrs. Dewey & Co., the publishers of our transatlantic contemporary, and it will be found very useful to those already interested in American mines, and to others who may be tempted to embark in that enterprise in the States."

CANFO, SAN DIEGO CO., CAL., July 3d, 1874. MESSRS. DEWEY & CO.—Gentlemen: To-day I received the patent and other papers of my animal trap, that you so successfully worked through the patent office for me, for which please accept my best wishes. The chances are that I will have another application for you to make for me before long. I am well satisfied with your manner of doing business, and I think inventors of this coast stand in their own light when they do not put their business into your hands. I remain yours truly, A. M. GASS.

SCIENTIFIC PRESS.—As the old year is drawing to a close and the new is rapidly approaching, all our mining friends should subscribe for this scientific journal, especially devoted to their interests. It is a California enterprise, and compares favorably with similar organs of years more experience and age in the old countries.—Coffey Enterprise.

THE EXPLORERS', MINERS' AND METALLOGISTS' COMPANION.—Comprising a practical exposition of the various departments of exploration, mining, engineering, assaying and metallurgy; containing 672 pages and 83 engravings. By J. S. Phillips, M. E. Price—cloth, \$10.50; in leather, \$12; postage 50 cts. Sold at this office.

ROASTING OF GOLD AND SILVER ORES, and the Extraction of their Respective Metals without Quicksilver, 1876. It contains 142 pages, embracing illustrations of furnaces, implements and working apparatus. Price \$2.50 coin, or \$3 currency, postage free. Published and sold at this office.

KUSTEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arseniurets, and Gold and Silver ores generally, with 120 Lithographic Diagrams, 1867. The most complete treatise. Published at this office. Price, \$5. Postage, 50 cts. extra.

Any person receiving this paper after giving an order to stop it, may know that the order has failed to reach us, or that the paper is continued inadvertently, and they are earnestly requested to send written notice direct to us. We aim to stop the paper promptly when it is ordered discontinued.

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUBRO & Co.]

SAN FRANCISCO, Jan. 10, 3 P. M.

LEGAL TENDERS in S. F., 11 A. M., 941@942. SILVER, 64@65. GOLD in New York, 106. GOLD BARS, 880@890. SILVER BARS, 7@10 per cent. discount. EXCHANGE on New York, 50@55-100 per cent. premium for gold; on London bankers, 49; Commercial, 49; Paris, five francs per dollar; Mexican dollars, 93. LONDON CONSOLS, 94; Bonds, 102. QUICKSILVER in S. F., by the flask, 3 lb. 50c.

METALS.

(WHOLESALE.)

THURSDAY, M., Jan. 11, 1877.

IRON.—		
American Pig, ton	30 00	40 00
Swedish Pig, ton	30 00	40 00
White Pig, ton	30 00	40 00
Oregon Pig, ton	30 00	40 00
Refined Bar, 10 lb.	5 00	6 00
Plate, 5 to 8	5 00	6 00
Sheet, 10 to 14	5 00	6 00
Sheet, 16 to 20	5 00	6 00
Sheet, 22 to 24	5 00	6 00
Sheet, 26 to 28	5 00	6 00
Horse Shoes, leg	6 00	7 00
Nail Rod, leg	9 00	10 00
Norway	9 00	10 00
Roller	7 00	8 00
COPPER.—		
Copper Tinned	37 00	40 00
Sheeting, lb.	37 00	40 00
Sheeting, Yellow	21 00	22 00
Sheeting, Old Yellow	21 00	22 00
Composition Nails	21 00	22 00
Composition Bolts	21 00	22 00
STEEL.—		
English Cast, lb.	14 00	25 00
Anderson & Wood, ordinary sizes	14 00	25 00
Drill	16 00	25 00
Flat Bar	15 00	20 00
Flow Steel	15 00	20 00
TIN PLATE.—		
10x14 C Charcoal	10 50	11 00
Banco Tin	18 00	19 00
Australian	18 00	19 00
ZINC.—		
By the Cask	11 00	12 00
Zinc Sheet 7x10, 7 to 10, lb.	11 00	12 00
7x10, 11 to 14	11 00	12 00
8x14, 11 to 14	11 00	12 00
8x14, 11 to 14	11 00	12 00
NAILS.—		
Assorted sizes	3 50	4 00
QUICKSILVER.—		
By the lb.	50 00	50 00

GENERAL MERCHANDISE.

(WHOLESALE.)

WEDNESDAY, M., Jan. 10, 1877.

BAGS.—		
Eng Standard Wheat, 8 lb	9 00	10 00
Neville & Co	9 00	10 00
Hand Sack, 22x36	8 00	9 00
24x36	8 00	9 00
24x40	8 00	9 00
Machine Sack, 22x36	8 00	9 00
Flour Sacks, halves	8 00	9 00
Quarters	8 00	9 00
Eighths	8 00	9 00
Hessian, 60 inch	11 00	12 00
45 inch	8 00	9 00
40 inch	7 00	8 00
Wool Sacks, 34 lb.	50 00	55 00
4 lb.	55 00	60 00
Standard Gunnies	11 00	12 00
Bean Sacks	7 00	8 00
CANDLES.—		
Grant's	15 00	16 00
Mitchell's	15 00	16 00
CAN & GOODS.—		
Assorted Pig Fats	2 00	2 50
2 lb cans	2 75	3 00
Table do.	3 75	4 25
Jams and Jellies	4 25	5 00
Pickles, 1 lb	2 50	3 00
Sardines, 1 lb	1 50	2 00
Hf Boxes	3 00	4 00
COAL.—		
Anthracite, ton	8 00	9 00
Coal Bay	8 00	9 00
Bellingham Bay	8 00	9 00
Seattle	9 00	10 00
Cumberland	14 00	15 00
Mt Diablo	5 75	6 75
Lehigh	22 00	24 00
Liverpool	8 50	9 00
West Hartley	14 00	15 00
Scranton	13 00	14 00
Vancouver Id.	10 50	12 00
Charcoal, sack	75 00	80 00
Coke, bbl.	60 00	65 00
COFFEE.—		
Sandwich Id. lb.	21 00	22 00
Costa Rica	21 00	22 00
Guatemala	20 00	21 00
Java	22 00	23 00
Manila	20 00	21 00
Ground, in cas.	25 00	26 00
Chicory	27 00	28 00
FEEL.—		
Sac to Dry Cod.	5 00	7 00
Bonell's	8 00	10 00
Eastern Cod.	6 00	8 00
Salmon, bbls.	6 00	8 00
Hf bbl.	3 75	4 00
2 lb cans	2 65	3 00
1 lb cans	1 80	2 00
Col Riv. hf bbl.	25 00	26 00
Pld Cod, bbl.	22 00	23 00
Hf bbl.	11 00	12 00
Mackerel, No. 1	11 00	12 00
Hf Bbl.	12 00	13 00
In Kite	25 00	26 00
Ex Mess, hf bbl.	30 00	32 00
Pld Herring, 3 lb	30 00	32 00
Boston Sunk Hg	40 00	42 00
etc.		
Lime, Sta Cruz	2 00	2 25
Cement, Rosen	2 75	3 00
Portland	4 75	5 00
Plaster, Golden	3 00	3 25
Gate Mills	3 00	3 25
Land Plaster, in 30 lb	22 50	24 00
NAILS.—		
Assorted sizes, keg 3 25	3 25	4 00

WEDNESDAY, M., Jan. 10, 1877.

PAINTS.—		
Pure White Lead	9 00	10 00
Putty	4 00	5 00
Chalk	14 00	15 00
Paris White	14 00	15 00
Venice Red	34 00	35 00
Averill Chemical	34 00	35 00
Paint, gal.	2 00	2 40
White & tints	2 00	2 40
Ch Yellow	3 00	3 50
Light Red	3 00	3 50
Metallic Red	1 30	1 60
China No. 1, lb.	5 00	6 00
Javanese	7 00	8 00
Arabis	10 00	11 00
Cal. Bay, ton	16 00	18 00
Common	5 00	6 00
Jarmen Id.	16 00	18 00
Liverpool fine	25 00	26 00
SOAP.—		
Castle, lb.	10 00	10 00
Common brands	4 00	6 00
Fancy brands	7 00	8 00
SPICES.—		
Cloves, lb.	45 00	50 00
Cassia	22 00	25 00
Nutmegs	85 00	90 00
Pepper Grain	15 00	17 00
Mustard, Cal.	15 00	16 00
1 lb glass	1 50	2 00
SUGAR.—		
Cal. Cube, lb.	13 00	14 00
Golden C	13 00	14 00
Powdered	13 00	14 00
Circle A	13 00	14 00
Fine crushed	12 00	13 00
Granulated	12 00	13 00
Hawaiian	10 00	11 00
Cal. Syrup, kgs	72 00	74 00
Hawaiian Molasses	25 00	27 00
Young Hyson	35 00	40 00
Moynie, etc.	35 00	40 00
Country pckd Gun	50 00	60 00
powder & Im	50 00	60 00
Hyson	30 00	35 00
Poo Chow O	35 00	40 00
Japan, 1st quality	40 00	50 00
2d quality	25 00	35 00

LEATHER.

(WHOLESALE.)

WEDNESDAY, M., Jan. 10, 1877.

Sole Leather, heavy, lb.	25 00	29 00
Light	22 00	24 00
Jodot, 8 Kil, doz.	48 00	50 00
11 to 13 Kil.	68 00	70 00
14 to 16 Kil.	70 00	72 00
Second Choice, 11 to 13 Kil.	57 00	60 00
Cornellian, 12 to 16 Kil.	57 00	60 00
Females, 12 to 13 Kil.	63 00	66 00
14 to 16 Kil.	71 00	74 00
Simon Ultra, 12 to 16 Kil.	58 00	60 00
14 to 16 Kil.	66 00	70 00
18 to 17 Kil.	72 00	74 00
Simon, 18 Kil.	61 00	63 00
20 Kil.	50 00	52 00
24 Kil.	72 00	74 00
Robert Calf, 7 and 9 Kil.	35 00	40 00
Kips, French, lb	00 00	1 35
French Sheep all colors	40 00	45 00
Eastern Calf for Backs, lb	1 00	1 25
Sheep Roams for Topping, all colors, doz.	9 00	10 00
For Lining	5 00	6 00
Cal. Russet Sheep Linings	75 00	80 00
Boot Legs, French Calf, pair	4 00	4 50
Good French Calf	4 00	4 75
Best Jodot Calf	5 00	5 25
Leather, Harness, lb.	24 00	32 00
Fair Bridle, doz.	48 00	52 00
Skirting, lb.	33 00	37 00
Welt, doz.	30 00	35 00
Butt, ft.	18 00	19 00
Wax Side	17 00	18 00

Dewey & Co. { 224 } Patent Agt's.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending December 31st, 1876, the Board of Directors of the German Savings and Loan Society has declared the dividend on Term Deposits at the rate of Nine (9) per cent. per annum, and on Ordinary Deposits at the rate of Seven and One-Half (7 1/2) per cent. per annum, free from Federal taxes, and payable on and after the 15th day of January, 1877. By order, GEO. LETTE, Secy.

DIVIDEND NOTICE.

San Francisco Savings Union, 532 California St., cor. Webb.

For the half year ending with December 31st, 1876, a dividend has been declared at the rate of Nine (9) per cent. per annum on Term Deposits, and Seven and One-Half (7 1/2) per cent. on Ordinary Deposits, free of Federal tax, payable on and after 15th January, 1877. LOVELL WHITE, Cashier.

Mining and Other Companies.

Aetna Tunnel Company.—Location of principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice is hereby given that at a meeting of the Board of Directors, held on the second day of January, A. D. 1877, an assessment (No. 1) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 420 California Street, San Francisco, Cal. Any stock upon which the assessment shall remain unpaid on Monday, the 25th day of February, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 19th day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. JAMES M. HAYEN, Secretary.

Office, Room 6, No. 420 California Street, San Francisco, California.

Great Blue Gravel Range Mining Company.—Location of principal place of business, San Francisco, State of California. Location of works, Placer County, State of California.

Notice is hereby given that at a meeting of the Directors, held on the 22nd day of December, 1876, an assessment (No. 7) of Fifty Cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, Room 33 Merchants' Exchange, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on Monday, the 25th day of January, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 14th day of February, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. W. BRYANT, Secretary.

Office, Room 33, Merchants' Exchange, California street, San Francisco, Cal.

Howland Tunnel Company.—Location of principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice is hereby given, that at a meeting of the Board of Directors, held on the second day of January, A. D. 1877, an assessment (No. 1) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 420 California Street, San Francisco, Cal. Any stock upon which the assessment shall remain unpaid on Monday, the 25th day of February, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 19th day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. JAMES M. HAYEN, Secretary.

Office, Room 6, No. 420 California Street, San Francisco, California.

Josephine Gravel Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Brushy Canyon, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 2), levied on the 6th day of December, 1876, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Boyd, Jno F, Trustee	10	1500	150 00
Boyd, Jno F, Trustee	11	500	50 00
Boyd, Jno F, Trustee	13	100	10 00
Duncan, Adam	21	200	20 00
Duncan, Adam	22	200	20 00
Duncan, Adam	23	100	10 00
Duncan, Adam	29	200	20 00
Ingersoll, J. E.	27	400	40 00
Kates, J. P.	24	200	20 00
Kay, Joel	19	50	5 00
Kay, Joel	32	1000	100 00
Kay, Joel	33	100	10 00
Kay, Joel	35	600	60 00
Small, Wm, Trustee	31	500	50 00
Walsh, Wm	62	250	25 00
Walsh, Wm	63	100	10 00
Walsh, Wm	64	100	10 00
Walsh, Wm	65	25	2 50
Walsh, Wm	66	25	2 50

And in accordance with law and an order of the Board of Directors, made on the 6th day of December, 1876, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, No. 531 California street, San Francisco, on the 25th day of January, 1877, at the hour of 2 o'clock, p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale. WM. SMALL, Secretary.

Office, Room 1, No. 531 California street, San Francisco, California.

Mariposa Land and Mining Company of California. Location of principal place of business, San Francisco, California. Location of works, Mariposa county, California.

Notice.—There is delinquent upon the following described stock, on account of assessment (No. 3), levied on the 9th day of November, 1876, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Adams, Thomas	A 4	50	50 00
Brumby, J. H.	unissued	300	300 00
Bound & Co.	unissued	300	300 00
Curless, W. B.	272	100	100 00
Colman, W. T.	473	100	100 00

Iron and Machine Works.

PACIFIC
ROLLING MILL COMPANY,

SAN FRANCISCO, CAL.

Established for the Manufacture of

RAILROAD AND OTHER IRON

—AND—

Every Variety of Shafting,

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

—ALSO—

HAMMERED IRON
OF EVERY DESCRIPTION AND SIZE.

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. Box 2032, San Francisco, Cal., will receive prompt attention.

The highest price paid for Scrap Iron.

THE RISDON

Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,

SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

Directors:

Joseph Moore, Jesse Holladay, C. E. McLane,
Wm. Norris, Wm. H. Taylor, J. B. Haggin,
James D. Walker.WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

THOS. PENDERGAST.....HENRY S. SMITH.

ÆTNA IRON WORKS.

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, bet. Howard and Folsom

SAN FRANCISCO.

AMERICAN MACHINE

AND

Model Works

Experimental and fine Special Machinery, Dies, Taps, Punches, Reamers and other tools made to order. Planing, Gear Cutting, Machine Repairing, etc. Models and Patterns for Inventors promptly executed, in wood or metal.

I. A. HEALD, 514 Commercial St.
Between Sansome and Leidesdorff Sts., San Francisco.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS,

CROSS' PATENT BOILER FEEDER AND SEDIMENT COLLECTOR.

Dunbar's Patent Self-Adjusting Steam Piston Packing, for new and old Cylinders,

ALL KINDS OF MINING MACHINERY.

FRONT STREET, BETWEEN N AND O STREETS,
Sacramento City.

OCCIDENTAL FOUNDRY,

137 and 139 First St., San Francisco

STEIGER & KERR,

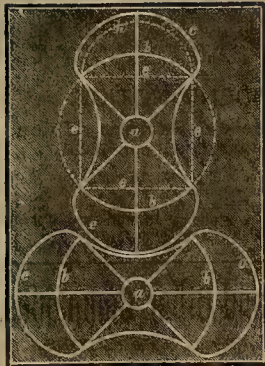
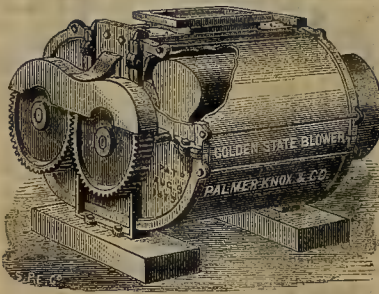
IRON FOUNDERS,

Quicksilver Condensers and Furnace Castings.

Sole manufacturers of the Hepburn Roller Pan and Callahan Grate Bars, suitable for Burning Screenings.

Notice.—Particular attention paid to making Superior Shoes and Dies.

CALIFORNIA BRASS FOUNDRY,

No. 125 First Street, Opposite Minna,
SAN FRANCISCO, CAL.All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch.
J. H. WEED. V. KINGWELL.GOLDEN STATE IRON WORKS, CO-OPERATIVE,
FOUNDRY and MACHINE WORKS.MINING
—AND—
MILLING MACHINERY
OUR SPECIALTY.

GOLDEN STATE SUCTION AND PRESSURE BLOWER FOR VENTILATION OF MINES. BLAST OR EXHAUST FOR FURNACES OR REDUCTION WORKS.

They have no superior. The casing is made in sections, so as to be easily accessible. They run easily, not rapidly, and the perfect contact of wings gives a uniform and powerful blast.

PALMER, KNOX & CO.,

Nos. 19 to 25 FIRST STREET, San Francisco, Cal.

ASBESTOS COATING



For Steam Boilers, Pipes, etc. Best non-conductor of heat in use. It effects a LARGE SAVING OF FUEL, LASTS AS LONG AS THE IRON to which it is applied, and is reasonable in cost.

Representatives: United States Government Buildings and the principal manufacturing establishments in the East and on the Pacific Coast; the principal mines and mills in Nevada, etc., etc.

United States and Foreign

SALAMANDER FELTING COMPANY.

PACIFIC BRANCH,

(Patents issued September 4, 1869; October 5, 1869; October 4, 1870; May 9, 1871.)

SEWARD COLE, Manager,

Office: 317 California Street, S. F.
Factory: Berry Street, bet. 4th and 5th, S. F.
Nevada Agency: 38 North C Street, Virginia.

DEALERS IN

H. W. JOHNS' ASBESTOS ROOFING AND PAINTS—Fire and Weather Proof

ASBESTOS STEAM PACKING, made from pure long fiber Asbestos. Indestructible and Self-Lubricating. Circulars and Descriptive Pamphlets Sent Free.

THE ASBESTOS PATENT FIBER COMPANY,

Of Philadelphia, offer For Sale through their Agent in San Francisco,

ASBESTOS STEAM PACKING,

ASBESTOS BOARDS AND ASBESTOS STEAM JOINTS,

All manufactured from the pure utilized Asbestos Patent Fiber, and under patents granted to J. S. Rosenthal. The packing is in all sizes from one-quarter to three inches in diameter, round, and free from all grit or mineral matter. The



Also, For Sale by

DUNHAM, CARRIGAN & CO.,

107 & 111 Front Street.

PATENT FIBER BOARDS,

For covering Boilers, Pipes, etc., to prevent radiation of heat and condensation of steam, is a very desirable article. It is manufactured in sheets, of thicknesses thirty by forty-four inches square, and is easily applied. The

STEAM JOINTS

Are of all sizes, and are a much superior article to anything before introduced. All these goods are extensively used in the Atlantic States and give general satisfaction.

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SOLE AGENT FOR THE PACIFIC COAST,

118 & 120 Main Street, San Francisco,

(At the Hydraulic Elevator Works.)

HAWKINS & CANTRELL,

MACHINE WORKS,

210 and 212 Beale Street, bet. Howard and Folsom Sts., - - San Francisco.

Manufacturers of

IMPROVED PORTABLE

Hoisting Engines,

For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

SHEET IRON PIPE.

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Corner Howard and Beale Streets,

Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

California Machine Works,

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BIRCH, ARGALL & CO.,

Builders of QUARTZ, SAW AND FLOUR MILLS,

Keating's Sack Printing Presses,

THE ECONOMY HYDRAULIC HOIST FOR STORES,

And General Machinists.

Winers' Foundry and Machine Works,

CO-OPERATIVE,

First Street, bet. Howard and Folsom, San Francisco.

Machinery and Castings of all kinds.

PHELPS
MANUFACTURING COMPANY.

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS, HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,

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FOUNDRY AND IRON WORKS.

HINCKLEY & CO.,

Manufacturers of

STEAM ENGINES,

Quartz, Flour and Saw Mills,

Hayes' Improved Steam Pump, Brodie's Improved, Crusher, Mining Pumps,

Amalgamators, and all kinds of Machinery.

N. E. corner of Tehama and Fremont streets, above Howard, San Francisco.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

Light and Heavy Castings of Every Description Manufactured.

Sole Proprietors and Manufacturers of

Lynch's Ventilating and Illuminating Tile,

The Only Illuminating Tile Manufactured for Lighting Cellars, Basements and Dark Rooms which provides proper ventilation for such places.

129 and 131 Beale Street,

BET. MISSION & HOWARD, SAN FRANCISCO.

SACRAMENTO BOILER WORKS,

37 Fremont St., cor. Mission, S. F.

HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, No. 32 Fremont Street.

McAFEE, SPIERS & CO.,

BOILER MAKERS AND

GENERAL MACHINISTS,

Howard between Fremont and Beale Sts., San Francisco

W. T. GARRATT'S

BRASS and BELL FOUNDRY

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MANUFACTURER AND IMPORTER OF

Church and Steamboat BELLS and GONGS,

BRASS CASTINGS of all kinds,

WATER GATES, GAS GATES,

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A General Assortment of Engineers' Findings.

Hooker's Patent Celebrated

STEAM PUMP



The Best and Most Durable in use. Also, a variety of other

PUMPS

For Mining and Farming Purposes.

ROOT'S BLAST BLOWERS,

For Ventilating Mines and for Smelting Works.

HYDRAULIC PIPES and NOZZLES,

For Mining Purposes.

Garratt's Improved Journal Metal.

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IRON PIPE AND MALLEABLE IRON FITTINGS.

ALL KINDS OF

WORK AND COMPOSITION NAILS,

AT LOWEST RATES.

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MINING ENGINEER.

All classes of mining properties reported on, consultations had on reduction of ores of all descriptions, plans for furnaces and reduction works furnished, and the construction of them superintended. Ore tests made at the office.

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\$55 & \$77 a Week to Agents. Samples FREE P. O. VICKERY, Augusta, Maine.

PACIFIC MACHINERY DEPOT,

H. P. GREGORY & Co., Nos. 14 & 16 First Street,

P. O. Box 168.

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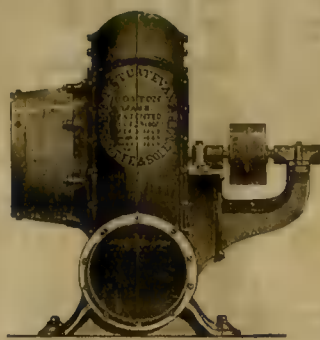
SOLE AGENTS FOR THE PACIFIC COAST FOR

J. A. Fay & Co's Wood-working Machinery,

Blake's Patent Steam Pumps,

Tanite Co's Emery Wheels and Machinery,

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Sturtevant Exhaust Fan for Removing Shavings and Sawdust from Machines.

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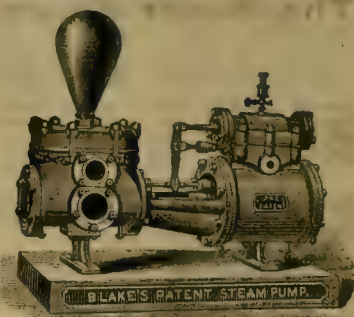
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Nathan & Dreyfus' Glass Oilers, and Mill and Mining Supplies of all Kinds.

BLAKE'S PATENT STEAM PUMP.



Over 8,500 in Successful Use in the United States.

PATENTED

CAST STEEL SHOES AND DIES.

Guaranteed Cheaper than the Best Iron. IMPORTANT NOTICE.

Reduction in Price from 16 Cents to 12 Cents Per Pound.

Owing to our largely increased business, the present low price of iron from which our Steel is manufactured, and the improved facilities for casting and forging, we take great pleasure in announcing that from and after this date we will supply our IMPROVED CAST AND FORGED STEEL SHOES AND DIES FOR QUARTZ MILLS at twelve cents per pound, delivered at San Francisco or Sacramento, instead of sixteen cents, as heretofore.

We also furnish Steel Plates for Blake and other Ore Crushers, Steel Gut Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

Address all orders, with dimensions or drawings, to

CAST STEEL SHOE & DIE CO.,

59 Nevada Block, S. F.



Hooker's Patent Direct Acting Steam Pump.

W. T. GARRATT,

Cor. Fremont & Natoma Streets, S. F.

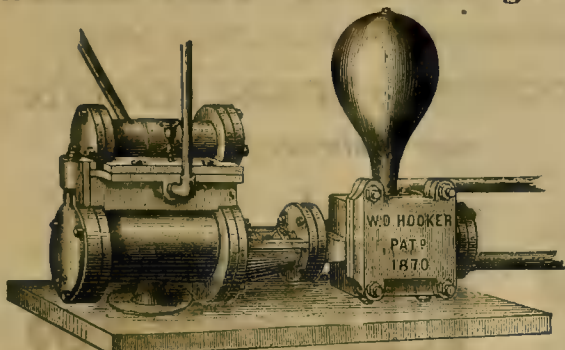
Sole Proprietor & Manufacturer for the Pacific Coast.

SIMPLE, CHEAP AND DURABLE.

Adapted for all purposes for which Steam Pumps are used.

The Best Pump in Use.

SEND FOR CIRCULAR.

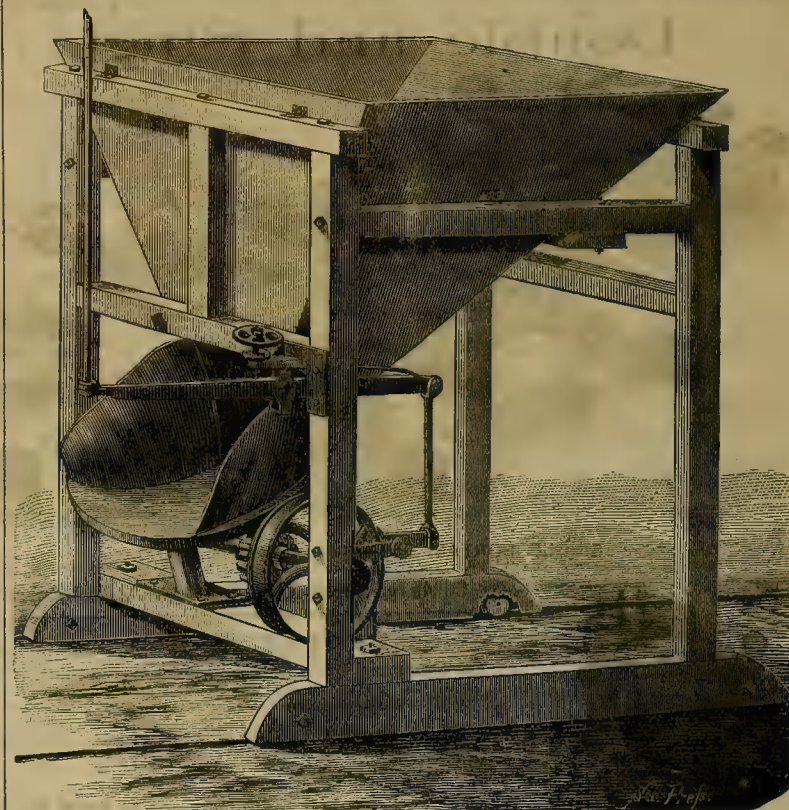


N. B. - Also manufacturer of Hooker's Deep Well and Double-Acting Force Pump. Received the Silver Medal awarded at the last Mechanics' Fair in San Francisco.

\$1,000 Challenge Ore Feeder,

AWARDED FIRST PREMIUM

At the Tenth Industrial Fair of the Mechanics' Institute.



It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

REFERENCES.

A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them." - A letter from Mr. C. C. Belding, of Amador County, speaks in the highest terms of them. - Two of the machines were shipped to the Bunker Hill Mill, also Gover Mill, Amador County. - Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen. - Soulsby Mill, Tuolumne County. - California Company, Nevada City. - Omaha Gold Mining Company, Grass Valley. - St. Patrick Mill, Placer County.

\$1,000 CHALLENGE.

Backward in Coming Forward.

C. P. Stanford Fails to Come to Time on the Challenge of \$1,000 to Test the Merits of His Ore Feeder as Against Mine. The Challenge is Still Open to Him or any one else. GENTLEMEN, Put up or Shut up.

A letter has been received from the Crescent mine, Plumas County, in which it states that the Tulloch is a failure as against the \$1,000 Challenge Feeder of Hendy's.

We warrant the machines to give perfect satisfaction, and to be a better and more durable Feeder than any other in the market, and will sell them as cheap as any other of its class.

For Description, Send for Circular to

J. HENDY, Sole Manufacturer,

NOS. 49 & 51 FREMONT STREET, - - - SAN FRANCISCO, CAL.

Where it Can be Seen in Operation.

ALSO, MANUFACTURER OF

HENDY'S IMPROVED AMALGAMATOR and CONCENTRATOR, AND DEALER IN

QUARTZ MILL MACHINERY.

GOLD, SILVER AND COPPER MINING.

Reducing and Concentration Machinery.

FRASER, CHALMERS & CO.
SUCCESSORS TO EAGLE WORKS MFG. CO.
MANUFACTURERS OF
STAMP ENGINES, BOILERS, AND STAMP MILLS
CRUSHING, AMALGAMATING PANS AND
ROLLERS, AND SYSTEMATIC MILLING, SMELTING, AND CONCENTRATION OF ORES
ROASTING CYLINDERS
GENERAL MACHINERY
CHICAGO.
Address: FRASER, CHALMERS & CO., Chicago, Ill.

Hoisting Engines, Diamond Drives, etc., Manufactured by M. C. BULLOCK.

SAVE YOUR GOLD.

MINERS AND QUARTZ MILL MEN

SUPPLIED WITH

SILVER PLATED AMALGAMATING PLATES IN ANY QUANTITY AND SIZE, AT LOWEST RATES, AT

San Francisco Gold and Silver Plating Works

653 & 655 MISSION STREET, SAN FRANCISCO.

E. G. DENNISTON, - - Proprietor.

HOTEL, RESTAURANT, PLUMBERS', GUNSMITHS', AND ALL KINDS OF METAL WORK PLATED IN THE MOST DURABLE MANNER.

Printers and Others Wanting Cheap Power, Buy

BAXTER ENGINES! PRICES REDUCED.

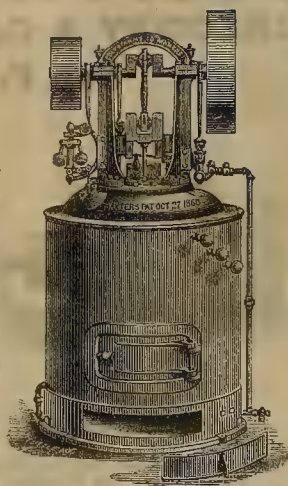
SIZE, SPEED, WEIGHT AND REDUCED PRICE LIST

The Baxter Steam Engine, 1877.

Horse Power.	Size of Cylinder.	Size of Pulley.	Size of Fly Wheel.	Revolutions.	Floor Space.	Height over all.	Total Weight.	Price.
Two (2)...	3x4 in.	9x4 in.	18x3 1/2 in.	300	2 1/2 feet.	5 1/2 feet.	1380 lbs.	\$400
Four (4)...	4x4 1/2	12x5	22x4	260	3	6 1/2	2170 "	600
Six (6)...	5x5	14x5 1/2	24x5	240	3 1/2	7 1/2	3100 "	800
Eight (8)...	6x6	16x7 1/2	26x6	200	4	8 1/2	3780 "	1000
Ten (10)...	7x7	20x8 1/2	30x8 1/2	190	4 1/2	9	4850 "	1200
—ALSO—								
Ten Horse Power Boiler with 6 Horse Power Engine,						8 "	4260 "	1000
Fifteen " " " " " " " " " " " " " " " "						8 1/2 "	4400 "	1100
" " " " " " " " " " " " " " " "						9 1/2 "	6000 "	1300
" " " " " " " " " " " " " " " "						9 1/2 "	6450 "	1400

Floor space for 15 Horse Power Boiler, 4 feet 10 inches.

The Price includes Furnace, Boiler, Engine, Heater, Water Bottom, Gang, Cocks, Safety Valve, Steam Valve, Governor Valve, Pump, Blow-off Cock, Smoke Jacket, Smoke Pipe Elbow, Steam Gauge and Glass Water Gauge. In short it is a "self-contained machine," ready to be set up and run immediately.



BAXTER ENGINES! PRICES REDUCED.

NO EXTRA INSURANCE TO PAY. NO LIABILITY TO GET OUT OF ORDER. NO DANGER FROM EX LOSION.

IN SHORT, THEY ARE THE MOST

ECONOMICAL, SIMPLE, SAFEST & DURABLE
Engine in the World

We Fully Guarantee Them in all the Above Particulars.

They are Manufactured by the

Colt's Patent Fire Arms Manufacturing Co.,

Who have spared no expense in getting up special Tools and Machinery with which to build these Engines, so that

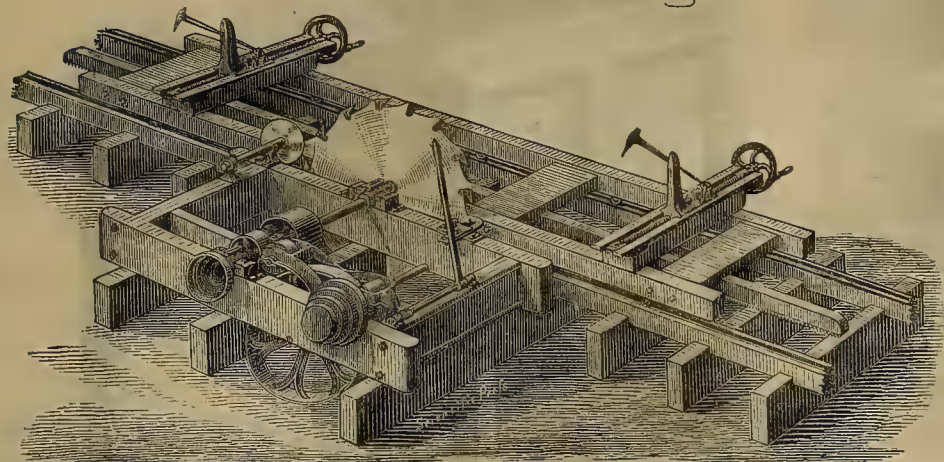
Every Part is Made up to a STANDARD GAUGE,

And are perfectly interchangeable, the importance of which will be understood by all who are at all familiar with machinery. Thus, every engine of a given size is an exact duplicate of every other one of that size, and in case of breakage, the broken part can be immediately replaced by its perfect duplicate. The inventor of this Engine had in view, in its construction, the great need that exists for a perfect Steam Engine—of small power—adapted to all kinds of light mechanical work, and that should also combine all that is good in Steam Engines. The first point was to secure a perfectly philosophical boiler and furnace, in order to insure the most perfect combustion, and to take up the greatest amount of heat in generating steam. The second point was to make a perfect cut-off Engine, working steam expansively, and keeping up the temperature of the cylinder to prevent loss by radiation or condensation. The third point was to combine and make the whole a mechanically and scientifically correct machine. The result is

The Greatest Amount of Power Proportioned to the Amount of Fuel Consumed,

This proving the fact—well known to men of science, THAT WATER IS THE BEST MEDIUM to transmit the mechanical forces generated in the combustion of fuel, to the production of motive power.

Double and Single Portable Saw Mills.



These Mills are built in the strongest, most durable and workmanlike manner, and are capable of driving any size saw up to 64 inches. They are furnished

With Improved Friction Feed and Gig Back,

Both being operated by the same lever; no belt being used to gig back. They are capable of

Cutting From 8,000 to 12,000 Feet Per Day.

SAW MILL MACHINERY

Of all Descriptions Furnished to Order. Address,

BAKER & HAMILTON,

SAN FRANCISCO, CAL.

SINGLE PORTABLE SAW MILL. PRICE, \$650.00.

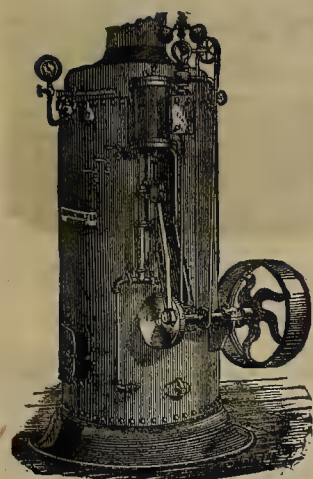
DIMENSIONS OF "BOOKWALTER" ENGINE AND BOILER.

ENGINE.				BOILER.					Price of Engine and Boiler.
Horse Power.	Size of Cylinder. Inches.	Revolutions.	Size of Wheel. Inches.	Diameter. Inches.	Height. Feet.	Floor Space. Sq. Ft.	Fire Surface. Sq. Ft.	Total Weight. Pounds.	
3	3 1/2 x 6	240	12 DIA. 6 FACE.	24 INCH.	1 1/2 FEET.	37 IN.	36 SQ. FEET.	1325 POUNDS.	\$325
4 1/2	4 1/2 x 7	240	22 " 6 "	28 "	5 "	39 "	54 "	1800 "	375

Price List and Dimensions of Ames' No. 0, Portable Engine.

ENGINE.					BOILER.							Price.	
Horse Power.	Diam. of Cylinder. Inches.	Length of Stroke. Inches.	BALANCE WHEEL.		Revolutions per Minute.	Diameter in Inches.	FIRE BOX.		TUBES.				Weight Pounds.
			Diam. In.	Face In.			Diam. in Inches.	Height. Inches.	Number in Inches.	Diam. in Inches.	Length Inches.		
4	4	6	21	41	260	34	18	18	28	2	48	1480	\$375
6	5	6	24	44	260	27	23	24	38	2	48	2025	500
7	6	8	23	63	160	30	25	24	38	2	54	2430	595
8 1/2	6	8	28	64	190	32	28	24	44	2	54	2600	670

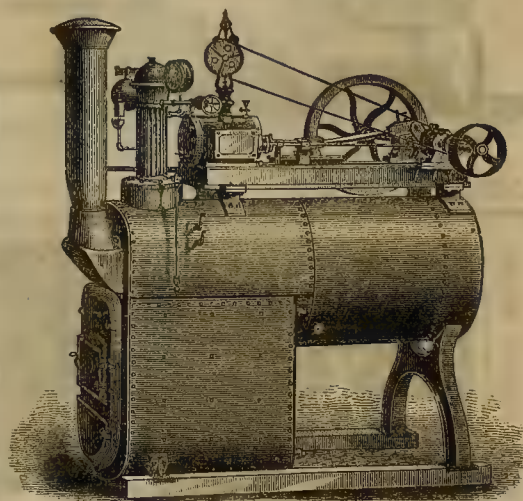
Every Engine is Fired up and Tested before it leaves the Factory.



"BOOKWALTER" ENGINE.

AMES' CELEBRATED PORTABLE ENGINES.

These Engines are manufactured by the same firm (Ames Iron Works) that make the Ames Strawburners; the same care is taken, and the same extra quality of material, first-class workmanship and finish is used in their manufacture as in the Strawburners. The Engines are made fully as well and in better style than most stationary engines are, and intended for use as such when desired. There are comparatively few cases, however, where they cannot be used in their portable shape as such. They are certainly more cheaply and quickly set and put in operation; occupy less space; have all the steam, exhaust and water connections fitted and complete. They require no skilled machinists and masons to set them up in running order. The "Ames" are carefully tested and run with steam at the shop and made perfect there, which cannot be done with the ordinary stationary engine. We claim that the Boilers, Steam and Exhaust passages, and other vital points of these Engines are scientifically proportioned in accordance with the best experience and use of the Steam Engine Indicator; also, that as the manufacturers make a specialty of Portable Engines and Strawburners, we sell a better and larger engine for less money than those who do not confine themselves to the manufacture of any "particular" article. We will not attempt in this space to enumerate the uses to which the Ames Engines have been applied, but merely make the assertion that no style of engine in the United States can surpass them in economical adaptability to "any" work or location. The larger sizes, from 15 to 40-horse power, have met with great success, on account of their large boiler capacity, in driving saw mills, and other uses where slabs, saw dust and other light fuel is necessarily used. A saw mill and corn mill, or any two machines, can be driven at once direct, without the intervention of shafting and pulleys. They are mounted complete, with all connections, and fully tested with "steam" and hydraulic pressure before shipment—until they are known to be complete and perfect in all their parts. They are furnished with Smoke Pipe, Governor, Heater, Pump, Steam Gauge, Water Gauge, Whistle, Safety Valve, Gauge Cocks, and Oil Cups.



AMES' NO. 0, PORTABLE ENGINE.

PRICE LIST OF AMES' CELEBRATED PORTABLE ENGINES.

NUMBER.	CYLINDER.		BOILER.						FLY WHEEL.			Revolutions per Minute.	Estimated weight of Engine and Boiler in lbs.	Horse-power as usually rated.	PRICE ON SKIDS.
	Diameter in Inches.	Stroke in Inches.	FIRE BOX.			TUBES.			Diameter in Inches.	Faces in Inches.					
			Diameter of Wheel in Inches.	Length in Inches.	Width in Inches.	Height in Inches.	Number.	Diameter in Inches.			Length in Inches.				
0	3 1/2	6	23	23	18	16	18	2	41	9 & 20	250	1,700	3 to 4	\$ 600	
1	5	10	24	24	18	26	21	21	51	24 & 40	5 & 6	175	2,700	5 to 6	850
2	6	10	27	26	22	32	20	3	60	40 & 40	6	175	2,900	7 to 8	1,100
3	7	10	29	30	24	34	22	3	60	30 & 32	8	175	4,000	9 to 10	1,250
4	8	10	32	32	26	36	24	3	68	30 & 44	8	175	5,800	11 to 12	1,450
5	8	12	32	38	26	37	27	3	68	30 & 48	8 & 10	150	6,900	13 to 15	1,550
6	9	12	33	52	27	37	29	3	82	40 & 54	8 & 12	150	7,200	15 to 18	1,750
7	10	12	35	52	29	38	34	3	82	44 & 54	8 & 12	150	7,700	20 to 25	2,100
8	11	16	37	52	31	41	39	3	100	48 & 60	10 & 12	130	10,800	25 to 30	2,500
9	11	18	39	52	33	48	45	3	112	60 & 72	12 & 12	110	12,200	30 to 35	2,850
10	12	18	39	52	33	49	45	3	124	60 & 72	12 & 15	110	13,850	35 to 40	3,200

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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, JANUARY 20, 1877.

VOLUME XXXIV.
Number 3.

(Copyrighted.)

Mechanical Ore Concentration and Separation—No. 18.

(Written for the Press by FRANCIS M. F. CAZIN, M. E.,
Santa Fe, New Mexico.)

Assorting According to Size.

When speaking of the principles on which mineral dressing is based, it has been stated that certain action of mineral particles tending to separate them locally by difference in speed or tendency to move can only be depended upon when particles of equal (or at least very similar) size are made to act together. This being a fact established by experience as well as by theory, it would, indeed, have no practical purpose whatever to ventilate what similar action particles will exercise although of differing specific gravity when also of different size, size and gravity neutralizing reciprocally. This is all very useful for the studious engineer, to assist him in avoiding blunders, as they are made by the thousand by the uninitiated, but here, where I do not intend but to write for a direct practical purpose and not to discuss or to indulge in scientific intolerant slang, it is sufficient to say, **Without Sizing No Fully Successful Mineral Dressing.**

To deny this in theory as well as practically is proving incompetence and making a fool of oneself, as well as trifling with the means that may be miscarried in fruitless attempts.

When speaking about the "breaking" of the ore, it has been explained that the nature and quality of the ore has in every special case to be consulted, in order to determine in how large a size the ore should be broken, for separating the rock successfully from the valuable parts.

Now it is impossible to break rock by power, into any size, on an average, without at the same time breaking part of it into somewhat smaller sizes. It will consequently be required, in all cases, to work more than one size in the separating machinery. It has also been explained before, that in breaking by crusher and rollers, such sizes coming from the crusher small enough not to require further rolling, should be kept out by screen sizers (as is done in Dodge's combined crusher and rollers); and also, that the material is most advantageously treated dry until ready for the separation and preliminary sizing thereof.

It therefore remains to indicate the most favorable shape of dry as well as wet screens (sizers). There is no mechanic who will not admit at once that the inclined cylindrical form, where the motion has to be imparted to an inclined shaft and the entire weight pressed toward one friction is disadvantageous when compared with the conical form, where the central shaft is horizontal. Nevertheless a St. Louis journal, professing to be competent in such matters, puffs up the product of a St. Louis foundry, and recommends the inclined cylindrical shape. This is only one of the many cases where incompetency is taking the middle of the track.

The capacity of the screens has to be determined according to the quantity the crusher and rollers are able to work, which quantity depends a good deal on the nature of the rock, and therefore cannot be indicated in general.

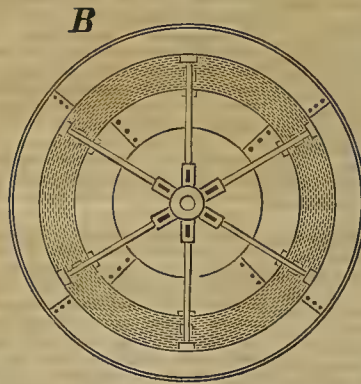
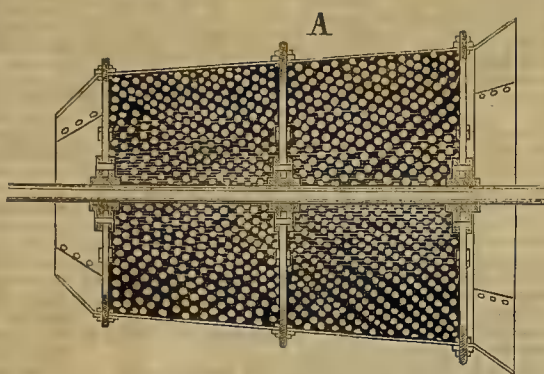
The figures A and B, in the accompanying cuts, show a screen of middle size, and of such arrangement as by practice proves the most effective. The work and machinery thus far described forms generally the dry department. From this department all the mineral rock passes into the next department, in a state crushed and rolled down to no bigger size than that determined on as the biggest to be used for ultimate separation. The whole bulk is dry, or at least contains no more water than the small quantity clinging to it from the mines, or from atmospheric influences. The entire bulk enters the second department by being dropped into a gutter with a stream of water sufficient to carry it to its destination.

The Rain.

The good substantial rainfall of the past week has entirely dissipated the almost universal fears of a dry season. The farmers wear smiling faces in prospect of an abundant harvest, and the city people, who are indirectly interested, are happy to see the rain. The miners, who have needed the rain as much as the farmers, are joyful over the good prospects of a plentiful water season.

The fine, pleasant weather of the past two months has been unfavorable for gravel mining in one sense, but it has been good for quartz miners. There has been but little more water to be pumped out from that class of mines, than there usually is in summer, and those engaged in prospecting or opening up new ledges, have had but little to contend with from the elements.

Up to within a short time since there was water enough for the gravel miners, but for several weeks our many claims have been waiting for water. The opportunity has been taken, however, to put the claims in first-class order for winter, and we do not doubt but that it has been better for the miners to be so well prepared. The storm of this week has extended all



REVOLVING DRY SCREEN.

over the State and promises an abundant supply of water and snow. It indicates, moreover, that more will come, and the miners now need have no further fear of a dry winter. After all the time the miners have had for preparation they ought to make a good showing next year, and we think they will.

ACADEMY OF SCIENCES.—The regular meeting of the Academy of Sciences was held on Monday evening last. William B. Hyde was nominated for life membership. Mr. Lockington read a paper on various specimens of crustacea of the Pacific coast. Mr. Edwards presented a paper, in continuation of his series on the *Lepidoptera* of the Pacific coast, describing a new and beautiful species of moth, from Kern county, making the fourteenth species now found. He remarked that specimens of these are so rare that it would be hopeless for foreign collectors to enrich their museums from this source. Dr. Kellogg read a paper on three new plants. Mr. Edwards acknowledged with thanks the compliment paid him at the last meeting, of electing him a life member. Professor Davidson read a paper on the irrigation of Egypt.

BULLION SHIPMENTS.—Since our last issue shipments from the prominent mines have been as follows: Modoc, January 11th, \$6,620—total to date, \$60,257; California, 12th, \$191,875.73—total for January, \$1,288,211.06; Con. Virginia, 13th, \$66,565.32—total to date, \$125,389.19; Chollar, 13th, \$7,070.02; Ophir, 12th, \$3,394.84; Tybo Con., 9th, \$5,873.86—total to date, \$14,686.16; Leopard, 9th, three bars bullion, value, \$4,923; Manhattan, 16th, \$12,800; Modoc, 13th, \$5,630—total to date, \$65,887; Tybo Con., 13th, \$10,893.78—total to date, \$25,579.94; Northern Belle, 14th, \$15,207.28; California, 17th, \$107,771.32—total to date, \$133,895.91; Con. Virginia, 16th, \$38,563.80—total to date, \$163,952.99; Modoc, 15th, \$5,680—total to date, \$71,567.

EUREKA VS. RICHMOND.—A dispatch from Eureka, Nevada, gives the following particulars of a suit to determine the boundaries of two mines: One of the most important mining suits ever tried in Eastern Nevada is now on trial in the District Court, the Eureka Consolidated company being plaintiff and the Richmond company defendant. The former brings action at law for the recovery of \$2,250,000, estimated value of 35,000 tons of ore at \$70 per ton, which is alleged in the complaint to have been taken by defendant from plaintiff's ground. Plaintiff also will file a bill in equity, asking for an injunction restraining defendant from further working the disputed ground until a trial of the case can be had. The famous Potts chamber, from which so large an amount of rich ore has been extracted by the Richmond company, is situated in the disputed ground. Plaintiff, in its complaint, bases its claims to the ground under an act of Congress, and also under the covenant of compromise entered into between the two companies, in the settlement of the celebrated suit between them which was tried in the District Court several years ago, and which resulted in the disagreement of the jury. The injunction matter will probably come be-

The California Bonanza.

The annual meeting of the California mining company was held on Wednesday of this week, when the reports of the officers were presented. The Superintendent gives a detailed report of the condition of the mine underground, which we have not space to publish in this issue. In the first part of his report he says: "The California mine has yielded during the year ending December 31st, 1876, 128,800 15-20 tons of ore. Of this ore 127,540 12-20 tons have been reduced, leaving on hand in the ore houses and at mills, 1,260 3-20 tons, valued by assay at \$189,000. The ore reduced has yielded bullion of the value of \$13,400,841.40, being 73% of the assay value of the ore. The value of the gold in this bullion was \$6,488,640.58, and of the silver, \$6,912,200.82. The average yield of the ore per ton is \$105.07.

The exactions to which the bullion produced has been subjected—in the way of heavy discount on silver, local taxes on net proceeds—and the cost of transportation of the bullion, have materially reduced the apparent yield.

The President's report is as follows: The payment of monthly dividends of two dollars per share (\$1,080,000) commenced on the 15th of May last; and, while the stockholders have been kept in constant alarm by sensational rumors, given greater publicity by journals purporting to furnish reliable information, the mine has continued to produce the necessary amount of bullion for the payment of these dividends. The year has been singularly uneventful in misfortune; during that period the extraction of ore has continued with scarcely the interruption of a single day, or the necessity of recording any accident. The management which has achieved so happy a result is entitled to your confidence and approval.

The heavy discount on silver has materially affected the profits of the production; and this would have been even more sensibly felt had not the percentage of gold been unusually large. The recent advance in silver promises an improvement in this respect for the coming year.

The following figures show to what importance the mining business has grown, and how extensively your stock figures in it. There have been transferred during the year 850,000 shares. As every transfer indicates a transaction, by placing the average price for the year at 60, we find that \$51,000,000 represents the aggregate of these transactions.

The Secretary reports the gross product of the mine at \$13,400,841.50. Total disbursements, \$13,742,200.22, including \$8,640,000 paid in dividends. The present overdraft is \$339,637. The reduction of ore cost \$1,613,472.70; discount on bullion, \$895,521; salaries and wages, \$412,509; supplies for mine, \$296,887; C. & C. joint shaft, \$191,908; bullion freight, \$93,066; hoisting ore, \$70,915; assaying, \$34,804; interest and exchange, \$53,715; taxes, \$15,175; bullion in hands of Bank of Nevada, \$1,342,967.

There are supplies in the mine valued at \$36,750, and machinery worth \$48,257.

SUPERINTENDENT UTQUHART, of the Fire Alarm Telegraph, wants to make arrangements by which alarms of fire may be heard in districts where the sound of the alarm bells is not audible. He proposes to place gongs in several of the large foundries and factories, which shall be connected with the wires of the alarm telegraph, and when an alarm is struck on these gongs, to have the same repeated by the steam whistles in these places.

A BILL has been introduced in the Nevada Legislature by Baker, compelling foreign corporations to reincorporate in that State and have offices there.

fore the court some time next week, but the case cannot come to trial before next March.

MINING SUIT.—A dispatch from Salt Lake says: About two weeks ago the English stockholders of the Flagstaff mine sent A. G. Hunter to take charge of their property, it having been under the management, for several years past, of J. N. H. Patrick. Upon his arrival here Mr. Hunter obtained possession of the mine through an attachment of the Justice's Court at Alta, since which time there has been a contest for possession before Judge Shaeffer, of the Third District Court, which was decided to-day in favor of the English party. This has been the most productive mine in Utah for the past five years.

OUR REVIEW.—Owing to the use of so much space for our annual mining review this week we have omitted our usual illustration on the ninth page. We have also left out other matter of which want of room prevented the insertion. Our review will be found very comprehensive in character, and is well worth perusal by all interested in mining development, as it gives facts and figures from all localities on the coast. The statistics given will be found reliable, and may be taken as a basis for calculation.

THERE is a probability that Dakota will be divided and a new Territory erected out of a portion of her lands, to be styled "Huron." A bill to that effect has already passed the Senate. The proposed new Territory is to be formed from the northern half of Dakota, and will comprise 70,000 square miles, with a population of about 10,000. The soil is said to rank equal for productiveness with the best in the United States under corresponding temperatures.

Rights of Stockholders.

Discussion at the Consolidated Virginia Meeting.

The annual meeting of the Consolidated Virginia mining company was held last week, and in our last issue we gave in full the official reports. Want of space, however, prevented the publication of any of the proceedings of the meeting, which were pretty exciting. Some of the stockholders contended that the management had not acted fairly, while others thought they had. We append that part of the proceedings of interest to the general public.

After the report of the Superintendent was read Mr. S. P. Dewey rose and said; I second the motion to receive the report, and take the occasion to congratulate the shareholders on the favorable condition of the mine and the prospects—now a certainty—of an early resumption of dividends and their continuance for a long period of time, certainly until the 1600 and 1700-foot levels are exhausted of the rich bodies of ore known to extend to that depth. Of the

Truthfulness of this Report

I have not a doubt, as the statements of the Superintendent are confirmed from other reliable sources. My only regrets are, first, that these facts were not given to the public a month ago, strengthening the stock and preventing the terrible sacrifices so many of the shareholders have been made to suffer; and, second, that the report does not embrace the workings of the diamond drill, about which so much anxiety is felt by the shareholders, who feel that its operations and disclosures are reserved to the benefit of the managers alone. We are entering upon a new year, and I trust a new era in the management of the company's affairs. What we want most is information—all the information that exists from day to day regarding the developments of the mine. This, stockholders have a right to demand, and this alone will give all an equal chance, and preserve them from becoming the prey and victims of designing manipulators. At the proper moment in the proceedings of this meeting I propose to offer a resolution or two on this subject of information, which I trust will receive your support and approbation.

The Diamond Drill.

Mr. Mackey here said that so far as the diamond drill went, there had not been a diamond drill run in the mine below the 1500-foot level, and therefore Mr. Fair could not have reported anything respecting it. As for the managers keeping back information, he had not done so, and he did not believe that Mr. Flood had. All the information to be obtained about the mine was included in the Superintendent's weekly reports, and they were open to the public. He repeated his denial of the use of the diamond drill below a certain level.

Mr. Dewey said the managers had not denied it over their own signatures. If they had done so the people would have believed them.

After an angry discussion between Mr. Dewey and Mr. Flood, Mr. Mackey said: Come, come, gentlemen. If Mr. Dewey will gamble in stocks he must expect to lose once in a while, and at any rate this is no time to bring up personal matters. I want to say now—and not only for the benefit of Mr. Dewey, but all the gentlemen here present—I am the largest individual stockholder in the company, and have more at stake than any man in it. I work the mine with Mr. Fair in Virginia, and it is simply impossible for us to tell two or three days or a week ahead what the mine may develop. We cannot promise anything for the future to a certainty. Events are constantly happening to upset our calculations. Hard rock, caves, bad air and a hundred things occur at any moment to retard our progress. The management have done as well as they can and can do no more.

Mr. White—who, it may be here stated, represented Brighton in the English Parliament for 16 years, and who purchased \$200,000 worth of California and Consolidated Virginia stock when in the 80's—here came to the front. He said that he appeared in his own behalf and in behalf of numerous English stockholders who were dissatisfied with the course of the bonanza managers. They had kept their affairs too secret, a method of transacting business quite inconsistent with British frankness.

To this Mr. Mackey warmly replied that an Englishman could know nothing about the working of an American mine, a matter regarding which even himself and Mr. Fair might be mistaken. Those who were so much given to blowing about the mine ought to come to Virginia and try to run it themselves. The statement had been made that they had been using a diamond drill in prospecting the lower levels; the fact was that they had not used a diamond drill at all below the 1550-foot level.

Mr. Dewey—I merely asked for information. If that is a fact I withdraw my statement respecting it.

Solomon Heydenfeldt replied generally to Mr. Dewey's remarks.

Regular Statements Wanted.

Mr. Dewey reiterated what he had said about the desirability of regular statements by the managers. He also recalled the remark made by Mr. Flood, in an interview made some months ago, to the effect that the prospects of the Consolidated Virginia mine were excellent, and that it would continue to pay dividends uninterruptedly for a long time to come. Mackey

interrupted by asking if it was not Tom Fitch who said that, and continued: "The statements to which the gentleman alludes have been published regularly for the past two years.

Mr. Dewey—I have found these statements true with few exceptions. If we had the same means of obtaining information here it would be a good thing.

Mr. Mackey (impetuously)—Now, Mr. Dewey, my dear sir, if you will come up to Virginia you shall have all the information you can possibly get.

Mr. Dewey—What I desire to ask on my own behalf, and in behalf of other stockholders, is that the management do something to give us more confidence.

Mr. Mackey—I suppose Mr. Dewey is dissatisfied in regard to the depreciation of his stock as well as in respect to alleged mismanagement.

Mr. Mackey—Silver is high and discount is high. The expenses of running a mine are enormous. The wages of the men from top to bottom are \$4.50 per day. A mill cannot be put up for less than \$500,000.

Mr. Dewey—We know all that.

Mr. Mackey—Not a man can be hired to work in the mines for less than from \$4.50 to \$10 per day. The expenses of handling the ore and keeping the mines in order are very heavy. Then there are great obstacles to be overcome, such as water, ventilation, danger of fires, etc. Then if there is any delay people say there is something wrong, and get mad. What are you going to do about it?

Mr. Dewey re-read his remarks on the superintendent's report, and renewed his motion to adopt, which was put and carried without a dissenting voice.

In voting for trustees 483,136 shares were voted for the regular Flood & O'Brien ticket and 32,335 for the opposition.

A Resolution.

Mr. Dewey read the following:

Resolved, That the directors be instructed to make or cause to be made and published monthly statements of the financial condition of the mine, showing its receipts and expenses with the balance to debit or credit at the end of the fiscal month.

Mr. Murphy—That has never been done by any mining company in San Francisco before, so far as I know.

Mr. Dewey—Not a man can be hired to work in the mines for less than from \$4.50 to \$10 per day. The expenses of handling the ore and keeping the mines in order are very heavy. Then there are great obstacles to be overcome, such as water, ventilation, danger of fires, etc. Then if there is any delay people say there is something wrong, and get mad. What are you going to do about it?

Mr. Heydenfeldt—There is a difficulty in the way of this. The fiscal condition of the company can hardly ever be told at the end of the fiscal month. It often happens that just at that time the products of the mine have not been fully realized, because large amounts of bullion may not have been sold. It has sometimes occurred in past year, that there has been a great decline in stocks. At one time this decline reached 27% and the management wisely declined to sell their bullion at such an enormous discount, holding over very large amounts for improved rates, that they might advance the interests of the company. They did not, on this account, cease the payment of dividends, but overdraw the company's account at the bank to pay those dividends, rather than that the stockholders should suffer. Statements made at the end of the month might often give a very inadequate idea of the financial condition of the company. They might have a million dollars in bullion on hand, and might have more than a million overdrafts. All that the trustees can be required to do is to give the financial condition of the company as nearly as possible.

After some discussion Mr. Dewey offered the following:

Resolved, That the trustees be and they are hereby authorized and instructed to procure and deposit with the secretary, full, true and correct copies of all existing and future surveys, plans and drawings of the underground workings of the mine, and to keep the secretary fully informed as to the condition and profit of the mine, and that they direct him to exhibit such plans and drawings and surveys, and to impart all official information to any stockholder during business hours when requested so to do.

This resolution was at first presented in more extended form, but abbreviated to this shape.

Mr. Dewey went on to say that in all the mines with which he had ever been connected as director or chief officer, they had always had plans and drawings showing the working of the mines, corrected from day to day, illustrating the sinking of winzes, the running of drifts, etc. These enabled the stockholders to watch the progress and development of the mines, and correct all misrepresentations likely to do them injury. He continued his remarks as follows:

The object of the resolution is to establish a bureau for information where every stockholder shall be at liberty to go for official information concerning the condition and prospects of the mine. Private or personal statements made by individuals, whether in the management or out, do not suffice; on the contrary, they are detrimental to the general mass of stockholders. A few importunate or favored ones may be benefited, while the many who are equally entitled to information learn but little of the affairs of

what may possibly affect their entire fortunes. Added to which, the system of imparting private and individual information leads to misrepresentation and suppression of truth by the party especially favored. What one has a right to know is equally the right of all, and no statement can have such weight with the shareholders as that which is official. Who does not know that the want of official information respecting the mine and its prospects has within the past 90 days depreciated the value of the stock of this company many millions of dollars, and caused the ruin of hundreds? Who does not believe that this ruin would have been averted by an official statement that the stoppage of dividends was the result of temporary causes only, and not from impoverishment of the ore body, as was publicly and continuously asserted by persons interested in depreciating the shares for stock jobbing purposes? Had the secretary, under authority such as is embodied in this resolution, exhibited to the shareholders full plans of the mine and published candid statements of its condition and of the finances of the company, announcing the fact, which is doubtless undeniable, that so soon as the necessary connections in the mine could be made, involving a period of probably from 30 to 60 days,

Dividends would be Resumed,

Under favorable conditions for their continuance over a long period of time, confidence in the mine and its management would have gathered new strength instead of weakening, the broker and capitalist would not have pursued the marginal customer, the panic we have witnessed would have been averted, and many a man and woman now impoverished by reason of his or her investment in the bonanzas would be yet happy and hopeful of the future and patient in the present. Considering, too, the fact that it is but a few months since the chief among the trustees of the company, and he who is credited by the public with being the head and front of its affairs, gave publication through the press of this city to these words: "I tell you, sir, that these mines will pay dividends right straight along, and will continue paying them when those who are maligning them are cold in death," etc. He certainly owed it to himself, if not to his fellow-shareholders, and especially those who had invested upon the truthfulness of such statements, that some explanation should be given of the causes which produced so serious a falsification of his prophecy. I have great faith in the future of the bonanza mines, and believe that the best portion of their great wealth is yet to be realized. This faith cometh from knowledge not obtainable from official sources or through the channels of this office, as it should be. Give us faithfully the information called for by our resolution, with an honest administration of affairs at the mine, and I venture the prediction that the value of our shares will enhance as rapidly as they have depreciated under the dark-lantern policy.

The Directors' Views.

Judge Heydenfeldt—I am satisfied that the substance of the requisition is not in the power of the stockholders at all. The management is instructed in the nature of its duties by law. They have been duly elected to bear the burdens of office. Even if they were disposed to give way to the fancies of stockholders, they are not sufficiently well informed to have definite views in regard to what they want.

Mr. Dewey—We merely want information in regard to the mines.

Judge Heydenfeldt—You must appeal to the trustees, then, to make an order of that kind.

Mr. Dewey—The resolution is an instruction which we give the trustees. To say that the power does not rest with the stockholders still, merely because they have elected trustees, is an absurdity.

Mr. Dewey went on to say that every stockholder had a right from day to day to know what his paid agents were doing, and the idea that any man, or any set of men, had the right to refuse such information, was an absurdity. A man with 100 shares of stock had just as good right to know about the affairs of the company as the man who owned 100,000. He risked his property equally—perhaps ran even greater risks, as what he had invested might be all of his little fortune. To ignore the demand of these people was doing them a great injury.

Mr. Mackey—It is very hard to reply under the circumstances. I just want to make a few remarks in regard to the honesty of the management. I defy any gentleman to say that there has been any dishonesty in the management of the Consolidated Virginia mine.

The resolution was finally adopted, Mr. Heydenfeldt voting against it.

The Nevada Mill Company.

Mr. Dewey—I have another resolution that seems more important than any yet offered. I have considered it of sufficient importance to give it a preamble. It is as follows:

WHEREAS, The Nevada mill company, which was organized and consists of Messrs. Flood, O'Brien, Mackey and Fair, have within the past year erected a large and efficient mill for the reduction of ores, and have used said mill solely for reducing the ores of the Consolidated Virginia mine at a profit to said mill of about \$600,000 per annum, besides tailings, and at a corresponding loss to the stockholders of the company,

Resolved, That the trustees be authorized and instructed to enter into negotiations with some mill company for the purchase of said mill at any reasonable price, and that in the event of a failure to effect such purchase, they be instructed

to purchase any other desirable mill property or to cause to be constructed without delay one or more mills adequate to the necessities of this company.

Rev. Mr. Briar came suddenly to his feet after the reading of this resolution. He said that, in his opinion, the less property a company had the better they were off. He might sell out his stock in the mine, and retire from business, when he would find himself a mill-owner contrary to his will. He had rather Flood and O'Brien, Mackey and Fair, would run their mill up there independent of the mine, and they would run the stock-mill down here.

Mr. Dewey—The importance of this resolution to the welfare of the company can hardly be exaggerated. Indeed, I may say that its future success depends in a great measure upon its adoption. With this conviction and knowing to what extent the interests of the company—through the inconsiderateness of stockholders in disposing of their proxies—depend upon the favorable action of the men who are at the same time our trustees and owners of the mills sought to be acquired, I venture an appeal to them to favor this resolution; believing as I do that such an abnegation of personal interests in favor of the company whose interests they represent, will add to their great wealth that which is of still greater value, the good opinion of their fellow-men, and the gratitude of the shareholders who have so generously confided to them their interests and so long and patiently submitted to this injustice. Every one at all conversant with the facts knows to what a fatal extent the mill interest, as it is called, is eating out the vitals of the mining interest on the famous Comstock. Why, sirs, I venture the opinion that but for it the Ophir, the Chollar, the Belcher, would to-day be dividend-paying mines, with a vastly appreciated value in their stock.

Why is it that Ophir, with a bullion product of \$2,350,000 the past year, pays nothing to the shareholders, while its shares have depreciated during the same time from \$75 to \$17, the whole mine, with \$350,000 in its treasury, selling to-day for less than two-thirds of the year's product and but little more than the value of its plant? Why is it that the Chollar has for the past five years been made to yield an average of 100 tons of ore per day, and that of a grade just sufficient to pay its diurnal tribute of \$500 a day to this mill interest and nothing to stockholders, while if the stockholders had owned their own mills they would have saved, during these five years, nearly \$1,000,000, giving a handsome interest on their investment? The Belcher is to-day turning out an average of 200 tons of ore per day, the milling profit on which is over \$1,000 per day, or 33% per annum on the present market value of the stock, and yet the stockholder gets nothing. With Consolidated Virginia the figures assume more stupendous proportions. The company have paid for milling their ores for the past 32 months the enormous sum of \$5,320,000, of which fully one-half is a clear profit and should now be in the company's treasury, saving the necessity for suspending dividends, also the great depreciation in the market value of the stock, and the widespread ruin and distress that have followed. And yet this is not the whole or even the greater part of the losses suffered by these mines through this "mill interest," for, not satisfied with the enormous profits made in the reduction, they claim the tailings also, which of right are and should be the property of the company. The great value of these tailings will be seen by the following figures and estimates: The bullion product of the Consolidated Virginia mine has been in round numbers \$39,000,000; the percentage realized from the mills in reduction averages about 70% of the assay value, which would give the enormous sum of \$16,700,000 to the tailings, of which probably one-half can be recovered by these mill owners. Is it not time then for stockholders to take action against a system that is so fatal to their interests, and by the adoption of this resolution rid themselves at once of this vampire which is sucking out the very life-blood of the mine, and will soon render their stock worthless? Again I appeal to the gentlemen whose duty it is to represent the interests of all the shareholders, to give it their very efficient aid. The great fortunes which they have acquired from mines and mills should now, it seems to me, demand from them this act of justice and a more liberal policy.

Mr. Heydenfeldt—We should vote unanimously in favor of this resolution.

Captain Hall—I must protest against this resolution to purchase the mills. I would not be willing to take my part of the stock and take the chances.

Mr. Wadsworth—I don't want to buy any mills. I think one thing would eat the other up. I believe we can make more money to take the dividends, and let them run the mills.

Mr. Dewey—I have had conversations with the mill men at Virginia on the subject, and have also had an interview with the assessor of the revenue in regard to the milling business. He knows as much as any man how much it costs. He says that the mill pays for itself every 90 days.

Mr. Mackey—That's a mistake, Mr. Dewey.

Mr. Dewey—I have the thing reduced to writing.

Rev. Mr. Briar—I think that the most of those present have perfect confidence in the men who are running these mills. If the proxies authorized to vote here vote to purchase

MECHANICAL PROGRESS.

Notes on D. mills.

Professor Sweet, the mechanic of Cornell University, continues his notes in the *Polytechnic Review*. We quote a few points on drills: The machines for driving drills are as various as can well be imagined, ranging from a bit-stock, turned by hand and forced up by the breast, through a similar device made stronger and turned by one man while the pressure is put on by a lever worked by another; then the fiddle-drill, in which a string passed around a spool and fastened to an elastic bow is used to turn the drill—the ratchet-drill, the crank-drill, the geared crank-drill, the lever-drilling machine, the post-drilling machine, the girder-drilling and boring machine and the radial machine.

With all our modern perfected machinery it seems useless to spend much time in describing such primitive devices as a fiddle-drill and lever-brace, and yet there are times when small holes are to be drilled in large castings, that it costs twice the time and money to move the work to the machine than to drill the hole, providing the workman had the tool and disposition to do it by hand.

In the construction of the fiddle-drill there should be a thread cut on the spool for the cord to work in to keep it from chafing. In the crank-drill for general purposes, the crank direct on the drill-spindle to work without the intervention of gearing is the best, though not so applicable to all positions as one driven with bevel gearing. Where there is gearing it would be an improvement if they were readily changeable to change the speed.

Of the score of ratchet-braces, that is, the devices for working a drill by moving a lever back and forth, there are but few that seem to possess all the requirements desirable. If the ratchet teeth are coarse, there is too much lost motion; if the teeth are fine they wear out, break off, or the pawl soon gets so it will slip over. To overcome these objections the differential ratchet was invented, or rather patented, as no doubt it had been invented a dozen times before. This device consists in placing say three pawls equidistant around a ratchet with seven teeth. Only one of these pawls can engage at once; so while the teeth in the ratchet are strong, there being but seven, the ratchet cannot under any circumstances be turned backwards more than the 21st part of a circle before one or the other of the pawls will catch. This overcomes both of these difficulties, but leads to another, viz., complication, or at least a multiplication of parts. There have been a half dozen or more friction devices invented for the same purpose—the object sought being to produce a tool that there should be no lost motion whatever, and also one that would work silently. The noise of the ratchet is thought by some to be objectionable, but none of the devices have proved anything like a success. The most of the friction devices which work at all have more or less lost motion—none of them are durable. The greater part of them fail to work in all positions, and as to doing away with the noise, it could be done easily with an ordinary pawl if it were worth doing. The drill is forced up to the work by the screw at the back being rested against some temporary structure, or support. It is better to have this support elastic or yielding than rigid, for with a rigid support the screw must be set out at every revolution of the drill; whereas, if it is yielding, the drill may be revolved several times and the spring will keep to its cut. A chuck fitted to the ratchet-brace, so as to use the ordinary drills of the shop instead of having to have an extra set for that special tool, is economy.

A drill will stand to take a heavier cut when used by a ratchet-brace than it would be either possible or policy to use when run by the drilling machine; the slow speed at which it is run does not generate heat enough to endanger the temper.

NEW GERMAN PATENT LAW.—The *American Manufacturer* says: The German patent law has long been a source of complaint on the part of inventors, and the aptitude of German manufacturers for appropriating to their use the creation of others' brains has become notorious. We are glad to learn, however, from our foreign exchanges, that a bill has been introduced into the Reichstag which promises a great improvement in the patent law of that country. The new bill provides that patents may be granted for a term of 15 years. For every patent thirty marks (\$7.14) are to be paid as soon as it is granted, but poor inventors are allowed a delay not exceeding two years. At the beginning of the second year fifty marks must be paid, and fifty marks more every succeeding year. Any person having used an invention before it was patented, may continue to use it without making any payment to the patentee. The latter is, however, bound to permit its use to any one that will pay for it. If this should be refused the patent privileges are lost. The patent office is to have the right of publishing all descriptions and drawings in print, and any person may search the specifications, drawings and other documents in the office.

Encouragement for Intelligent Mechanics.

The Company of Needle-makers, says *Ryland's*, having determined to offer prizes by way of encouraging and developing the art of needle-making in the neighborhood of Redditch, in which locality this manufacture has been established for many years past, the court of the company appointed a special committee to arrange a scheme for that purpose. A committee of manufacturers was selected from the manufacturing district, and the various details of the prize scheme were considered by it. The scheme of prizes sought to develop the art of needle-making under three heads, for which prizes were offered: First, to encourage the introduction of labor-saving machines; secondly, to reward skill in handicraft, and lastly, to stimulate the inventive and reflective talent of the needle-making locality in the neighborhood of Redditch, by means of prizes for essays in connection with the needle manufacture. With reference to labor-saving machines, none were submitted for competition; the conditions stated that they must have been originated since the first of January, 1875, and although a great deal of machinery has of late years been introduced with success into the manufacture, only one machine is known that would come within that stringent condition, and that was not entered. In the section, "Improvement in any of the processes of sewing-needle manufacture," four inventions were sent in. The judges awarded the first prize to Benjamin Hill, needle hardener, of Studley, for a pair of foot shears; and a second prize, consisting of £1, from local sources, with a certificate of merit, to Richard Bennett, junior foreman, of Redditch, for a "double polishing buff." Section No. 3, prizes for handicraft (tool making), produced, as might have been expected, the greatest number of competitors and the keenest competition. The prizes in this section were offered for the best specimens of tool and work for sewing needles and sewing-machine needles. In this section the judges awarded the principal prize to Chas. Townsend, tool maker, Redditch. For sewing machine needle tools the judges awarded the first prize to Jonah Warner, Redditch. The prize for the best essay was not awarded; a second prize for an essay was given to W. Shrimpton.

We are decidedly of the opinion, says the *Iron Age*, that a like effort to encourage progress in any of the leading manufacturing industries of the United States would be attended with great benefit. The intrinsic value of the prizes need not be great, but the honor of winning them would stimulate intelligent mechanics to master manfully the theory of their trades, and give substantial encouragement to inventive talent by securing immediate recognition for anything both novel and useful. The best way to educate the working classes is to encourage them to educate themselves.

A MODEL ENGLISH RAILWAY PARLOR CAR.—The Great Eastern railway is now running a new saloon, which has been built at the company's works, Stratford. This carriage is divided into five compartments, the one at each end being for servants and luggage respectively. The former is very conveniently furnished with green Utrecht velvet seats and backs, hat nets, etc., and has a bell communication with the body of the saloon, which is approached therefrom through an ante-chamber furnished with a morocco lounge and a falling leaf table, making a very convenient divan. This chamber leads through a sliding door into the body of the carriage, which consists of a spacious saloon, trimmed with maroon morocco, and enlivened with the elaborate floral devices and gilt moldings with which the ceiling is adorned. The furniture and fittings are satinwood, and consist of a couch, settee, arm-chairs, and a folding table at which ten persons can be conveniently seated, the floor being covered with a rich Brussels carpet. The remaining compartment (which is at the luggage end of the vehicle, and is entered from the saloon opposite to the sliding door leading to the ante-chamber) is fitted up with every convenience as a lavatory. The floor is tasseled wood, and the walls are covered with flock paper painted two shades of green, the ceiling being relieved with gold molding. The carriage is built of teak, varnished, and is carried on two bogie under-frames, with an arrangement of springs calculated to give the greatest possible ease in traveling, and is reported a perfect success.

NEW NUT.—A new nut is in use by the Boston and Albany railroad. It is a little thicker than the ordinary nut, and across its face are sawed two slots, crossing each other at right angles and cut almost half through the nut. The opposite side of the nut is convex, so that when it is screwed up tightly its corners, being the first to touch the face of the iron behind it, cause the four sections of the nut, separated by the slots in front, to approach the center of the bolt. This grip is tighter as the pressure behind it is greater, and it causes the threads of the nut to engage more deeply with those of the bolt.

BRITISH NAVY.—During the last 20 years the British government has added 573 ships to the navy by building, and has purchased 44 more. It has sold 110, broken up 125, and 31 have been lost. The number of Gatling guns in use is rapidly increasing. The large iron-clads are now all armed with them, and several have been sent to Malta for the Mediterranean fleet.

SCIENTIFIC PROGRESS.

Magnetic Declination.

The latest issued report of the Coast Survey contains a new discussion of "The Secular Change of Magnetic Declination in the United States and other parts of North America," by Charles A. Schott, Assistant, U. S. C. S. Forty-three stations are represented in the discussion, and over 400 observations. Formule are given for each station, with decennial tables computed therefrom. Mr. Schott says:

"A cursory examination of the column containing the epochs of greatest easterly excursion, the deflecting force producing the secular change attaining them an easterly maximum, shows that the needle became stationary in direction, and then reversed its secular motion, in the New England States toward the end of the past century, in the Atlantic coast States to the west and south early in the present, and in Mexico about the first third of the present century. In California, Oregon and Washington Territory, it has not yet reached this condition. We thus have the following epochs for comparison: Halifax, about 1711; Portland, Portsmouth, Newburyport, Salem, Boston, Cambridge, Nantucket and Providence, about 1779; Hartford, New Haven, New York, Hatborough, Philadelphia, Washington and Cape Henry, about 1800; Charleston, Savannah, Key West and Havana, about 1800; New Orleans, about 1831; Vera Cruz, Mexico, Acapulco and San Blas, about 1837; San Diego, Monterey and San Francisco, expected about 1907 (yet very uncertain).

We are thus directed to the extreme north-eastern States for probable indications of what may be expected to follow on the seaboard in more southern and western States. Respecting the secular movement of the needle, apparently a little more than a century passed before the influence which produced the turning of the north end of the needle westward in Maine (increasing there the western declination) was felt in Lower California (diminishing there the eastern declination). In California, Oregon and Washington Territory the eastern declination is at present still increasing, but with a losing rate. By the time the western elongation of the secular change is reached in Maine, we may expect to see the needle in the opposite phase, or at its eastern elongation, in California. We cannot as yet follow this influence directly over the interior of the United States for want of early observations; the westernmost interior stations for which an epoch could be made out were Buffalo, Erie, Cleveland and Detroit; these give the average turning epoch 1794. It may be quite practicable hereafter to trace out curves uniting all stations where the needle was stationary at a given epoch, and again at other epochs for regular intervals of time, say of 10 or 25 years.

GLASS SILK IN THE LABORATORY.—Glass silk, as it is called, is largely used in Germany, and especially in Austria, says the *Journal of Chemistry*, for filtering purposes in laboratories. It is made by winding fine threads of melted glass on rapidly rotating and heated cylinders. Under the microscope the threads appear as fine as the ultimate fibers of silk or cotton; they break more easily than the latter, but are excessively supple. From the inalterability of the substance, it is very well suited for filtering acid or alkaline solutions even concentrated, and various other substances, such as nitrate of silver, albumen, collodion, Fehling's liquor, etc. It affords great rapidity of flow with good filtration. It does not, like filters of paper or tissue, communicate organic matter to the liquids, altering and, perhaps, giving them a disagreeable taste. It is much preferable to amianthus, which, from the arrangement of its parallel fibers, cannot be formed in a flexible ball, and which lets fragments pass that float in the liquid. For analysis it is very advantageous, allowing of a ready determination of insoluble matters deposited; also by calcination and fusion of the glass may be found the volatile principles fixed in passage of the liquid, unaltered with empyreumatic products. The price of glass silk is at present pretty high, but its excessive lightness allows of a considerable number of filtrations being made with a small weight of it. Besides, it may serve an indefinite time if only after each operation it be abundantly washed with water and dried in air.

SPONGY PLATINUM.—The production of spongy platinum, says the *Mettallarbeiter*, is a task more easy in appearance than reality. The principal requirement of spongy platinum is that it should be spongy, but this obvious requirement is very frequently overlooked, and hard and useless masses of platinum are produced through overheating the sponge and running together the finer particles. Into a concentrated solution of muriate of ammonia, drop a similar solution of platinum chloride; a yellow precipitate is formed, which is washed three or four times in hot water to free it from the sal ammoniac. This precipitate, when properly cleaned, and while still moist, is dropped on a very thin platinum wire stretched several times across a small ring of copper, and is then allowed to dry thoroughly. After drying it is slightly heated over a spirit lamp, contact with the flame of which is to be avoided. As above remarked, only very careful heating over the spirit lamp will give satisfactory results.

Important Astronomical Observations.

The *Polytechnic Review* announces that the great refracting telescope, of 26-inch aperture, of the Naval Observatory, Washington, has been diligently employed for some time past in observations of the satellites of the outer planets, Neptune, Uranus and Saturn. A few evenings ago, Professor Hall, at 6 p. m., Washington mean time, observed a brilliant white spot on the central lower portion of the disc of Saturn. On giving notice of this to our chief observatories in the different States, he has had the satisfaction of hearing from several of them that they have since observed the same. He has also watched it closely, for the plain object of determining by these series of observations the true period of the rotation of the planet; an inspection of the text books on astronomy shows a discrepancy in the statement of this period by the Herschels. We anticipate the pleasure of presenting very soon the results of Professor Hall's investigations.

From the report of the superintendent of the Observatory, Admiral Davis, to the Secretary of the Navy, we learn that in connection with the observations which have occupied the great telescope, further interesting discoveries have been made. The companion of Procyon, discovered by Struve, Director of the Imperial Observatory, St. Petersburg, has been diligently searched for without success; but three other close companions of the same beautiful star have been discovered through the lens of the great telescope. These companions have been repeatedly seen at the Observatory, and on their positions being given they have been recognized by American astronomers also at other observatories.

It may interest our readers to learn, in this connection, that a volume prepared at the Observatory for the Centennial is now being distributed to those specially interested in astronomical pursuits, which contains a description of each of the telescopes of the Observatory, accompanied by a heliotype plate of the same; in connection with the several plates of the great refractor, a condensed report is given of its work on the planets, and on several of the larger nebulae. The last heliotype in the volume presents the results of this work in a quadruple picture. The volume is entitled "The Instruments and Publications of the Observatory from 1845 to 1876."

NITROGEN AND ELECTRICITY.—Recent French investigations, says the *Journal of Chemistry*, indicate that atmospheric electricity may have an important influence on the absorption of nitrogen from the air by plants. At a meeting of the Academy of Sciences at Paris in October, a paper was presented by M. Berthelot, describing some experiments he had been making which shed light on this subject. He availed himself of the normal electric tension of the atmosphere. A closed tube of thin glass was placed within another; in the former was a roll of platinum connected with a conductor electrified by the atmosphere, at a height of two meters, or about six feet and a half, while a thin sheet of tin surrounding the outer tube was connected with the earth. The space between the tubes contained either pure nitrogen or atmospheric air, along with moist strips of blotting paper, or a few drops of syrupy solution of dextrose. Twelve of these double tubes were exposed to the air from July 29th to October 5th. In all of them nitrogen was fixed by the organic matter, though in varying quantities. In two cases green spots of microscopic algae were found on the strips of moist paper in tubes containing nitrogen alone, showing a greater fixation of nitrogen in these. The experiments are of much interest as suggesting an influence in vegetation hitherto unsuspected, and we shall await further investigations with no little curiosity.

CURIOUS GEOLOGICAL FORMATION.—Down the Ohio river, at Martin's ferry, was discovered a few days ago, says the *American Manufacturer*, a very curious geological formation about 35 feet under ground. A well was being dug, about one-quarter of a mile back from the river, and at the depth mentioned, under the overlying sand, the workmen found an oval of soft sandstone, in which was embedded a closely-packed mass of hickory-nuts and twigs. Some of the nuts were broken open on the half-shell, while a few were complete even to the outer pods, which were opened at the radial point. There are also some impressions in the stone or hard clay which closely resemble small corrugated mollusks. Readers may form their own conjectures as to the time required for the overlying sand and the earth of the river bank to accumulate, for the nuts and shells would indicate that the locality had once been a part of the shore.

WEATHER WATCHING.—The chief signal officer in his annual report states that during the last fiscal year over 83 per cent. of his "probabilities" of the weather were verified. He thinks that an average of 90 per cent. is attainable. Owing to lack of appropriations the receipt of signals from the West Indies has been suspended. There are 145 signal stations in the United States. There is now being agitated a proposition to issue "probabilities" applicable to this coast.

[Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. E. Journals.]

Jan 8	Jan 25	Wm Small	531 California st
Jan 12	Jan 30	H B Condon	330 Pine st
Feb 17	Mar 5	L Leach	309 Montgomery st
Jan 27	Feb 16	F J Hermann	612 Commercial st
Jan 20	Feb 13	G R Riggs	515 California st
Feb 7	Mar 5	O H Bogart	402 Montgomery st
Feb 14	Mar 27	E Chastain	442 California st
Feb 15	April 14	T B Wingard	328 Montgomery st
Jan 29	Feb 23	S S Murfey	607 Montgomery st
Feb 6	Mar 1	J Greif	636 Washington st
Feb 29	Feb 28	D A Jennings	401 California st
Feb 15	Mar 3	J F Foulds	535 Clay st

TO BE HELD.

OFFICE IN S. F.	MEETING.	DATE.
Cor Cal & Mont'y at	Annual	Jan 24
419 California at	Annual	Jan 30
520 California at	Annual	Jan 30
328 Montgomery at	Annual	Jan 22
402 Montgomery at	Annual	Feb 3
Nevada Block	Annual	Jan 23
418 California at	Annual	Jan 23
220 Sansome	Annual	Jan 23
309 Montgomery ■	Annual	Jan 24
1201 Battery at	Annual	Jan 22
418 California at	Annual	Jan 23

THIN THREE MONTHS.

OFFICE IN S. F.	AMOUNT.	PAYABLE.
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426 California st	75	Jan 14
418 California st	50	Dec 15
418 California st	1 00	Jan 10
Cov Cal & Mont's m	50	Jan 5
309 Montgomery st	50	Jan 15
409 California st	30	Mar 10
534 California st	50	Feb 24

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

BLACK SAND G. M. Co.—Jan. 10. Object: to work the black sands of Coos and Curry counties, Oregon. Capital stock, \$10,000. Directors—John C. Angell, Ferdinand Vassault, Mercer Otley, John Thompson and J. W. Staples.

PRIMA G. M. Co.—Jan. 10. Capital stock, \$10,000.00. Jacob S. Taber, Isaac C. Ellis, David McKay, Fred Drew and C. S. Benedict.

ONWARD G. AND S. M. Co.—Jan. 12. Location: Alpine county, Cal. Directors—H. B. Melindy, E. F. Russell, F.

its members or other persons. Directors—John J. Noon, H. J. Esdohr, John Hoffman, G. C. Clark and Timothy P. Riordan. Capital stock, \$10,000.

CALIFORNIA PORTLAND CEMENT Co.—Jan. 12. Object: the manufacture of Portland and other cement. Directors—John Mate, F. A. Brown, A. J. Eesterly, H. Fisher and C. H. Harrison. Capital stock, \$300,000.

CALIFORNIA GRAVEL M. Co.—Jan. 12. Location: Mendocino county, Cal. Directors—J. B. Wheaton, T. Howland and H. C. Swain. Capital stock, \$10,000,000.

CLARK M. Co.—Jan. 10. Location: Globe District, Arizona. Capital stock, \$100,000. Directors—S. W. Wynnam, Wm. H. Hall, James Nelson, W. H. Reynolds, C. B. Higgins.

PUGET SOUND MANUFACTURING Co.—Jan. 17. Directors—Louis Sohns, David F. Schulte, Edward P. Flint, George H. Kellogg and Wm. K. Flint. Capital stock, \$10,000.

General News Items.

GREAT suffering in India, owing to crop failures.

THEY are having severe snow storms in the Eastern States.

Great damage was done by the ice breaks in the Ohio river this week.

A SEVERE northerly gale was felt all over the State on Friday last. Little damage was done in this harbor.

THE fires in the mines at Lykens, Pa., are gradually diminishing. The loss will be smaller than was at first supposed.

TEN vessels of the fishing fleet of Gloucester, Mass., are missing, and doubtless lost with all hands.

THE *Mark Lane Express* asserts that 500 tons of fresh American beef reach England weekly. This new branch of trade has created considerable anxiety in the English agricultural districts of Shropshire and Staffordshire.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

GOVER.—Amador Ledger, Jan. 13: The last crushing at the old 10-stamp mill realized from \$36 to \$50 per ton. The new 20-stamp mill is now running steadily, disposing of about 40 tons of ore per day. From present indications it is expected to clean up between \$35,000 and \$40,000 monthly.

HOISTING WORKS.—The hoisting works are now completed. They are worked by water power, and are of the most approved pattern, by Messrs. Knight & Co., of Sutter Creek. The shaft is 100 feet deep, and the intention is to put it down one or two hundred feet more.

FREEMONT.—This is a new location joining the Gover on the south. Rock is being taken from the old Gover shaft and crushed at the old 10-stamp mill. The ore runs from \$10 to \$12 per ton, with a body of quartz from five to six feet in width.

BUNKER HILL.—In sinking the shaft of this mine last week a quartz lens was struck measuring five to six feet in width and the rock looks keenly.

ORIGINAL AMADOR.—This mine looks better than at any previous period of its history. We have it on good ground, and the ore now being extracted will average \$30 or \$40 per ton. The prospects are sufficiently flattering to justify the sinking of a new shaft, necessitating the putting up of fresh hoisting works, which works will be prosecuted at once.

ALL THE MINES we have mentioned above are tributary to Amador City. With the addition of the Keystone, which moves out at the old gate, grinding from its batteries \$40.00 monthly, and also the Talsman, the mill of which will soon be finished, and the extraction of ore and production of bullion commenced, Amador City is unquestionably the liveliest camp in the county, if not in the State.

AMADOR CON.—For several weeks past work has been energetically pushed in running a tunnel into the north end of the mill under the old gate, grinding from its batteries \$40.00 monthly, and also the Talsman, the mill of which will soon be finished, and the extraction of ore and production of bullion commenced, Amador City is unquestionably the liveliest camp in the county, if not in the State.

MECHANICS.—In our perambulations of the past week we paid a visit to Gopher gulch, near Sutter Creek, for the purpose of looking at the above mine. We found a pile of rock on the dump ready for shipment. It is exceedingly rich in sulphurets, with a speck of fine gold discernible occasionally. The stockholders have faith in the paying quality of the ore that they would not sell the pile as it now lies on the dump for \$8 per ton. Reaching the bottom, 100 feet from daylight, we saw sufficient to satisfy us that the reports of the value of the mine were not exaggerated. The ore is a fine, bluish, crystalline, well-defined ledge, with hanging wall of slate as smooth as glass, measured between four and five feet in width. The shaft is timbered in a substantial manner from top to bottom. About 15 men are employed, under the superintendence of Mr. Savage. If the mine holds its own, a mill will be erected in the spring.

UNEXPLORED ORE.—On Saturday the men working in the tunnel of the Montclair struck a body of quartz, which for richness dwarfs everything in the shape of gold ore we have seen in this county. Large chunks of coarse gold were scattered over every specimen. Rock of that character is estimated to yield all the way from \$1,500 to \$5,000 per ton. It is hardly in the nature of things that there should be a large quantity of such way-up ore. The owners informed us, however, that several tons of rock equal to the samples exhibited were in sight.

BUTTE.

MINING.—Oroville Mercury, Jan. 12: From Dr. A. R. Stearns, of Magalia, the former owner of the West Branch mining claim, called the Wolverine shaft, at the north end of the claim. The rock that supplies the mill comes principally from the northern part of the mine. The bulk of the unexplored ground lies in the neighborhood of the contemplated shaft.

MOOREKING RIDGE.—John Francis & Co. are at work on a ditch to bring in water from Fall Creek to turn it into the head of Know Nothing ravine, where there is a large deposit of auriferous gravel. The water will be used to wash the gravel, and can be worked without much trouble when the water is brought in. This water will cover most of the ridge below the head of the ravine and the South fork of Feather river. All along the ground has been washed in spots wherever water could be had, and it has paid handsomely in places. As soon as this ditch is completed, times will be lively again. The ditch will carry about 1,200 inches. Anderson, Priest & Co. are cleaning out the old Gaskill ditch that will carry some 300 or 400 inches. This will be sufficient to work their claim during a large part of the year.

CALAVERAS.

THE TIGER QUARTZ MINE.—Calaveras Chronicle, Jan. 13: We are in receipt of some very encouraging intelligence from the Tiger quartz mine at Rich Gulch flat. The new proprietors of the property are pushing ahead operations energetically, the developments being altogether favorable. A tunnel has been run about 100 feet on the ledge, the face of the drift being 60 feet below the surface. The vein averages about three feet in width, and of fair quality. A 10-stamp mill is being erected, which is so nearly completed that it is expected to have the battery in motion the first of next week. The mill is to be run by steam and will be first-class in every particular.

VEITH HYDRAULIC.—There is no cessation of work in the Excelsior hydraulic, Tunnel ridge. Piping is "indulged in" continuously, and labor is prosecuted with as much energy as if it depended upon the utter demerit of the gravel bank. Veith pays no attention to the scarcity of water. He uses all he can get, and when the supply fails tackles the gravel with powder. There isn't a more persevering miner this side of the Rockies than John Veith.

EMERSON HYDRAULIC.—Everything is in readiness for piling at the Emerson hydraulic, Happy valley, and operations will be resumed next week. The water is being retained. The bedrock tunnel through which the flume is laid has been lengthened a hundred feet, bringing it close to the gravel bank, and the boxes laid. The flume has also been lengthened twenty-five boxes, at the lower end, to improve the "dump." The claim is now in splendid working condition.

THE DUREYA MINE.—Everything continues to progress favorably at the Dureya mine, Chile gulch. Since the new shaft, cams, etc., were put into the mill, the machinery has run like a top, and the stamps are kept constantly in motion. No difficulty is experienced in keeping the battery supplied with water.

WATER POWER DERRICK.—Preparations are being made for the erection of a water power derrick to sink the hydraulic claim, on Tunnel ridge, to take the place of the hand machine at present in use. The necessary castings are now being made in the Sutter foundry. The motive power is to be furnished by a latest pattern hurdy-gurdy water wheel, which, together with the necessary appliances, is to be constructed and put up by Mr. John Rider, the well-known millwright and machinist. As the pressure of nearly 200 feet is available, it is expected that the derrick can be operated with eight inches of water, which will very materially lessen the present cost of running it, while its capacity will be greatly increased. The work of

putting up the derrick is to be urged forward as rapidly as possible, and when it is in running order the Veith hydraulic will be in better trim for working to advantage than any other gravel claim in the middle or southern mines.

FRESNO.

CONFIDENCE.—Valley Argus, Jan. 13: The celebrated Confidence mine, situated in Fresno county close to the head of the Fresno river, has passed into the hands of Mr. P. Carroll and J. Morton, who are going to erect a 10-stamp mill upon the property immediately, when we may look for large shipments of bullion as soon as the mill is running. This mine is expected to rival the celebrated Hite mine of Mariposa county. The shaft, which is now sunk 15 feet, has produced 500 tons of quartz which is now upon the dump, and was examined last week by a first-class mining man, who says it will yield from \$20 to \$25 per ton, and enough of the richest rock has been taken and worked through an arrastra to pay for the sinking of the shaft, and also in driving a tunnel 150 feet, to strike the vein at a depth of 175 feet.

INYO.

DEFIANCE FURNACE.—Cosmo Mining News, Jan. 13: Since our last issue Defiance has shipped 1,000 bars of bullion, leaving on hand 100 bars. This is an average of 158 bars per day. Furnace running splendidly.

LOOKOUT GOLD MINES.—W. T. Grant, one of the principal owners in the gold mines just south of the Modoc claims in Lookout, came in last Tuesday. Grant has been in the Lookout work for several weeks, upon his ledges, principally upon the Alpha, which is showing up magnificently and much beyond anything he ever expected to realize. He has worked several tons of selected ore by an arrastra process, which yielded \$220 per ton. The specimens of ore brought in by him are as fine as any we have ever seen, plenty of native gold being perceptible to the naked eye. He will return in a few days to resume the work.

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KERN.

ANTIMONY.—Kern County Courier, Jan. 11: For a time work has been suspended on the antimony mine at San Emidio, owing to the difficulty of moving the ore from the mine to the furnaces. About a week ago Mr. Ross, of San Francisco, a practical worker in this peculiar ore, arrived at the mine from San Francisco, and after surveying the locality came to the place to procure workers for the continuation of the enterprise. The canyon will be spanned by a bridge and the ore moved on an iron track. It is intended to prosecute the work with energy, and we may soon expect great results from the new plans.

MENDOCINO.

CALIFORNIA PLACERS.—Mendocino Dispatch, Jan. 13: The mining at Cedar Creek, on the hydraulic claim, is now in progress. Water comes from an elevation of 200 or 300 feet. There are over 1,000 acres of land that are available for mining purposes. The ditch, when all completed, will cost in the neighborhood of \$15,000 or \$20,000, and will be completed sufficiently in 30 days for work to commence on the other side of Black mountain, and entirely finished in two months. There are 80 men at work now.

NEVADA.

RICH GRAVEL.—Nevada Transcript, Jan. 14: We learn that George Ragon has been taking out some very rich gravel from his claim at the head of Rush creek, near Cedar Creek. As his claim is seven ounces has been found in one pan of dirt. Last week he took out \$600 with the assistance of his little boy. This week, up to Tuesday, he had taken out \$75. A few years ago he took out \$9,000 in 60 feet of ground, near the same spot. The gravel is supposed to be the overflow from the old river channel passing through that section.

MINING SALE.—It is reported that the Murchie mine has been sold for \$100,000 to Messrs. San Francisco capitalists, and that Harvey Helen will superintend the working of the same. The mines belonging to the Murchies have laid idle ever since their hoisting works were burned, which occurred two years ago. They always paid well, and will do so again.

A LONG TUNNEL.—Grass Valley Union, Jan. 16: The Deer Creek mining company are engaged in running a long tunnel through which their claims at Mooney Flat will be worked. The tunnel is now in about 2,200 feet, and is in very hard rock. Two Ingersoll drills are kept constantly at work, and good progress is being made. When the tunnel is completed a large body of rich gold bearing gravel will be ready for the hydraulic process. Mooney Flat has the same character of gravel that has made the success of the famous Mooney Flat in Nevada county, but part of the tunnel is in Yuba.

ALASKA MINE.—Grass Valley Union, Jan. 11: The favorable reports from this new mining enterprise caused us to pay a visit to the mine to note progress. It is on the southern slope of Osborne hill, about two and a half miles southwest of Grass Valley, and in a locality somewhat famous for rich quartz and numerous ledges. The claim was owned by a miner named Mooney, who had several good crushings from it, but they found themselves unable to go to the necessary expense of putting up steam machinery, which they found was requisite after sinking a perpendicular shaft about 90 feet. The claim had lain unworked for about two years, until it was purchased by the present company, a few months ago.

PLACER.—Dutch Flat Forum, Jan. 11: The Baker claim, belonging to the Cedar Creek company, is the only claim in this section that is running. This claim is washing about five hours a day, and is advancing with its opening in an incredible manner. A bank blast, containing 100 pounds of dynamite explosive, was exploded on Saturday last. The Elmore Hill, Polar Star and Southern Cross claims are not washing, owing to the scarcity of water. The Franklin claim is ready.

AT GOLD RUN. The Cedar claims, belonging to the Gold Run hydraulic mining company (limited), is now in perfect trim. An additional shaft is being sunk, and the claim is being worked by the Indiana Hill claim, belonging to the Miners' ditch company, is fitted up in first-class style. The roof of the branch tunnel has been blasted out, an extensive rock cut run, a powder blast of 900 kegs exploded and the men laid off waiting for water. All the other claims in that district are ready.

LITTLE YORK MINES. The Empire mine is still being worked to great advantage. The supply of water, although greatly reduced, is enough yet to work four days per week.

BEAR RIVER MINES. The Centennial company have

been drifting and washing steadily with good results. The ground that they are now working is paying considerably over wages. Ritchie company have leased the lower part of their claim, to be worked on shares to D. Crissman & Co., and are receiving nice dividends therefrom. Doni Pedro company have tapped a channel through their bedrock tunnel, but the gravel found therein does not carry sufficient gold to pay for drifting.

LIBERTY HILL MINES. The Liberty Hill company are making good headway, with a large force of men and a fair head of water.

REXINGTON HILL MINES. The Rhode Island company, through means of reservoirs, obtains enough water from the gulches to grind sluice four hours per day. The Wide West company, in advancing their main drift across the channel, the air became so bad that it was found inadvisable to raise the sluice, the work on which has been progressing rapidly. The dirt taken from this mine has kept increasing in richness until it has reached \$14 to the pan.

LOWELL HILL MINES. Swamp Angel.—As the air drift connecting this mine with other diggings is completed, and has had the desired result, a large force of men are now employed, and the work of breasting out is progressing rapidly. One of the nuggets picked up in this claim last week weighed 150 lbs. The company's prospects are bright, and the Liberty Hill company are busily engaged in running their bedrock tunnels.

ST. PATRICK.—Placer Herald, Jan. 13: It is reported direct from headquarters that the St. Patrick Consolidated mining company intend commencing operations on their ledge at an early date. The St. Patrick Consolidated is an equity raised in the Pacific States, and the company is well equipped, and like the Crater will, when thoroughly opened, doubtless pay well. The western extension of the Crater, about which the owners and the St. Patrick company have been lawing for some time, has, we understand, been purchased by the St. Patrick company. This purchase will put an end to litigation in the matter, besides adding many thousands to the value of the St. Patrick company's property.

SIERRA.

LOW.—Mountain Messenger, Jan. 13: The river is as low now as it has ever been before in all the past eventful history of this historic mining town. The water has been so low for some time, that the river is low, still the Chinese are noisier and busier than most of the other townsfolk put together, mining in the river. They are buying all the old residences on Durgan flat, below W. T. Luther's, and soon will leave naught in their stead but huge piles of rock glistening in the warm sunshine. These investments undoubtedly pay, as most, if not all, the ground hereabouts prospects richly. But unless we are soon favored with some rain or snow, mining will be a dull business this year. Still the miners are most everywhere preparing to advance on the enemy's works as soon as the deluge commences.

TUOLUMNE.

RICH POCKET.—Tuolumne Independent, Jan. 13: The Pitts & Conlin quartz claim, on Experimental hill, continues to yield gold in quantities that is very flattering and encouraging to the owners. Last week, we learn, they struck another pay shute or "pocket," from which they took out, in one day, \$400. We were shown a sample of the rock, which is pure white, having a marble casing, and weighs two and a half pounds and contains \$100 in gold. From this the richness of the ore may be judged. It is a perfect network of veins and strata of quartz, dipping at every angle and threading it in every direction. The hill has not been prospected to a depth greater than 30 feet. The mining on this hill has been confined more particularly to the surface, which in many places is but a mass of crumbled up quartz, among which is found rich pieces of float.

HUNTER.—Operations at the Hunter mine are pushing rapidly ahead. The tunnel is now in, on the vein, about 350 feet, expecting to strike the shute every day. The vein is two feet thick, and the tunnel reaches a point about 300 feet below the surface. Hon. W. G. Long and parties below the mine, and they will undoubtedly develop a splendid property here. But he has been taken out of this mine that paid \$300 to the ton. This ore was obtained at a depth of 170 feet, and from the shute they are now running on.

CAVE DIGGINGS.—The new ditch, constructed by Messrs. Ghering & Ingram, is now nearly ready for use. The ditch will carry water from Tuolumne river to Cave diggings, a distance of several miles, and will be used for hydraulic mining at the same place. There is here an extensive bed of gravel of a good paying quality, but heretofore useless for want of water.

Nevada.

WASHOE DISTRICT.

JULIA.—Gold Hill News, Jan. 17: On the 1800-ft level the face of the west cross-cut is still in quartz and low grade ore. The lateral drift running south on the ore vein is showing a steady improvement, the ore giving better assays with every foot advanced.

SILVER HILL.—Sinking the main incline is making the best of progress, considering the hard character of the rock encountered and the flow of water necessary to be handled at the bottom.

CON. VIRGINIA.—Daily yield, 300 tons of ore. There is no change worth noting in any of the ore stops on either the 1400, 1500 or 1600-ft levels. The enlargement of the main drift connecting with the Gould & Curry is fast approaching completion. The main west drift from the C. & C. shaft on the 1650-ft level is in a distance of 649 feet, the face in more favorable ground. This drift will undoubtedly reach the ore vein in a very few more days.

CROWN POINT.—Sinking the main incline is making the best of progress. The 12-inch drills are doing excellent work. The rate of progress is from 26 to 28 feet per week. It is now down 1,958 feet.

OVERMAN.—The new pumping engine did not get fairly at work until day before yesterday, since which time it has done splendid work. It has already drained the water to within a short distance of the bottom of the shaft, and will soon have it dry, and in a distance ready for the resumption of work on the 1400-ft level. This is a compound, direct-acting engine, of 700-horse power, has a 32-inch initial and a 65-inch expansion cylinder, and is one of the most powerful and finest pieces of machinery ever erected on the Comstock. The attachment is direct to the bishop-head of the pump-bob, thus doing away with all the intermediate, old-fashioned double gear. A double column of 12-inch pumps extends from the surface to the bottom, which is equal in capacity to a single line of 17-inch pumps.

HOMESTEAD.—Work has been resumed during the past week in the Homestead company's new shaft. This is situated in Gold Hill, southeast from the Imperial and east of the Yellow Jacket mine. It is one of the old locations and very rich. The Homestead company are doing excellent work, and are receiving sufficient encouragement for going into more extensive and systematic operations.

CALIFORNIA.—Daily yield, 500 tons of ore. The ore stops on the 1400, 1500 and 1600-ft levels are all yielding an abundance of good ore, and never had a more promising appearance for the future than at the present time. The main lateral south drift on the 2000-ft level is steadily advancing, the drift on the 1400-ft level is also advancing. The north winze, near the dividing line between the California and Consolidated Virginia on the 1650-ft level, is being rapidly pushed ahead, the face also in rich ore. The main west drift from the C. & C. shaft on the 1650-ft level is in a distance of 649 feet, the face in more favorable ground. The appearances are that it will not take many more days to reach the ore vein in the drift.

JURICK.—Daily yield, 340 tons of ore, keeping the mills all running up to their full crushing capacities. The prospecting drifts on the 600 and 800-ft levels are opening up new and more extensive bodies of ore, while the breasts and stops on the 400, 500 and 700-ft levels continue to afford a steady and uninterrupted yield of good milling ore. The still mill is to be added to the crushing force in a very few days. The ore-producing prospects of the mine were never as promising as at this time, or the ore being milled of a better character.

LEVIATHAN. The timbering of the main north drift at

the 600-ft level being completed, the advancement of the ground being urgently pushed. An improvement of the ore has been made there, this week giving assays of from \$5 to \$128.77 to the ton; average assays \$45.20.

BALTIMORE & AMERICAN FLAT.—The northeast drift on the 1650-ft level is steadily advancing, the quartz and ore in the face still showing a steady improvement. Some of the streaks of ore in the face of this drift are very rich and give large assays in both silver and gold.

OUTRICK.—A few tons of ore are being hoisted daily from the old stopes on the lower levels. This ore is low grade, being but little better than a bare milling proposition. The prospecting drifts on the 1600 and 1700-ft levels are being prosecuted with a greater vigor and more rapid success than at any time in the past two years.

CHOLAN-PORE.—Daily yield, 120 tons of ore. The average assay value of which is \$28.50 per ton. Sinking the main incline below the 1700-ft level is making the best of progress. The bottom of the incline is perfectly dry. At the Combination shaft the big pumping engine and pumps are all ready for use when needed. There is no flow of water at the bottom of the shaft.

MIRAC.—The great prospecting drifts on the 1300-ft level are advancing in very rapid fashion. The lateral prospecting drifts on the 1405-ft level are making excellent headway.

UNION CON.—The ore in the face of the main north drift on the 1300-ft level is showing a steady and favorable improvement. The quartz vein in the bottom of the winze, which is sinking further to the southward below the same level, is also giving much better assays of both gold and silver.

CALCEDONIA.—Sinking the shaft is making the usual progress. The rock in the bottom is not as hard as it was some time since, but the flow of water is still strong and keeps the pumps very busy.

BULLION.—The north and south drifts on the 1600-ft level are each steadily advancing in very favorable vein material. The east cross-cut on the 1600-ft level is also making the best of progress, with every appearance of reaching the main ledge in a very few days.

YELLOW JACKET.—The new shaft is down 860 feet, and the ground at the bottom is dry and somewhat harder than it was last week. At the 1940-ft level of the mine the cross-cuts both east and west at the north line are being advanced, with nothing new to report. At the 2040-ft level the cross-cut, east of the foot of the south winze is in very favorable looking ground.

NORTH CON. VIRGINIA.—The strong flow of water recently struck in the west drift, on the 1100-ft level has been overcome, and work resumed with the greatest vigor in the face of both east and west drift at that station.

SOUTH COMSTOCK.—The main east drift on the 300-ft level has been stopped for the present, and the lateral drift started to the northward on the ore vein. The quartz in the face of this drift is improving.

GOLD & CURRY.—The new pumping engine is about ready to start up. The repairs to the pumping compartment of the main shaft are finished. The main east drift on the 1700-ft level is cleaned out to the face.

COSUMOROLITAS.—The upper workings still give forth their usual amount of pay ore. The drift from the bottom of the winze shows considerable improvement.

LADY WASHINGTON.—The lateral drift north from the main east drift or cross-cut, is to day in about 100 feet, still following the fine vein of quartz and low grade ore heretofore mentioned.

BUCKEYE.—The north drift on the 350-ft level has been connected with the north winze, and the extraction of ore for milling from that level has been commenced.

TRONAK.—Breasting out on the ore bodies on the 240 and 340-ft levels, is being prosecuted with all the vigor possible. The ore is of good character.

LADY BRYAN.—The cylinders, spur wheels, fly wheels, and all the larger and heavier portions of the new pumping machinery are in place.

SAVAGE.—The water is being held at a point below the 1900-ft level by the pumps, while every effort is being put forth to repair and put in good working order the connecting drift with the Hale & Norcross mine at that level.

ATREOLA AND ARGENTINA.—The shaft is down to-day to the level of 110 feet. Some little water is met with, but is easily disposed of by pumping it out through the tunnel. The character of the rock is changing to a most favorable character with every foot gained in depth, and very encouraging assays are obtained from it.

HALE & NORCROSS.—The water is held in check by the pumps a few feet below the 1900-ft level, while the connecting drift with the Savage station is being repaired and put in working shape.

BECKER.—Daily yield, 130 tons of ore, keeping the Santiago mill steadily running.

DAYTON.—The north drifts on the 500 and 700-ft levels are each steadily advancing in very favorable ledge formation.

PROSPECT.—West drift pushing ahead as usual, with the face somewhat harder vein material than heretofore met with.

SILVER CITY.—Some very good ore is being met with and extracted at the lower level, through the incline.

UTAH.—Sinking the main shaft has been suspended for a short time in order to open a station and put in another of those heavy lift pumps at the 1100-ft level.

EUREKA DISTRICT.

EUREKA CONSOLIDATED.—Eureka Sentinel, Jan. 14: At the Consolidated the rumor of an important ore body having been found was confirmed by the official letters of the superintendent, but its extent and value is "one of those things that no fellow can find out." The daily output of ore has largely increased, and the furnaces has run steadily through the week, producing about 950 bars of bullion. There are rumors of the firing up of additional furnaces, but we can trace them to no reliable source.

RICHMOND.—Furnaces running steadily the week, and there is no diminution in the supply. The main workings are all in good ore—some of it of a very high grade. Prospecting going on as usual.

K. K. CON.—The developments of the week have added greatly to the value of the K. K. and she steps into the ranks with hints of a big strike. About 60 tons are extracted and shipped daily, and the furnaces are running steadily.

ATLAS.—The connection between the new shaft and main drift was completed this week and the work of extracting ore will commence at once. The ore dump is finished and is quite imposing, towering 60 feet above the ground. All the improvements at the new shaft are very substantial.

HAMBURG.—Work still goes on, sinking the new shaft and extracting ore. There is an immense body of ore in sight, increasing in depth and width as it is developed. The company has abandoned the attempt to lease furnaces and have under consideration the proposition of building their own.

RICHMOND.—The furnaces now in operation at the Richmond smelting works are making an unprecedented run. They were started up on the 8th day of May last and have been running continuously eight months and six days, and are still in full blast. The furnaces of the company will be closed down on the first of March for the purpose of relining and the usual annual general clean-up. Work will be resumed as soon as possible, and if practicable during the same month.

SPANISH BELT DISTRICT.

TUNNEL.—Reese River Reville, Jan. 11: The two Barcelona companies, at Spanish Belt, Nye county, are pushing their joint tunnel with all the speed possible. Recently these companies purchased an Ingersoll drill, the same kind that is used in the Suro tunnel, which is now in successful operation. The superintendent telegraphs the San Francisco office that from six to eight feet per day is being run with the latter machine. At this rate of speed the ledge will be reached in less than two months. When it is cut they will be a depth of 600 feet below the surface.

The Agricultural Record of the Year.

The Californian who rejoices in the growth of his State may find many gratifying figures in the trade statistics of the year which has just closed. It was, upon the whole, a year of great activity in nearly all productive enterprises. In agriculture, in which, of course, our keenest interest is awakened, there were steps of progress of which all may be proud. The records of the trade organizations which show the amount of produce received in the city, and the records of the Custom House, which show the amounts exported to foreign ports, furnish data by which we may measure the results attained with plow and separator, with the shears, with the wine press and with vat and churn.

Let us note, first, the production of the leading cereal. The copious rains of last winter and the extent of land under the plow, set our statisticians fairly wild in their early estimates of the surplus of wheat we would have for export. It soon became apparent that their lines were overdrawn, and yet the result is grand enough. It is shown by the receipts reported by the Produce Exchange that there were shipped from the interior to this city 10,516,913 cts. of wheat. In 1875 there were received 7,676,007 cts. Our gain this year is, therefore, 2,840,906 cts. Of flour the receipts from our mills were 519,114 bbls., in 1875, 491,408 bbls.; a gain this year of 27,706 bbls. The Custom House records show the exports of these articles. We sent abroad in 1876 9,920,117 cts. of wheat, and 506,974 bbls. of flour; in 1875, 7,546,207 cts. of wheat and 467,719 bbls. of flour. The gain this year in export was, therefore, 2,373,910 cts. of wheat, and 39,255 bbls. of flour. The total value of wheat and flour exported during the year was \$18,564,525. This is a gain of \$2,000,000 in value over the value of 1875.

In barley there is also a notable percentage of gain. The receipts in 1876 were 1,626,066 cts.; in 1875, 988,280 cts.; an increase this year of 637,786 cts. The exports of this grain have grown in a more rapid percentage than the production. In 1876 the exports were 350,022 cts.; in 1875, 125,158 cts.; an increase this year of 224,864 cts. Our barley has this year been brought more prominently to the attention of Eastern brewers than formerly and there was for a few weeks quite a brisk movement both by rail and sea. The advance of railway rates, just as the movement was fairly started, embarrassed the shippers and reduced the trade. Then it was that we saw barley shipped around the Horn to New York, to be re-shipped by car to St. Louis, because all this distance could be compassed for less money than the 2,000 miles of rail hence to St. Louis.

As all our shepherds know to their sorrow, the wool trade of the year was exceedingly unfavorable, and both clips came upon a dull market. Thus, although the grand totals of amounts of wool produced take their place in the columns of increase, the low rates received detract greatly from the satisfaction which might have been felt over the result. Last week we gave the complete figures in wool, but in this connection it will be well to repeat that the total shipment from the State by land and sea was 52,633,923 lbs. In 1875, 48,183,017 lbs. were exported. This shows an increase to the amount of 4,450,906 lbs., but the low prices prevailing reduced the increase in value to a low figure.

The increase in dairy production during the year is quite notable. The dairy has been carried into regions which were formerly thought unfitted for it, and there has been a tendency to increase of cowage in the older dairy counties. The figures as compiled by Mr. Stone, the statistician, show that the receipts of butter during the year have been 10,927,200 pounds. In 1875, the receipts were 9,551,500 pounds, an increase this year of 1,375,700 pounds. The receipts of cheese were 7,017,300 pounds; in 1875, 6,021,000 pounds; an increase this year of 996,300 pounds. From these data, with estimates of the value of the commodities, it is safe to say that the aggregate value of the dairy products received in this city during the year was \$4,500,000. This indicates that our dairy industry is of no mean importance, as it can show a produced value of one-half the value of our famous wool clip, and one-quarter the value of our wheat and flour surplus, which gives us a reputation all over the world. The year has closed with butter and cheese at much lower figures than were common, but the present prospect is that this will find compensation in the coming months. The drouth, if continued, will prove serious to many of the interior ventures, and will restrict the weight of production to the northern coast and the ranches on the river low-lands.

In other lines of agricultural production, the year has some points of increase and some of decrease. The production and export of green fruits has been much larger than heretofore. Raisins have been numbered by the ten thousands of boxes. On the other hand, the wine export

has shown but a very narrow margin of increase, only a value of \$6,460 over the record of 1875 being recorded. Hides, which years ago were almost the sole article of export from this coast, are now yearly decreasing in amount, and leather is also figuring in smaller numerals. Thus the usual course of productive growth is followed by our State as it changes more and more from the lower to the higher agricultural arts.

Aside from agriculture, the productive industries of our State and coast show praiseworthy results. The production of the precious metals for the coast has increased from a value of \$80,889,037 in 1875 to \$90,875,173 in 1876. The coinage of our mints shows a total of \$32,069,000 in 1875 to \$42,704,500 in 1876.

Not the least favorable deduction from the figures of the year is that we are growing in the line of independence, and our home production is satisfying the needs of our people. The Custom House figures show that the duties collected on foreign imports were, in 1875, \$8,131,637, and in 1876, \$7,817,736, a decrease this year of \$313,901. At the same time the gross value of our exports was \$73,463,250 in 1875 and \$80,421,971 in 1876, an increase of \$6,958,721. Reducing our expenditures for foreign goods and at the same time increasing our sales of produce for export, is throwing the balance of trade more and more in our favor and storing up a surplus of wealth among our own people. This movement can continually go on if our men of wealth will but do their State the justice of patronizing home industries and if those in charge of productive enterprises will do justice to our splendid conditions of soil and climate and produce wisely all that it enters into the mind of our citizens to desire.

Moore's Flat Gravel Mines.

The Nevada Transcript has been shown a very complete and finely executed map of the mining section in and about Moore's Flat, drawn by Surveyor Fen Miller. It shows the mines, gravel beds, bedrock lines, ditches, streams, roads and villages along the lines of the ancient blue lead leading from Forest City and Minnesota, in Sierra county, to Snow Point, in



Nevada county, and along the line down as far as North Bloomfield. It gives the location of every mine and every mining claim on the route, all the levels from point to point, and shows the incline or pitch of the channel, and other details. It is a very finely executed and valuable production. It shows among others the following locations between Snow Point and the grounds of the North Bloomfield Co.: Cowger & Co., Wand & Blackwell, Curtis & Co., New York Co., Consolidated Co. Nos. 1 and 2, Centennial Nos. 1 and 2, Emigrant Blue Gravel Co., American Consolidated, Moore's Flat Blue Gravel Mining Co., Little Giant, Shanghai, Purcell & Tunney, Shay & Co., Central Co., Dead Wood, Illinois, Eagle, Nevada, Blue Banks, Boston, Independent, Monumental, Franklin, Blackburn & Co., Watt & Co., Long & Atwood, etc. Some of the claims on the west rim of the supposed channel, at Moore's Flat, are extensively worked, and are rich and pay splendid dividends, but a majority of them are as yet barely prospected. The work of regular development is now going on in several places to open claims, and on most of them more or less work is being done each year. The Moore's Flat Blue Gravel Co., Sid. Hunt Superintendent, is sinking a shaft at a point about half a mile southeast of the town of Moore's Flat, on the side hill. It is expected a depth of about 400 feet will have to be reached to strike the bedrock. The finest hoisting works in the county have been erected there, and a large shaft of three compartments is being sunk. It is timbered up in the same substantial manner as those of the California and other mines on the Comstock. A tunnel is also being run to tap the shaft at a point 200 feet below the surface for drainage. The tunnel will be about 1,000 feet in length. The work is being pushed ahead as rapidly as possible. The company owning the claims is a wealthy one, and the Superintendent is a thorough and practical miner. This claim is located about one and three-quarter miles below Snow Point, on the line of the channel. The Nevada company, a little further down, are running a tunnel to tap their claim, which will be over 2,000 feet in length when completed, which will allow all their ground to be washed through it, and will afford outlet to other claims back of them, when their ground is worked out. Watt, Dibble & Co., are sinking a shaft on their claim, which is located about four miles below Snow Point, on the north side of Bloody Run creek, and which

covers an area of over two miles on the line of the channel. It is expected they will have to sink about 300 feet to get to bedrock. Other work is also being done on other claims on the line. Most of the ground is so located, that it will have to be worked by drifting, which is regarded by many to be as profitable a way as any other; particularly where the banks above the channel are of such great depth as they are on this channel. The developments being made by these companies will soon demonstrate the great value of that district, and will induce capitalists elsewhere to seek it for profitable investment. It is generally acknowledged by all who know anything of the section of our country from Snow Point to French Corral, that it is the most extensive and richest mining region on the coast. The developments mentioned above will only add further testimony to the fact, and help to make it more generally known elsewhere.

Abies Venusta.

In the vegetable kingdom the conifers bear a markedly high and deserved rank, but none more so than the *abies*, or fir family. One variety of the *abies* is found alone within the borders of San Luis Obispo county, and is so rare that, until quite recently, but one specimen was to be found in all Europe. So rare is a knowledge even of this beautiful tree that we have heard but two persons mention it in our two years' residence in San Luis. These gentlemen were Dr. W. W. Hays and Mr. Ernst Krebs. Mr. Krebs has spent large sums of money to obtain specimens, but has never succeeded in getting healthy ones until the present week, when he received seventeen fine young plants. The foliage resembles, slightly, the common firs of the forest. It is far more delicate, the leaves longer and not so crowded upon the limbs, which are slender and graceful. The upper side of the leaf is a deep bright green, while the under surface is striated with silver, white and pale sea green, perfectly beautiful in their delicate blending. It is said to be the most beautiful object among all California's forest treasures, and when the wind puts in motion its airy branches is said to resemble undulating waves of

silver foam. From these young specimens in the grounds of Mr. Krebs, we can imagine what a forest would be where the spiral trunks rear themselves to a height of 50 or 60 feet, and are clothed with a profusion of its delicate foliage.

The habitat of this treasure is a circumscribed spot of a few acres in the deep recesses of the Santa Lucia mountains, on the border of Monterey county, and so inaccessible that but few, even of the hardy hunters, have ever seen it. This is said to be the only spot in the known world where the tree is found. In the early days of California the padres used to send Indians to gather the resin that exudes from the trees where scarified by accident or design; and this resin was burned in the censurers before the high altars upon great occasions. From this fact it derives the local name of "Pinabeta de los Padres." Mr. Krebs has made arrangements to have a supply of seed gathered next season, and will, we hope, be successful in introducing it into common cultivation.—*San Luis Obispo Tribune*.

RAINFALL AND FORESTS.—Mr. Meehan, of the *Gardener's Monthly*, is evidently an infidel on the rainfall-forest faith. He says: "Our European friends are finding some curious 'facts' in regard to rainfall and forests. In France, a Mr. Faurat found that there was much more rain fell in a forest than on a sandy plain not a great way from it. It so happened, however, that another forester kept an account in a forest about the same distance from the sandy plain, and the figures do not agree. Most persons would have suspected an error in ascribing much influence to the forests, but these two fell to discussing the nature of the forests themselves; and now it is asked of us to believe, that while ten per cent. more rain will fall on a pine forest than on a sandy plain, only five per cent. more falls on an oak one. The only wonder is that 95 per cent. should fall on the treeless plain."

ROOFING POMPEII.—Among the various propositions made to the Italian government is one by a society of Italian and foreign capitalists, to put a roof, composed of glass and sheet-iron, over the whole of the ruined town of Pompeii. This is necessary on account of the constant decay which the frescoes and the walls are undergoing. All that the company asks is that the admission fee be increased, and that extra tax be given to them for a certain number of years.

The Isthmus Canal.

Last week we alluded to the fact that a decision had been handed to President Grant in favor of what is known as the Nicaragua route for the isthmus canal. As this is a matter of such deep interest to the industries of our coast and now seems nearer realization than at any former time since the project was broached, we have prepared a little engraving showing the route along which our produce may soon be speeding to the European markets. By this engraving the following report of the commission may be better understood:

To the President of the United States—Sir: The commission for the United States appointed by you to consider the subject of communication by canal between the Atlantic and Pacific oceans, across, over, or near the isthmus connecting North and South America, have the honor to submit, in advance of their more elaborate and final report, containing data for their conclusions, and after a careful and minute study of the several surveys of the various routes across the continent, the following unanimous report:

First. That the route known as the Nicaraguan route, beginning on the Atlantic side at or near San Juan de Nicaragua, known to Americans at Greytown, running by canal to the San Juan river, following it by slack water navigation to Lake Nicaragua, across that Lake to Rio del Medio, and thence by canal to Rio del Brito, on the Pacific coast, possesses, both for construction and maintenance of a canal, greater advantages, and offers fewer difficulties from engineering, commercial and economical points of view, than any one of the other routes shown to be practicable sufficiently in detail to enable a judgment to be formed of their relative merits.

Second. That the summit level of this route to Lake Nicaragua is designed to be kept at a permanent height of 108 feet above the level of the sea. This height is to be overcome in the Atlantic slope with four dams in the San Juan river and ten lift-locks, and in the Pacific slope with ten lift-locks.

The total distance from the Greytown end to that at Brito is 181 33-100 miles. Of this distance the Atlantic slope division from Greytown to San Carlos, at Lake Nicaragua, comprises 108 5-10 miles, of which 63 miles are by slackwater navigation, and 45 5-10 miles by canal. The summit level division comprises 56 5-10 miles by Lake Nicaragua from San Carlos, at the head of the San Juan river to Rio del Medio. The Pacific slope division comprises 16 33-100 miles by canal from the mouth of the Rio del Medio to the mouth of the Rio del Brito. The dimensions of the locks proposed are 400 by 70 feet, with 26 feet depth of water. Artificial harbors must be constructed at Brito and near Greytown, and although that at Greytown presents unusual features, requiring careful study and skillful treatment, there is no question of its practicability.

Third. That the cost of construction of this canal and harbor, with all the necessary adjuncts, will be at least \$100,000,000, and that the cost by any other route will greatly exceed the cost by this route.

Fourth. That after all the preliminary arrangements have been made, the time required for actual construction should not exceed 10 years.

Fifth. That an interoceanic canal across this continent should be under the protection of all nations interested, and that they should guarantee not only the neutrality of the canal, but also of a contiguous strip of territory on each side of not less than 50 miles in breadth, and of ocean approaches for a distance of not less than 100 nautical miles in any direction along the coast and out seaward from each end.

The prospects for an early commencement of the work are considered extremely favorable. Under the direction of the President the principal maritime powers of Europe have been severally addressed upon the subject of the canal, the satisfactory results of the surveys which have been made, and also the views embodied in the above report as to the best route. Answers have been received from some of the governments, in which they express themselves favorable to an early prosecution of the work, and admit the wisdom of according it an international character by an equal participation in its construction, and in the maintenance for it of an inviolable neutrality. As soon as the views of all nations communicated with have been received the President contemplates submitting all the papers and correspondence in a special message to Congress, in which he will urge that the United States take the steps necessary to the inauguration of this great enterprise.

In lighting fires in stoves likely to smoke, first warm the chimney or its contents by burning a handful of shavings or paper on top of the coal.

A Curious Mining Machine.

Some two months ago a couple of gentlemen named B. Hedge and O. N. Walker came from Augusta, Maine, to Oronville, and after spending a few days looking around, began the construction of a boat on the banks of Feather river, just below the bridge, and but five minutes, walk from the business part of the town. There was nothing peculiar about the boat or barge, except its size, it being probably 40 or 50 feet in length, and perhaps 20 in width. The top of it was boarded over and it made a large platform. The space between decks was about three feet and unoccupied. By the time the boat was completed, a steam engine and an iron pipe 26 feet in length and about 30 inches in diameter, were on the ground and ready for use. The story now came out. These gentlemen were going into the business of mining by a new process. We will describe it as it now is, and every man, woman and child in Oronville will tell you the same story, for they have seen the new machine work. As we said before, the pipe is 26 feet in length, and made of thick iron—hoiler iron, we think. At the bottom is a valve, or trap-door, which opens both ways, inward and outward, but is prevented from opening in the latter direction by a latch, until the operator desires to have it opened, and then all he has to do is to remove the latch or spring and the valve opens. This is all at the lower end. Half way up to the top is another valve; that is, a round hole six or eight inches in diameter has been cut through the tube or pipe, and a cover fitted to it so as to close air-tight. The cover is hung on hinges, and opens and shuts with the slightest movement of the pipe. Its use will be seen further on. The top of the pipe is covered by a round iron covering, which is securely fastened in its place. Through this top runs an iron pipe an inch or more in diameter, on the top of which is a valve; the pipe is half as long as the large pipe, and the lower end of it is filled with small holes. There are also at the top, or near it, of the large tube or pipe, two small holes, into which are fitted pipes, one from the boiler and the other from the pump. By means of a mast or crane, with blocks and tackle operated by the engine, this large pipe is suspended in the air by a bale, the lower end a few feet from the side of the boat and two or three feet above the water. The engineer puts on steam, and the pipe, of its own weight (for it weighs 2,000 pounds) begins to sink into the river. The lower valve opens inward, and the pipe fills with water until the bottom of the river is reached. We will say the water is eight feet in depth. Of course there will be eight feet of water in the pipe, and all above it will be full of air. Now for the novel work. The engineer forces the pipe full of steam, which drives the air out of the large tube into the small one inside, whence it escapes out of the top through the valve. The upper part of the large tube is now full of steam. One cubic inch of water makes 1,728 inches of steam. Now, by means of the pipe from the water pump, a stream of water is thrown in upon this steam, which instantly is condensed, leaving a vacuum, but only for an instant, or rather a space of time so short that it cannot be noted, for up comes the earth from the bottom of the river and fills the pipe, which is then raised by means of the engine, the bottom valve opened outward, and down slides the muddy mass into a boat, where it is washed and the gold taken out. This pipe can be lowered and raised inside of a minute, and bring up each time from two to four tons of earth, stones and everything else beneath it. The atmospheric pressure is 15 pounds to the square inch. As soon as the pressure is removed by making this vacuum, up comes everything beneath pipe except the bedrock itself. Everything about the machine is plain and simple. There is nothing in the work to get out of order that we can see. One can see when the pipe fills with earth, for it suddenly shoots downward a foot or two. A patent has been obtained in this country, England, and some of the South American States. It was originally intended for cleaning out rivers where mud banks had been formed, but it was thought best to try it in our river beds as a mining machine. So far it works well.—*Oronville Mercury.*

CLEANSING OLD IRON WATER PIPES AT ELGIN.—A short time ago the commissioners of Elgin resolved to cleanse the old iron water pipes, and relay them in those parts of the town where they would be of use. The first portion of the pipes (which had been in the ground for more than 20 years, and were much incrustated) has now been cleansed. The process was gone through at New Elgin, where a rough furnace was erected to meet the object in view. The pipes, two at a time, were laid into the furnace, and subjected to an intense heat for about half an hour. The action of the heat loosened the incrustation of the pipes, and when the pipes were lifted out of the furnace the greater portion of it at once fell off. The most troublesome portion of the work, however, remained to be done. The pipes had to be cleaned with a spring scraper, made to exactly fit the size of the pipe. After undergoing this work, the pipe was allowed to cool till it was in a fit condition to be dipped into a "well" some 12 feet deep, containing Smith's patent solution, where it remained for nearly a minute; after which it was taken out, and presented all the appearance of a new pipe. By the adoption of this process the town will, it is said, be £300 richer than if the old pipes were sold as mere metal, and new pipes bought to replace them.—*Ironmonger.*

USEFUL INFORMATION.

Fire-Proof Shingles.

A writer in the *Polytechnic Review*, says a gentleman in Philadelphia has effected arrangements for practically introducing upon a large scale an extremely simple and excellent process for impregnating shingles with antiseptic and noncombustible substances, the immediate object of the process being to prevent the destruction of the shingles by rot, and to render them proof against fire under ordinary contingencies. Concerning the great utility and value of a process of this kind which will fulfill in practice the promises of its advocates, there can be no difference of opinion. Shingle roofs have always been extremely popular, as the enormous annual consumption of timber in their production indicates, but the advantages which they possess on the score of cheapness and excellence is materially affected by their liability to take fire at the slightest cause, and the rapidity with which they deteriorate, by decay or rot, under the influence of the weather.

The annual consumption of shingles in the United States at the present time has been estimated at about 4,000,000,000, of which doubtless, not less than 75 per cent are demanded to replace those destroyed by fire or rendered worthless by rot. It will, therefore, be apparent that these two elements of mortality entail upon the country at large an enormous annual loss in dollars and cents, to say nothing of the loss arising from the communication of fire to neighboring buildings, which, in many instances, may be directly traced to the same cause.

The expedients that have heretofore been practiced to obviate or lessen these dangers and disadvantages, consist mainly in the liberal employment of paints or whitewash, which, in addition to being expensive and troublesome, are only partially, or at best, temporarily effective. By the process which Mr. Smith employs, the shingles are submitted to the action of antiseptic and non-combustible chemicals, until through saturation is effected. This treatment insures the effectual coagulation of whatever of the decomposable sap matters remain in the wood, and so completely impregnates the fibers with mineral matter, that their ignition from all ordinary causes of accidental fires, such as sparks from locomotives, flying cinders from burning buildings, etc., is rendered impossible. At the same time the texture of the shingles is rendered denser and harder. A burning chip of wood, or glowing coal, placed in contact with the surface of one of the prepared shingles will simply carbonize the wood, at the place of contact, but will not inflame it. As a preventive against fire, therefore, the process in question is obviously of great practical value. The removal or the conversion of any aluminous matters that may remain in the wood into insoluble compounds with the antiseptic chemicals employed, on the other hand, is an equally effectual and valuable preventive of rotting.

From the inventor's published statement, the cost of the prepared shingles will not prove to be an objection against their general introduction, but will, on the other hand, prove to be one of their strongest claims to public favor. At the present time the wood used for the better (because more lasting) qualities of shingles is cypress or cedar, and requires to be carefully selected and seasoned, and are sold at a much higher price per thousand than the commoner sorts made from spruce, hemlock or pine. The process of Mr. Smith permits of the use of the hemlock, pine, spruce, chestnut, poplar, or other common sorts of wood, and by virtue of the imperishable and fire-proof qualities which it imparts to them, renders these materials more durable and vastly safer than the more expensive materials usually employed. The actual cost of the treatment is admitted to be quite small, and the prepared shingles are available to the public at a price notably cheaper than they are at present charged for the better grades of ordinary shingles, the inventor's statement being to the effect that they can be sold at a cost of one-third the price of good cedar shingles.

The Manufacture of Woolen Hats.

But few of our readers are acquainted with the processes involved in the manufacture of woolen hats. The *Philadelphia Trade Journal* is enabled to furnish the following details through the courtesy of two prominent Reading firms. The processes are as follows: The wool is first thoroughly cleansed by immersion in hot water; it is then wrung out and placed in a drying room to dry, after which it is passed through a picking machine, making 900 revolutions per minute. The wool being thus prepared, is next fed into a carding machine, which turns out 20 dozen double bodies per day. Each body is cut in two, each half forming an entire hat. These half bodies are next passed through a felting process, by the aid of steam, which renders them more compact and of a denser fiber. They are then placed in a hoghead and boiled for two or three hours, and are then tied up in linen rags and passed through the fulling and sizing machine, then soaked in cold water to remove the vitriol, which would otherwise turn gray; from thence they are blocked and returned to the soak for one night for the same purpose, after which they are placed in the coloring tank, then reblocked, as the coloring process brings them to their original shape. They are then placed in the drying-room to be made ready for

stiffening, which is done by the aid of glue and Irish moss. (One of the firms now uses shellac.) They are then put into another drying-room, from whence they are taken, ironed, trimmed and packed in pasteboard boxes, one dozen of a given size in each box; these boxes are in turn placed in wooden ones, one dozen in a box, making a total of one gross in each. This is the way in which these well-known firms manufacture upwards of sixty dozen hats per day, aided by the most expert workmen.

The Rates of Postage.

Postal cards, one cent each, go without further charge to all parts of the United States and Canada; with an additional one-cent stamp they go to all parts of Europe.

All letters, to all parts of the United States and Canada, 3 cents per half ounce.

Local or "drop" letters, that is, for the city or town where deposited, 2 cents if delivered by carriers, and 1 cent where there is no carrier system.

Newspapers, daily, semi-weekly, tri-weekly and weekly, regularly issued and sent to regular subscribers, 2 cents per pound, payable at the office of publication; newspapers and magazines published less frequently than once a week, 3 cents per pound.

Transient newspapers, magazines, pamphlets and handbills, 1 cent for each two ounces or fraction thereof. Single copies of the Presses weighing less than two ounces, the postage upon irregular numbers is 1 cent each. All other miscellaneous matter, including unsealed circulars, books, book manuscripts, proof-sheets, photographs, etc., and also seals, letters, balls, and roots, and merchandise not exceeding four pounds in weight, 1 cent for each ounce or fraction thereof.

The following are the postal rates with Europe. The rates for letters are for the half ounce or fraction thereof, and those for newspapers for four ounces or fraction thereof:

To Great Britain and Ireland, letters 5 cents; newspapers 2 cents; France, letters 5 cents; newspapers 2 cents; Spain, letters 5 cents; newspapers 2 cents; all parts of Germany, including Austria, letters 5 cents; newspapers 2 cents; Denmark, letters 5 cents; newspapers 2 cents; Switzerland, letters 5 cents; newspapers 2 cents; Italy, letters 5 cents; newspapers 2 cents; Russia, letters 5 cents; newspapers 2 cents; Norway, letters 5 cents; newspapers 2 cents; Sweden, letters 5 cents; newspapers 2 cents; Turkey, European and Asiatic letters 5 cents; newspapers 2 cents; Egypt, letters 5 cents; newspapers, 2 cents.

For Asiatic countries, the half ounce limit for letters, and the four ounces for newspapers, still holding good, the rates are:

To Australia, letters, via San Francisco (except to New South Wales) 5 cents, via Southampton 15 cents, via Brindisi 21 cents, via San Francisco 2 cents, via Southampton 4 cents, via Brindisi 8 cents; China, letters, via San Francisco 10 cents, via Southampton 27 cents, via Brindisi 33 cents, newspapers 2, 4 and 8 cents, by the respective routes; British India, letters, via Southampton 21 cents, via Brindisi 27 cents, newspapers 4 and 8 cents respectively; Japan, letters, via San Francisco 12 cents, via Southampton 27 cents, via Brindisi 33 cents, newspapers, via San Francisco 2 cents, via Southampton 4 cents, via Brindisi 8 cents.

ECONOMY DUE TO EMPLOYERS.—"Waste not, want not," is a grand old proverb. "He that is faithful in little is faithful in much." It is true enough that a person who takes no care of materials committed to his hands by an employer, will not be careful of his own property. Economy and wastefulness are habits that will influence us, whether with our own substance or that of another. As a rule, the man or boy who takes care of his employer's goods will be likely to look after his own, and is on the road to prosperity. Some men are worth much more than others, simply because they waste nothing. If an employer be wealthy, and stock abundant, that is no excuse for waste or carelessness. Loss is loss and robbery, whether it be in much or little. It is forcibly said that "Heaven allows nothing to be destroyed." There has not been a single drop of water wasted since the creation. The decomposed elements of the past autumn will supply aliment for the next spring. Economy, rigid economy, is one of the laws of Nature; and we shall not realize the "good time coming" until we are careful and economical.

GOOD HEALTH.

Wearing and Washing Flannels.

We read in *Hall's Journal of Health* that the very best thing that can be worn next the skin, in summer as well as winter, is common woolen flannel. One color has no advantage over another, except that white is more agreeable to the sight. Recent scientific experiments, carefully conducted, prove the truth of the popular sentiment, that woolen flannel is the best fabric to be worn next the skin, as it absorbs more moisture from the body than any other material, and by so doing, keeps the body more perfectly dry. Cotton absorbs the least, hence the perspiration remains more on the skin, and being damp, the heat of the body is rapidly carried off by evaporation and suddenly cools when exercise ceases, the ill effects of which no intelligent mind needs to be reminded of. Hence it is that the common observation of all nations leads them to give their sailors woolen flannel shirts for all seasons and for all latitudes, as the best equalizers of the heat of the body.

We believe it to be one of the most difficult things about the house to properly wash flannels so that they will neither shrink nor full up and become hard. Mrs. Beecher has a talk in the *Christian Union* about this, as follows:

Cut up what soap may be needed, and dissolve in a skillet of boiling water. Let it stand on the stove and simmer till every particle is dissolved. Never rub soap on the flannels or allow a bit to settle on them. Nothing "fulls" flannel so badly as rubbing soap on it or letting bits of it settle on the cloth. A place on which a bit of soap has lodged or been rubbed will have a different shade from the rest when dried, making the whole garment look spotted.

Take a small tub, not quite half full of scald-

ing hot or boiling water. Into this pour enough of the dissolved soap to make a rich suds, pour to this some ammonia, prepared from "concentrated ammonia"—a tablespoonful and a half to 10 or 12 quarts of suds is a fair proportion. Stir this and the soap into the hot water till it is all thoroughly incorporated. Then put in the flannels. Two or three articles are quite enough to soak at one time. Press them well under the water, but turn them over in the water occasionally while they are soaking. Let them remain in the water till it is cool enough to put the hands in without discomfort. While washing keep a good quantity of water at boiling heat on the range for rinsing purposes and to keep the suds as hot as it can be used. Before one piece is washed and ready to be wrung out, fill a small tub half full of clear hot water. Into this stir a little more "blueing" than would be used for cotton or linen. Shake out each piece as soon as washed quickly, and throw at once into the hot rinsing water.

Rub the flannel as little as possible, but draw it repeatedly through the hands, squeezing rather than rubbing. Harsh rubbing thickens and injures the fabric. Never wring with a wringer, as the pressure mats the nap down so closely as to destroy all the soft fleecy look of good flannel. Wring with the hands as dry as possible, then rinse and wring out again; and when as dry as it can be made by hand, snap out, stretch and pull out into the true shape; dry in the open air, if possible. Bring in when not quite dry, roll up a short time, and iron while still a little damp, so that each part can be more readily brought into shape. Pressing when ironing is better for the flannel than rubbing. It does not make the fabric feel so hard and wiry.

Scarlet flannel is poisonous to some skins if used before washing, and as one is not always sure how one may be affected by it, it is safer to give it a scald in hot water with a little soap—not enough to make a strong suds. Let it stand and soak a few minutes, then wring out and treat like other flannels. The smell of new red flannel is not agreeable to many, and for this reason it is desirable to wash it before using. But no washing that we have any knowledge of can keep red flannel looking nice if used for underwear for any length of time, unless worn by people who do not perspire freely. It becomes badly discolored and spotted in most cases. Washing red flannel before making up will "shrink" it as much as is desirable.

Useful and Healthful Children.

A lady writes for the *New York Tribune* as follows: The great effort of many parents seems to be to surround their children with bulwarks against want and trouble that they may be in a measure secure from a large part of the ills that flesh is heir to. The father is unwilling that his children should struggle against overwhelming odds as he has done, should toil and economize and plan and fight as he has had to do, and he fancies that investments in real estate and a balance in bank will be the best inheritance he can leave them. So he denies himself indulgence in even necessary things that he may save and make for his family. The mother, remembering how irksome household tasks were to her in her girlhood, permits her daughters to lead lives of domestic ease and indolence, thinking that in so doing she makes the best manifestation in her power of maternal love. As a natural consequence of this view on the part of parents, we see growing up all around us young men and women perfectly useless for all the practical purposes of life, mere hot-house plants, that under glass and with proper conditions of moisture and temperature thrive luxuriantly, but so tender and helpless and unprovided against adversity, that one blast of the north wind freezes them to the core, withers all their activities and paralyzes all their faculties; or if they take heart of courage and battle against misfortune, they are so ignorant of the use of the weapons they must handle, that the fight goes against them.

There is only one way of making the muscles firm, hard and strong; food, of course, is necessary, so is rest, but more vitally important than either is vigorous exercise, and this each owner of muscle must take for himself. Just so of intellectual and moral fiber. It is built, not from without, but from within, and is the result of independent thought and action. The sooner a boy can be made to wait upon himself, to think for himself, to act for himself, the sooner will the germs of true manhood begin to develop within him. It is no kindness to surround him with such attention and care that he will not be compelled to learn the lessons of self-reliance, of patient industry, of persistent hope. There is profound wisdom and philosophy in the exhortation of St. Paul to "rejoice in tribulation," not because it is a pleasant thing to the soul, but because it develops strength, and brings to the individual exercised thereby a consciousness of power and an ability to use it that could not be otherwise attained. As well might the giant oak complain of the storms and tempests that have been its ministers of strength and growth, as the soul, mighty in capability through conflict and disaster and victory, complain of the dust and struggle of the battle-field, whence its spoils were won. The real crowns of this world are crowns of labor. Happy are they who rejoice in discipline, in adversity, in struggle, and accept as the crowning blessing to the race in its present fallen condition, "Cursed is the ground for thy sake; in thy sweat thou shalt eat bread."

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them, I think it will create a great deal of dissatisfaction. I don't want to give my proxy to vote for any such thing. Let the men who are present vote their own shares on this question, and not those of their proxies. That would be unlawful and create general dissatisfaction.

Mr. Heydenfeldt—We have been here a long time, and are tired out. I am willing to pass anything the gentleman wants if he will complete his labors and let us go home. As a matter of course, nothing that is passed here is binding upon the trustees. The stockholders delegate their power, and their only remedy is to take care whom they elect. These resolutions are simply mandatory to the attention of the board, and they won't obey the directions unless they choose to do so. They have been selected on account of their knowledge, ability and skill to manage this business. They know how to manage it, and the stockholders don't know how. At best the resolutions are but advisory.

A Voice—I move to lay the resolution on the table.

Mr. Mackey—Mr. Dewey says that the assessor at Virginia informed him that a mill would pay for itself in two or three months. Now I would like to know from whom he got that information. Whoever told you that, it is not true. No mill can be cleared short of a year or 18 months. Then we must consider the risks that are to be run of the property being destroyed. You cannot build a mill that will crush 300 tons of ore for less than \$450,000 or \$500,000. There is a great deal of talk about

Tailings.

We will sell them if anybody wants them. These tailings ran to waste in the Carson river for 10 or 12 years, until Mr. Hobart and myself conceived the plan of running them down to Big Flat and saving them. The plan cost \$130,000. My object in taking them down was, as I have a very large family, to give them to the little fellows to work when I am gone.

Some further opposition to the resolution was made, when Mr. Heydenfeldt said: "Since all the stockholders are against you, Mr. Dewey, you had better withdraw your resolution."

Mr. Dewey—I think not. I shall pursue my remarks.

Mr. Heydenfeldt—Well, withdraw the proxies and vote so.

Mr. Dewey went on to explain his resolution, and in the course of his remarks stated that \$13 per ton was charged for milling Con. Virginia ore.

Mr. Mackey—We don't charge anybody \$13 a ton. We used to when quicksilver was high. For the last four or five months we have charged only \$12.

The resolution was lost.

Thanks to the Management.

The following resolution was presented by Robert Sherwood:

Resolved, That the thanks of the shareholders are due to the trustees for their efficient management during the past year.

This resolution was adopted, and the following stronger one presented by E. C. Platt:

Resolved, That all the matters and things, acts, contracts, transactions and disbursements made and entered into, agreed upon or executed by the Board of Trustees during the past year be, and the same are hereby ratified, approved and confirmed.

After some very angry and heated talk this resolution was also adopted, and shortly after the meeting adjourned.

Oil Refining in California.

The Los Angeles *Herald* speaks as follows of the oil interests of southern California and the progress of refining:

The present development of the oil interests of Los Angeles county will render interesting some notes of the progress of refining hereabouts. About four years ago a refinery was established in the San Fernando oil region by a stock company. It was placed under the charge of a superintendent named Smith. This gentleman could not get a satisfactory percentage of light oil from the heavy crude product. About 18 months ago the refinery passed into the hands of Messrs. G. D. Scott and Baker. These gentlemen were a little more successful than Mr. Smith had been, but they also failed to secure the best results. They were succeeded by a Mr. Shoemaker, of Akron, Ohio, with a like record of failure. Determined to make a success of it next time, Mr. J. A. Scott, a noted refiner of the Pennsylvania oil regions, was sent for, and his handling of the refinery was attended with entire success. He remained in the San Fernando district until his presence was called for at Ventura, to take charge of the California Star oil refinery.

Mr. Scott, we are now informed, is turning out of the works there some 20 barrels of refined oil daily, with very limited facilities. The gross product of the Ventura wells and springs is about 80 barrels of crude petroleum a day. The wells there are down to a depth of about 140 feet. At San Fernando there are five producing wells, and the gross product of crude oil daily is about 40 or 50 barrels.

It should be stated that the oil of the San Fernando district is of a much finer grade than the Ventura article. It refines much more satisfactorily than the latter, and yields a much larger percentage of illuminating oil.

There is a lively demand for the petroleum of southern California in San Francisco and throughout the State at large. As refined by

J. A. Scott it is regarded as superior to any oil imported from the East. The oil producers at San Fernando labor under a disadvantage from which their Ventura brethren are free, notwithstanding the lighter gravity and consequent greater value of the Los Angeles product. A pipe is now being laid from Ventura to Wheeler's canyon, a distance of 27 miles, and its owners promise to pipe oil to Ventura for \$1 a barrel. From Ventura it is carried to San Francisco for 75 cents a barrel by ocean vessels. Thus the whole cost of its transportation there, from the spot where it wells out of the ground to its market in San Francisco, is \$1.75. It costs the San Fernando producer, on the other hand, just \$3 a barrel to get his oil transported to San Francisco, via the Southern Pacific railway.

The Los Angeles and Ventura oils, as refined by Mr. Scott, command about 40 cents a gallon. As there are about 45 gallons to the barrel, a barrel of this oil is worth in the San Francisco market about \$18. Mr. Morrison, an experienced oil refiner of Pennsylvania, has been sent for to take charge of the San Fernando refinery, and he will doubtless obtain results as satisfactory, in the manipulation of the crude petroleum of that section, as those achieved by Mr. Scott.

The outlook for oil production in southern California is emphatically promising. We have a better record from our oil wells to-day than the Pennsylvania wells showed at the same stage of development. Experienced Pennsylvania oil men assure us that the probability of a yield quite as prolific as that of Pennsylvania, at some time, is great. Patience, perseverance and some outlay in sinking the wells to the required depths are all that are needed. One or two failures should not dispirit prospectors. The fortune of the Pennsylvania, Ohio and West Virginia pioneers was the most variable thing in the world. One man would strike it and a man 50 feet away from him would fail. Until some wells have been sunk to a depth of 1,400 or 1,500 feet we cannot be said to have begun to prospect for oil. The kind of well-boring that has hitherto prevailed in Los Angeles and Ventura counties bears the same relation to well-boring in Pennsylvania that a claim "hogged" on the Mexican principle has to the superbly developed mines on the Comstock lode. It is much to have learned that we have in this section reliable oil wells. Their development will be certain to follow in time, just as the development of every other capability of this section has surely taken place. And we think development has fairly set in now.

California Pisciculture.

The past year has shown quite an increase in the catch of some of the varieties of fish of California. The increase in salmon has been most marked, and shows already that by artificial hatching the supply of this fish can be almost indefinitely increased. Observations during the past year have proven that this fish is to be found in California every month in the year, which is not the case elsewhere. The Fish Commissioners of this State have, so far as the means at their disposal would admit, acted with energy and good judgment.

The law making a close season between August 1st and November 1st, has been well enforced and with the result that further prosecution for violations will probably not be necessary in the future. In the carrying out of the programme of the law, the Commissioners have been materially aided by the railroad and transportation companies, who forbade their agents and employees to transport salmon out of season.

Successful Propagation of Shad.

The closed season for shad will expire in December, 1877. At that time it is believed by the Fish Commissioners that the natural increase of the fish will be so great as to prevent their extinction on this coast. As experiments have shown that young shad cannot be kept in safety for a longer time than seven days, Prof. Baird, of the United States Fish Commission, will make no attempts to send them from the Atlantic coast to Oregon. He intends, if possible, to send a full carload of young shad—about 3,000,000—during the coming season, which will be placed in the Sacramento river. With this additional number it is thought the entire Pacific coast, from San Diego northward, will be amply stocked, as from the young shad heretofore placed in the Sacramento river, adult fish have been taken at various points, from Wilmington to the Columbia river. Although the taking of shad is at present not lawful, yet numbers have been caught in nets set for other fish at various points in this State. The latest instance known to the Fish Commissioners was the taking of two adult shad in Sonoma creek last week. These fish were almost ready to spawn, and their ripe condition so early in the season shows that they can be taken here about the same time as in Alabama and Florida. During the past year the Fish Commissioners of California have placed 125,000 young shad in good condition into the Sacramento river near Tehama.

Stocking the Rivers With Salmon.

During the past year the Fish Commissioners have had hatched out and placed in the Upper Sacramento, Pitt and McCloud rivers 2,500,000 young salmon, care having been taken to distribute them in the smaller tributary streams, so as to protect these young fish from trout and other enemies. The Commissioners expect to

hatch out and put into the Sacramento and other interior rivers a similar number next year, and will continue to do so annually as long as the Legislature of California will make suitable appropriations for the purpose. From investigations made by them, the Commissioners are satisfied that the artificial hatching and introduction of the above number of young salmon yearly into the Sacramento river, in addition to the increase from natural sources, will be ample to keep up and even increase the supply of salmon beyond the consumption of our people. They believe that the business of canning salmon for export, as now practiced on the Columbia river, can, in such case, be made profitable in California. The value of salmon canned the past year on the Columbia river is estimated at about \$4,000,000, the supply being inadequate to the demand. The article of canned salmon is finding increased sale wherever introduced, and there seems practically to be almost no limit to the demands in the future. The proprietors of the canneries have already made contracts in advance for nearly 200,000 cases of the next season's catch. The limit of the supply of salmon in the Columbia river is said to have been reached, and unless artificial hatching is engaged in, that river will become as unproductive as was the case in California rivers a few years since.

Some of the parties engaged in canning salmon on the Columbia river are in favor of the State of Oregon and the United States taking some joint action in preserving and restocking that stream. They state they will assist in defraying the expense attending artificial hatching of salmon, and that a sum of \$5,000 to \$10,000 expended yearly would be ample to keep up the present supply of fish in that river. The Fish Commissioners of this State report that the 200,000 young salmon placed in the Truckee and Little Truckee rivers, Donner lake and Prosser creek have done well, the young fish having lately been seen in those waters in great numbers. Should these fish survive the perils of poison from saw dust and almost impassable dams on the Truckee river, they will find their way to Pyramid lake, and thence annually return to stock the waters from whence they came. The water of Pyramid lake is said to be somewhat salt and abounds with suitable food for salmon. During the past year the Fish Commissioners have made arrangements to exchange salmon eggs for desirable fish, natives of Japan and Hawaii. To the latter they sent 30,000 eggs, a portion of which are reported to have hatched out and doing well. From Honolulu a quantity of young fish were shipped to this port, but from lack of care died while on the voyage. These fish—the arava—are said to attain the weight of 15 pounds, resembling the salmon in looks, but tasting more like a shad, without, however, that fish's abundance of small bones. The arrangements for an exchange with Japan were made so late in the year that salmon eggs could not be sent this season. The Commissioners sent, however, by the steamer which sailed on the 3d inst., 30,000 white-fish eggs, a portion of a supply just received from Michigan. They will also send some Eastern trout eggs when received, and some eggs of the Sacramento river trout, in March next. In return the Commissioners expect to receive some mullet and carp, both being of fine eating quality. Other varieties of fish are also promised from Japan.

Importation of White-Fish Eggs.

The Commissioners have just received a shipment of 300,000 white-fish eggs in good order, from Michigan. One-half this number were sent to New Zealand by the last steamer, under arrangements made by Prof. Baird, United States Fish Commissioner. Another lot of 300,000 white-fish eggs is expected to arrive here in a few days, to be divided as above. Those retained by the Commissioners are to be hatched out at Berkeley, and afterwards to be distributed in the waters of Tahoe and Donner lakes, and Eagle lake, in Lassen county. The white fish placed some years since in Tulare lake are reported to have done well, large quantities of the fish having been seen during the past year. Of those placed in Clear lake very little is known, as very few only have been seen. As the waters of this lake are very deep, the Commissioners think the probabilities are that the fish are not likely to be taken there without systematic fishing, as is practiced in Lake Michigan, etc., which so far has not been tried in California waters.

Experiments with Eastern Trout.

The Commissioners expect to receive, about the 10th instant, 200,000 Eastern trout eggs, which are to be hatched out and placed in the public waters of this State. When hatched out notice will be given to the public through the press, so that parties who may desire to stock waters can make application and procure the young fish from the hatching house at Berkeley. The Eastern trout eggs heretofore received have been hatched out and placed in mountain streams, among others the South Yuba, North fork of the American and Prosser creek, also in Calaveras creek and other streams in Alameda, Napa and Yolo counties. These fish have grown and thrived well, a large number having spawned, thus insuring a continuous supply.

Dolly Varden Trout.

The Commissioners the past year made arrangements to secure a supply of the Dolly Varden trout eggs, under the direction of Myron Green, of the United States Fish Commission. McCloud river men were sent to the headwaters of that stream, but failed to obtain any eggs, the fish spawning in September and October, instead of February, as is the case with the Sacra-

mento trout. This difference in spawning time, however, assures the prevention of hybrids, no other trout being then ripe with milt or eggs. Efforts will be made the next season to procure a supply of eggs, with the view of distributing in other waters in the State which are supplied by melting snows, the only places where the fish will thrive. These fish were supposed to be only native to the McCloud river, but it is now known that they are to be found in almost all the snow-fed rivers of the Alaskan coast emptying near Behring straits. The name of this fish in pisciculture is *Salmo Campbellii*.

California Trout.

With the view of restocking some of the streams that have been exhausted of their natural supply of fish, the Commissioners have made arrangements to procure a quantity of eggs of the ordinary trout of this State. An arrangement has been made with Myron Green, Lower Soda Springs, Siskiyou county, by which that gentleman will collect and artificially hatch out a large quantity of trout eggs. A portion of these will be purchased by the Commissioners in March. This trout, which is called *Salmo trutta*, is highly thought of in the Atlantic States, where they are considered a shy and gamier fish than the native trout.

Graylings and Other Species.

This fish, said to be the most beautiful in American waters, will be propagated in California the coming season, the Commissioners having arranged to receive 50,000 eggs from Michigan. These, when hatched out, will be placed in some of the highest and coldest streams of the Sierras, and in time their produce will be used to stock all streams in the State which may be of suitable clearness and temperature. Of the other fish introduced into California by the Commissioners, the majority seem to have done well. The Schuylkill catfish, which were placed in the slough near Sutterville, have largely increased, and have been well distributed throughout the State. The Mississippi catfish placed in the San Joaquin river have also done well, a number weighing from three to five pounds having been taken at various times.

The black bass in Napa and Alameda creeks have largely increased in numbers, and from these creeks it is expected to stock other waters of the State.

In 1873, the Commissioners placed in San Antonio creek a number of tautog or blackfish, the only salt water variety that arrived then in good order. These fish were strong and lively, but from the time they were placed in the creek have not been heard from. They should have increased and have been found in rocky waters. The Commissioners will this season make further attempts to introduce lobsters on this coast. With this view, Livingston Stone, United States Fish Commissioner, has been making a series of experiments to keep lobsters alive for a sufficient period of time to reach California. A full carload of lobsters and salt water fish will be brought to this State during the coming season.—*Bulletin*.

Encouragement of Labor.

The Empress Eugenie has been interviewed by a newspaper man, and amongst other things tells of the various schemes she and the Emperor devised to benefit the poor laboring man. Among other things was a sort of loan society to lend money to those who were really willing to go down to work on the land, but had not money enough to enable them to subsist till the crops came in. The Empress said it was remarkable to note that hundreds applied for loans for every imaginable purpose—every one who wanted help to go down to actual labor. But she and the Emperor kept strictly to their point. No security was exacted but honor for the return of the money. The parties borrowing had to have their honor vouched for by reputable persons, and the only penalty for refusal to pay was that the voucher's words were not taken for any subsequent case. They lent out 1,000,000 francs in this way, of which all but 1,000 francs was duly returned.

This little incident proves how many people there are who will rather live by their wits than by honest labor, a hundred to one, says the Empress; and then it proves how honest real honest labor is. It proves a point we have often urged, that encouragement to earnest and honest labor is among the greatest wants of our time. We would not have "education" any less elaborate or perfect than now; but the education which encourages a whole population to live by their wits rather than by their hands, is defective, and we certainly ought to do more to encourage hard work, both in the interest of humanity in a practical sense, as well as in the interest of good morals.—*German Town Telegraph*.

BERRIES.—The Placer *Herald* says: Of all the wonders of this wondrous country, we know of nothing so remarkably wonderful as the feat of picking fresh ripe blackberries, grown on vines in the open air, at an altitude of about 3,000 feet above sea level, on Christmas day. Yet such was really done this last Christmas by Charles H. Hicks, from the vines in his garden, near Yankee Jims. As proof of the fact Mr. Hicks sent by mail, in a small box, last Monday, two sections of the vine, on each of which there were about a dozen berries in all stages of maturity; the leaves also were fresh and green. Among the lot some eight or ten of the berries were fully matured. In size they were large, in appearance fine, and in flavor would compare favorably with average summer berries.

Eureka District.

History of its Development.

A recent number of the Eureka Sentinel gave quite an interesting history of Eureka district, its growth and development, from which we copy that part relating to the mines:

The mines of Eureka district were discovered in the summer of 1864 by a prospecting party from Austin, who located mines in New York canyon and organized a mining district, with G. J. Taunehill as Recorder. Very little work was done until 1866, when Meyers, Arnold & Co. sold their claims to a New York company, who spent large sums of money in the district, but met with very poor success. The first furnace was built by Moses Wilson, in that year, and an attempt made to smelt the ores, which resulted in a total failure. The refractory ores were too much for our early miners, who knew but little of smelting, and as a consequence the district was pronounced a failure. A few indomitable spirits still stuck to it, and in 1868, Messrs. Morris, Monroe & Co. employed Mr. C. A. Stedtfeldt, of Austin, to build another furnace. It was not a success in a financial point of view, although the fact was demonstrated that the ores were rich in gold and silver, and only needed a modified process to insure a profitable return. By this time the White Pine excitement, which had carried away the most of our population, was at an end, and many miners found their way back to the district, bringing with them no capital, but stout hearts, and the little faith left them from their sad experiences on the "Pogonip." A few merchants followed in their wake, and quickly disposed of their goods—on credit—and the nucleus of a town was started. Money was scarce, lumber high, and nothing in sight but locations and drafts on the future. Notwithstanding these drawbacks, the pioneers struggled on, overcoming obstacles that would have discouraged less hardy men, and waiting for something to turn up that would give them relief. This desideratum was some process that would successfully cope with the rich, but refractory ores. In the fall of 1869, Colonel Robbins built a small furnace and demonstrated that the ores could be smelted, making a profitable run on ores from the new mines. About this time Colonel Buel leased the McCoy furnace and bonded the Buckeye, Champion, and Sentinel mines. The ores were worked successfully, they being of a character well adapted to the smelting process. This settled the fortunes of the camp and enlisted outside capital. Colonel Buel organized a company to build large smelting works. The firm, Buel, Bateman, Allen, Ingoldby and Farron, was called the Bateman Association. In the meantime Wm. Lent had purchased the mines bonded by Buel, also the Central, Roseland and Mammoth, and then effected a consolidation with the Bateman company, known henceforth as the Eureka Consolidated mining company. The ores smelted were very rich, the assays to the end of April, 1870, comprising many thousand tons, averaging \$75 gold, and \$83 silver, the ore containing about 50% lead.

The product of bullion to June 1st, 1870, was six hundred 14 u. and 10 l. s.

A good showing for the new district. Still there was a drawback. Smelting was a new method, and the furnaces built were defective in construction. From repeated experiments it was found that 30% of the silver and 40% of lead contained in the ores were lost, and the old dumps assayed as high as \$80 per ton in silver. In the fall of 1870, the Eureka company completed what was known as a modification of the Piltz furnace, and it proved a perfect success. Much of the former loss, occasioned by the unsuitable construction of the old furnaces, was entirely avoided, and the district was assured a cheaper smelting process, and a higher yield of lead and silver. There has been no improvement on these furnaces, with the exception of the dust chambers, and an automatic tapping apparatus, invented by Messrs. Keyes & Arents.

The yield of bullion for the year 1870 was \$1,500,000. There were at this time 14 furnaces built, and eight in steady operation. Substantial improvements and permanent buildings were the order of the day, and the tents and caves, or dug outs, that had heretofore been sufficient for habitations, were replaced by more civilized structures. From the discovery of the camp until 1870 our citizens were in a state of poverty. Those few who were fortunate enough to dispose of their claims went elsewhere to enjoy the proceeds, and those who stuck to the camp were living on faith and promises; but the coin commenced to flow back to Eureka, and find its way into the pockets of the producers. New industries sprang up. Charcoal was in demand and wood at a premium. The hills swarmed with men burning coal and cutting wood. The ores that had been extracted from open cuts and surface deposits became exhausted and deeper workings were necessary, which caused a demand for miners. The roads were lined between the mines and furnace, and large freight wagons and overlaid coaches filled the roads between the railroad and Eureka.

The flush times were on us, and with them came the usual influx of roughs, but, nevertheless, the town was remarkably quiet, temperate and industrious for a new mining camp. Perhaps we owe this fact to the discovery of Pioche, which place seemed to have great attraction for this undesirable class, but the fact remains that we escaped much of the disorder usually a part of life in a new mining camp. In July, 1870, the Eureka Sentinel was founded by

Messrs. McConney & Skillman, and published as a weekly. The ensuing year the outlook of the camp justified the issue of a daily, and the paper passed into the hands of Messrs. Cassidy & Elliot, and has been continued as a daily to date.

The mine par excellence of the camp was still the Eureka Consolidated, but there were several promising ones west of their ground. The Richmond, Colorado, Virginia and other locations which had been consolidated, were owned by W. C. McCoy & Co. A new consolidation was formed with Ogden, Dunne & Co., who owned smelting furnaces. This association was called the Richmond Consolidated mining company. In the fall of 1871 J. M. English negotiated a sale of this property to an English corporation, with a capital of \$1,000,000 and it passed into their hands, retaining the old title. R. A. Fisher was appointed superintendent, and extensive improvements were commenced and soon carried to completion. Four additional furnaces were built, and land was donated by Major McCoy to the company for this purpose. The Jackson, Buttercup, Phoenix, Bullwhacker, General Lee, Dunderberg and Wide West were swelling the stream of bullion and contributing to the general prosperity. It would take too much time and space to follow the mines in detail, noting the various changes up to the present time, but all these properties are still yielding ores, and are worked under various names. The Eureka Consolidated and Richmond remain the foremost mines in the district. They have both attained a depth of 1,000 feet, and the body of ore in the Richmond is of vast proportions and increased value, and rivals the famed Comstock. The bullion yield increased yearly and culminated in 1875, when we shipped \$6,000,000. The yield fell off in 1876, but the decrease was owing to the depreciation in silver and other causes, but even then the shipments amounted to over \$4,000,000.

We have sketched what may be termed the opening chapter in our history. From a few pioneers the population had increased to 4,000 souls. The canvas and log houses were being rapidly replaced by brick and stone structures. Bullion flowed in a steady stream from our furnaces, and the evidence of permanent wealth and stability was found on every mountain side within the range of vision, and one would suppose that with all this testimony in our favor there would be few doubters. There certainly were none among those who had examined our mineral resources. It is true that none of the mines had attained any great depth. To offset this, was the known fact that all over the globe mines that carry base metal ores have proved to be the most permanent, but San Francisco shouted limestone, and the Comstock echoed back the cry, accompanied with the babble of the would-be scientists about true fissure veins. In fact, it seemed to have become an axiom that there could be no permanent bodies of ore that did not fulfill all the conditions of the Comstock lode. The unfortunate result of operations in White Pine was cited to support this theory, and timid capitalists shook their heads and buttoned up their pockets when Eureka was mentioned, while the few sanguine ones reaped a rich reward for their investments. We well remember before the bonanzas were found in the Crown Point and Belcher, and the prospects were not very bright in Virginia City, that the same dismal predictions were made of her future. A true fissure vein was there all the same, and theories were as tenable before as after its discovery, but it did not inspire capital with confidence, and the papers of that city tell to-day how it was that the indomitable perseverance of one man redeemed it from ruin while capital stood aloof and waited for the result. Turning from the modest outlook of 1870 to the firm basis of 1877, we congratulate our townsmen on the overwhelming evidences of our present stability and future prospects. The fact is conclusively established that our mines have yielded and are still yielding large quantities of gold and silver. They have been worked to a depth that proves all theories antagonistic to their permanence, false in fact and false in conjecture. The problem of successful reduction has been overcome, and the returns by smelting are as sure as any other process, and the only one applicable to our ores.

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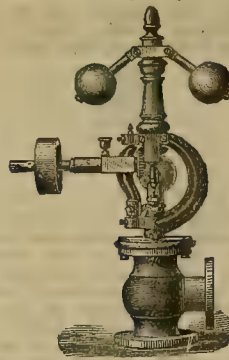
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Continued from page 41.

there yet, and extensive tunnel claims are also being worked. The mining outlook of the county is considered as extremely encouraging. In the upper part of the county several new enterprises are being carried on. The Railroad canal will be extended to Mosquito gulch this summer, taking the ditch through ten miles of mining country hitherto unsupplied with water facilities.

In Butte county the Chinese continue to work the lava beds below Oroville. About \$20,000 per month is taken from these mines. Some of them have paid well and others not.

The Siskiyou and Humboldt county mines are principally quartz, of which the Black Bear is the most profitable. Some placer mines are worked in bars and beaches, but mining is not carried on in a very extensive manner.

In Mono county, where mining was for so long a time a failure, better work is now being done, and capitalists have of late turned their attention that way, so that we may soon expect to hear of an improvement. In several cases this year good results have been made and the county will probably redeem itself before long.

Inyo county has probably made greater strides this year than any other of the mining centers of the State, although much remains to be done there yet. The old Cerro Gordo base bullion district is rather under a cloud, and Panamint has not answered the expectations hoped for, but the Darwin, Lookout and Lee districts are coming to the front. There are now in the county three mills at Independence, two furnaces at Cerro Gordo, two furnaces of the Modoc mine at Lookout, and the New Coso furnace at Darwin. The 30-ton furnace at the Hidalgo mine is about starting up, and a 10-stamp mill for the Minetta Belle mine at Lookout. The two furnaces of the Defiance are also at work. A number of the mines are doing well, the Modoc particularly, which paid its first dividend this month. The Union Consolidated, at Cerro Gordo, yielded 1,325 tons of lead last year, reducing 9,950 tons of ore at a cost of \$137,826.

Mendocino county has come into the rank of mining counties this year, by the discovery of the Calpella placers. There are about 1,000 acres of land available for mining purposes. A ditch is now being built to work the ground by hydraulic system.

San Benito county mines, mainly quicksilver, give promise of better results before long. These mines are near the summit of the mountains dividing San Benito from Fresno county, at a level of 3,350 feet above the valley level. The Staton mines, worked previously for quicksilver, are now worked mainly for antimony, the furnaces now being run on this ore. The deposits of antimony, of which 50 at least are uncovered, show large bodies of fine metal. They have large quantities of both cinabar and antimony ore, and have abundant wood and water facilities, with good means of transportation. The Consolidated Wonder group, on the north of the Staton mines, comprise some 20 promising discoveries. A furnace will soon be constructed.

In addition to the products heretofore named, this State also produces lead, copper, borax, soda, manganese, salt, cement, gypsum, antimony, plumbago, asbestos, nickel, kaolin, fire-clay and other mineral products. The past year has seen a very great increase in oil production, the petroleum mines in the lower country having had the aid of capital to develop them. The oil interests of the southern part of the State are now quite extensive. New mines are being opened, refineries erected and a large section of country prospected, and we may expect a great increase in this business in the coming year.

Quicksilver.

Although within the past few years the quicksilver mining interests of California have been very greatly developed by the discovery and opening of new mines, erection of furnaces, etc., in 1876 quicksilver mining has not been very profitable. In fact, many small mines have had to close down temporarily. Many which started in with brilliant futures when quicksilver was selling for \$1.65 per pound, stopped working when it dropped to 50 and 60 cents per pound, as it ruled of late. It is, of course, much better for the gold and silver miners to get their quicksilver so cheap, but it has had a bad effect on many quicksilver mining companies. This State now produces fully one-half the product of the world in this article. The total receipts of quicksilver in San Francisco in 1876 were 63,928 flasks, against 50,246 flasks in 1875—an increase of 13,682 flasks. Until this year the lowest average price since 1870 has been 80 cents per pound, and prices this year have been by no means satisfactory to the quicksilver miners. The total value of the exports of this article for the year is set down as \$1,638,859. A very large proportion is of course exported. 40,992 flasks having gone by sea and 7,963 flasks overland. The mines of this metal extend almost the whole length of the Coast range, and a number of new ones have been discovered this year. We append the figures of production of the principal mines:

New Almaden, Santa Clara county.....	Flasks.
New Idria.....	29,651
St. John and Vallejo mines, Solano county.....	7,272
California.....	2,085
Sulphur Banks, Lake county.....	1,184
Great Eastern and Mount Jackson.....	8,882
Cloverdale, Sonoma county.....	150
Great Western, Lake county.....	1,028
Bella Union, Napa county.....	4,405
American mine, Lake county.....	271
Redington, Napa county.....	250
	0,183

Sunderland, San Luis Obispo county.....	1,402
North Almaden, Santa Clara county.....	17
Oakland, Sonoma county.....	2,150
Oat Hill, Napa county.....	510
Buckeye, Colusa county.....	407
Guadalupe, Santa Clara county.....	6,768
Abbott, Colusa county.....	1,456
Kentuck, Sonoma county.....	54
Manhattan, Lake county.....	976
Wall Street, Lake county.....	74
Oceanic, San Luis Obispo county.....	2,416
Altosna.....	2,000

Coal.

The fact that the Pacific coast import of coal amounts annually to from 250,000 to 350,000 tons, would lead one to suppose that we produced no coal of any amount. This is by no means the case, as large deposits exist in various parts of the coast and are being worked. The great Rocky mountain coal field, extending through Montana, Idaho, Wyoming, Utah and Colorado, and covering a large area, has scarcely been touched. The Coast range deposits, such as the deposits of Mount Diablo, Sacramento valley, the Coos bay, Oregon, and Seattle, Washington Territory, mines, are more generally worked. Most of our coal is "soft," and not of a first-class character, lignite being the most abundant. The Seattle coal is the nearest approach to anthracite known to the coast. The past year has not by any means been a successful one for the coal interests of the coast. A large number of vessels, attracted here by the wheat crop, have come from Australia or England with cargoes of coal and have brought it almost as ballast, for so cheap a rate as to depress our local coal interests. This has made little difference to the consumer, however, as to price, although the dealers have made money by it, while our local coal industries have been injured. Contra Costa county has been the largest coal-producing section of California, but, as stated above, the industry has not been profitable in 1876. The Union mine, at Summersville, one of the largest mines, has suspended work indefinitely. The coal has been worked out to such an extent that extra pumping apparatus is necessary, and the expense is not warranted by the low price and small demand. The Pittsburg has been idle for several weeks, and Central has not shipped any coal this season. The Antioch Ledger gives as follows the amount of coal that has been shipped from the Central, Union, Pittsburg, Eureka, Black Diamond, Peacock and Independent, since 1860:

	Tons.	Tons.
1861.....	6,320,1869	148,722
1862.....	2,342,1870	120,760
1863.....	43,198,1871	133,485
1864.....	37,468,1872	163,322
1865.....	60,530,1873	170,000
1866.....	80,024,1874	205,256
1867.....	109,490,1875	142,808
1868.....	133,839	
Total for 15 years.....		1,591,914

In addition to this, the Corcoran and Empire mines have shipped several thousand tons, and large sums of money have been expended in opening the Teutonia and Brentwood mines, which will doubtless be successfully worked in the near future. No figures are given for the year 1876. The coal from this region is principally used for boiler coal, and is not so well adapted for domestic purposes as the imported varieties.

The Lincoln, Ione and Livermore coal mines, which are now producing, give promise of an excellent future, and bid fair to become important coal centers. In Sonoma county several veins of coal have been found, none of which have as yet been prospected sufficiently to prove their value. In addition to this, coal was found last year in Santa Cruz, Monterey, Santa Barbara and Los Angeles counties. In all these places prospecting for coal is being actively prosecuted in various directions, while the deposits already found are being tested. As yet, however, the developments are not such as to warrant any prediction of their value, although there is no reason why all of them should not prove good coal mines. The fact that these coal deposits seem to be scattered over so large an area is an encouraging one, as in all directions population is increasing and towns building up, where coal is needed. It argues well also for new discoveries not yet made and the success of a few companies will set others on the track.

Iron.

The Pacific coast uses annually about 50,000 tons of iron, a large proportion of which could be produced by its iron mines were sufficient attention paid to the deposits. Capitalists have, however, not yet entered this field of industry, although indications are now apparent that the deposits will not be allowed to lie idle much longer. Oregon iron has for some time been known as first-class, but for some reason the company which used to work the deposits at Oswego have been obliged to suspend operations. The Oregon deposits extend from Portland on the Willamette to St. Helens on the Columbia, but little has been utilized. In California it is found all over the State from one end to the other. The main difficulty in the way of the development of this industry is the lack of proper fuel for the furnaces. Several iron mines have been located lately by different companies, some of which will be worked this year. The Eureka company, recently organized, is to work a hematite mine in El Dorado county, about two miles from Placerville. The ore is inexhaustible, and said to assay from 65 to 80 per cent. iron. There is near by plenty of wood for charcoal and a deposit of limestone, which can be used for a flux. As yet, however, there is not a single iron furnace in blast in the State of California, notwithstanding the consumption of iron and the existence of large and valuable deposits. The precious metals attract most

attention from our miners and capitalists, few of whom are familiar with iron mining.

Nevada.

The State of Nevada is now the greatest bullion producing region in the world. The famous Comstock lode of course produces most of it, yet there are many other productive districts which yield amounts to swell the gross product very materially. We have not space here to mention individual mines outside of very prominent ones, nor to give even a brief review of operations in the numerous districts which are scattered all over the State. The figures of production show for themselves the prosperity of the industry. The following mines have produced in 1876 the figures set opposite the names. Of course there are hundreds of others, the returns from which are not obtainable, yet the brief list which we have made up makes a good showing:

Consolidated Virginia, Comstock.....	\$16,657,649 47
California.....	13,386,050 39
Belcher.....	2,820,590 36
Opbir.....	2,340,848 70
Crown Point.....	904,339 80
Chollar-Potosi.....	457,248 25
Con. Imperial.....	138,238 66
Imperial.....	24,657 34
Overman.....	55,990 07
Bullion.....	45,000 00
Eureka Con., Eureka District.....	602,825 55
Richmond Con. ".....	2,167,202 25
K. K. Con. ".....	200,000 00
American Flag, Pioche.....	48,009 97
Raymond & E. ".....	578,242 61
Leopard, Cornucopia District.....	480,908 86
Tybo Con., Tybo District.....	623,274 47
Manhattan, Lander county.....	1,240,000 00
Paymaster, Ward District.....	230,000 00
Northern Belle, Esmeralda.....	1,517,685 30
Jefferson, Nye County.....	102,383 89

Of course the Comstock continues to be the center of attraction, as it always will. In the vicinity of that lode there are a number of what are termed outside mines, which have this year received attention and are being worked. Eureka district continues to flourish, as the figures we give elsewhere of the product of the mines prove. The Richmond and Eureka Consolidated are the most prominent and the largest producers. The Manhattan mine in the Reese River country produced \$1,229,679 this year. The mines themselves have greatly improved and are daily showing a continued improvement in size of veins, extent of chimneys and quality of ore. Eastern Nevada has looked up of late and most of the districts now give better promise than ever before. We have given in the Press all the current news from these localities weekly, so it is not necessary to refer to them more in detail here.

Mines of the State of Nevada belong principally to citizens of this city, and most of the capital employed comes direct from here, so that our community is as much interested in the developments there as here. A good many of the old districts are coming to life again as prospectors prove the worth of mines in their boundaries. Again, new districts are discovered and settled up, so that the mining developments of the State are on the up grade. The past year has been a comparatively dull one, however, the heavy discount on silver having a disastrous effect in some instances, and there are probably more miners in some of the districts than there is room for. Still, with these drawbacks, the State makes a splendid showing and one to be proud of.

The Suro tunnel, intended to drain and ventilate the Comstock lode, is more vigorously prosecuted than ever, and it may be safely counted that they make about ten feet per day, by the aid of Burleigh drills and fine machinery. The cost of the work so far has been over two millions and a half, and it is expected to strike the lode within the next twelve months. As yet no bonanzas have been struck, although some fair milling ore has been crossed. As they near the lode, however, the chances are expected to increase for finding blind ledges and they may strike something yet. It remains to be seen, however, whether all that is claimed for the tunnel will be realized when it reaches the lode. It was a stupendous undertaking, and has been carried forward energetically, so that the projectors are deserving of the reward they expect.

Utah.

In Utah Territory active mining has not been carried on to any great extent for more than five or six years, and although the bullion production is quite respectable, the Territory has labored under many disadvantages. The people who went there early expected to get rich in a day, and in failing to do so by the mines themselves, in several famous instances tried to get rid of the mines at fabulous prices. Values were inflated and capital invested was not returned in any proportion to its investment. At one time it was thought that the silver-lead mines of Utah would equal if not exceed the silver mines of Nevada and the gold of California. Eastern capital flowed in abundantly for a time, but reverses checked it, and the Territory did not "pan out" as was hoped for. An adventurous class of men seemed to have hold of the mines, and instead of working them legitimately they took advantage of the ignorance or confidence of investors and brought Utah mines into bad repute. The Territory has probably learned by experience the fallacy of this course of treatment and passed through the unhealthy period of its existence. The progress in mineral development for the past year has been encouraging. Quite a number of new mines have been found in the various districts which show rich and apparently permanent leads or deposits. The mines are none of them deep enough, however, to give confidence to investors. Capital is necessary for machinery to test the mines.

But capital, though once abundant, is now scarce. Another difficulty is the lack of available means of transportation for ores to bring them to a market. Coal or charcoal for the smelting furnaces is greatly needed. In 1875 about 1,400 tons of coke were imported from Pennsylvania for the use of the smelting works and about 60,000 tons of coal from the mines along the Union Pacific railroad. It is represented that the San Pete coal fields, about 100 miles southeast of Salt Lake City, would produce all that is required if a railroad were provided to transport the fuel.

As stated previously, most of the mines produce silver-lead ores, and naturally the smelting operations are very important in connection with them. A great many smelters have been started and are in operation, but still many others have failed, showing that either ignorance of the business or poverty of the ores was the cause. The business of smelting, however, is becoming better understood with practice, and low grade ores are reduced to base bullion much more successfully than formerly. Several new smelters were built last year and a number of old ones started up again. The Salt Lake Tribune gives a list of the smelters and says that in Salt Lake county there are eleven smelters, eight of which are in operation, and are turning out on an average about 70 tons of base bullion daily of about \$14,000 value. The bullion shipped from the Territory according to the tonnage report of the Utah Central Railroad for the year 1876 amounts to 20,039 tons, while reports from the smelters show as follows:

Mine.	Tons.	Amount.
Flagstaff.....	2,000 @ \$200	\$400,000
Davenport.....	2,000	400,000
Germania.....	1,700	340,000
Sheridan Hill.....	1,740	348,000
Galena.....	2,330	470,000
Saturn.....	1,660	332,000
Wasatch.....	100	20,000
Morgan.....	350	70,000
Pascoe.....	1,900	380,000
Chicago.....	2,517	503,400
Waterman.....	2,100	420,000
Longmaid.....	1,700	340,000
Total.....	20,047	\$4,009,400

The Tribune says: The product for 1875 was 16,330 tons, estimated at \$250 per ton, of a total value of \$4,082,500. Compared with the product of the past year, it is seen we have produced twenty per cent. more bullion, but lead and silver have depreciated in the market twenty per cent., so that while we have produced more in bulk there has been no increase in value.

Of the bullion produced during the year that from Tooele amounts to 6,327 tons, and that from Salt Lake 13,720 tons.

There are eighty-seven mining districts in Utah; the one attracting the most attention at present is probably Leeds district, in Washington county. Although known for some time, it has only now come to favorable notice. The formation is sandstone, which has had the effect of keeping away capital, as there is little experience with mines in this formation. San Francisco capitalists have gone in, however, and purchased several mines under the name of the Leeds mining company. The town of Silver Reef has been laid out, and has a population of about 1,000. A mill is in course of construction by the above named company; one custom mill is completed and two are promised. The miners are principally from Ely district, Nevada, many of the people of Pioche having gone to Leeds of late. A large influx is expected in the Spring. Up to November 1st there were only 25 men in the district, yet some fourteen or fifteen mines have produced since that date the sum of \$205,190—a good showing for a new district in so short a time.

Montana.

As a gold producing country Montana stands next in order to California, and although the production has fallen off of late years on account of mines being worked out, new discoveries are being made and new ground is opened. Some of its mountainous country is yet imperfectly prospected, such as the southeastern portions on the tributaries of the Big Horn, Powder and Tongue rivers. In all there are said to be about five hundred gold-bearing gulches in Montana, varying from half a mile to twenty miles in length, and in nearly all of them gold mining is carried on during six or seven months in the year. The length of ditches bringing water to the mines will aggregate six hundred miles. There are twenty mills in Lewis and Clark county. At Silver Star, Summit, Meadow Creek and Sterling, in Madison county, Radersburg and Crow Creek, in Jefferson, and several others mills are at work on quartz with variable results. It is only of late that much attention has been turned to silver mining in Montana, but now several mills and furnaces are at work on ore. There is a rich belt of argentiferous lodes in Ten Mile, Prickly Pear and Boulder Creek. This same belt has an outcrop at Butte, Deer Lodge county, and still further at Vipond and Bryant districts, in Beaverhead county. There are several mills at Butte, and the luviation process has also been recently introduced. The Territory is inadequately supplied with reduction works and large quantities of ores are shipped away. A large amount of copper is also mined and the ore shipped to Baltimore. Our correspondent who is now traveling in the Territory, has in late numbers given a series of interesting letters on Montana mining matters which give more details than we are able to refer to here. The great need of the territory is capital, for they have plenty of good mines scattered over a large area. They need men of

means to start them up, however, which cannot be done by mere working miners.

Arizona.

The main industry of Arizona is mining, and she has within her borders fine mines of gold, silver, copper, lead, iron and coal. Her mines have not been developed to any extent, however, for various reasons. Now, however, that the Southern Pacific railroad will soon reach her borders, they all hope and reasonably expect for an awakening of the mining interests. Judging from the quality of the ore shipped from there here occasionally she has the richest ore of any section of the Union. Several new districts have been opened this year, prominent among which is Globe, which we recently described in an extended article. The Territory is in need of reduction works and means of transportation, and our capitalists will find a rich harvest if they turn their attention that way. Arizona will before long be one of the principal if not the principal bullion producing regions of the United States. Only capital is necessary to develop the resources, as the mines are good and ore rich. We look for greatly increased returns from there this year in view of better means of transportation and more facilities for mining. The following figures show the product of some of the principal Arizona mines:

McCracken mine.....	\$ 78,687 21
Hondoo, Globe District.....	50,000 00
Silver King.....	140,000 00
Hackberry, Mineral Park, Mohave County.....	100,000 00
Keystone.....	35,000 00
Lone Star.....	30,000 00
Metallic Accident.....	10,000 00

Idaho.

In Idaho mining operations continue pretty much as usual. The local papers state that the Basin has done better this year than for the past five years, placing the product at \$1,000,000 and estimating the expected product of 1877 at double that amount. The mines of the Territory have been under a cloud here for some time. The quartz mines at Owyhee, which we have listed on our stock board, have been so badly managed for several years that the name of an Idaho mine was always coupled with that disagreeable word "assessment." This was by no means the fault of the mines, but of the managers, and considerable trouble was experienced there last year. The miners were not paid, although assessments were levied, and they had pretty hard times over there. The prospect has partially cleared up, however, and it is to be hoped that this year the miners of Idaho will have a better show. The miners certainly seem energetic and persevering enough, and the mines are good enough, but for the reason stated they are not in good repute here.

Oregon, Washington Territory and Colorado.

We have little new to report from Oregon. Some new ground has been opened and ditches built, but the industry remains about stationary there. Washington Territory, although producing some gold, has its richest mineral product in coal, of which it supplies this coast with large quantities. Colorado holds its own in mining matters, but its mining developments have less of interest for us here than they have for Eastern people. There is little, if any, California capital in Colorado, most of what they have invested coming from the East or Europe. The mining ground seems to cover nearly the whole State, but the gross production is less than one would suppose it to be, considering the number of mines. Many localities there, however, as elsewhere, are suffering for want of the aid of capital.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING JANUARY 20, 1877.

ORE ROASTING FURNACE.—William K. Alderley, Colusa, Cal.

FOR WEEK ENDING JANUARY 20th, 1877.

PUMP VALVES.—Garrett D. Hopper and William H. Laufkotter, Sacramento, Cal.

INCUSATORS.—Walter Masterson, Stockton, Cal.

CANNED AND PRESERVED FRUITS AND VEGETABLES.—Stevens & Groom, San Jose, Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

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Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]

SAN FRANCISCO, Jan. 17, 3 P. M.

LEGAL TENDERS in S. F., 11 A. M., 94@94½. SILVER, 64@67.

GOLD in New York 106½. GOLD BARS, 880@890. SILVER BARS, 7@10 ½ cent. discount.

EXCHANGE on New York 50@55-100 cent. premium for gold; on London bankers, 49½; Commercial, 49½; Paris, five francs @ dollar; Mexican dollars, 98.

LONDON CONSOLS, 96½; Bonds, 102½. QUICKSILVER in S. F., by the flask, 3½ lb. 50c.

METALS.

(WHOLESALE.)

THURSDAY, M., Jan. 18, 1877.

IRON.—		
American Pig, ton.....	30 00	@
Swedish Pig, ton.....	29 00	@30 00
White Pig, ton.....	30 00	@
Oregon Pig, ton.....	4 00	@
Refined Bar.....	4 00	@
Sheet, 10 to 14.....	5 00	@
Sheet, 16 to 20.....	5 00	@
Sheet, 22 to 24.....	5 00	@
Sheet, 26 to 28.....	5 00	@
Horse Shoes, reg.....	6 00	@
Nail Rod.....	9 00	@
Norway.....	7 00	@
COPPER.—		
Copper Tinned.....	37 00	@ 40
Sheeting, lb.....	37 00	@
Sheeting, Yellow.....	42 00	@ 42½
Sheeting, Old Yellow.....	10 00	@ 11
Composition Bolts.....	21 00	@
Composition Nails.....	24 00	@
STEEL.—		
English Cast, lb.....	14 00	@ 25
Anderson & Woods, ordinary sizes.....	16 00	@
Drill.....	16 00	@
Flat Bar.....	15 00	@ 20
Flange Steel.....	8 00	@ 12½
Tie Plates.....		
10x14 C Charcoal.....	10 50	@
Banca Tin.....	24 00	@
Australian.....	18 00	@ 18½
ZINC.—		
By the Cask.....	11 00	@
Zinc Sheet 7x3 ft. 7 to 10, lb.....	11 00	@
7x3 ft. 11 to 14.....	11 00	@
8x4 ft. 3 to 10.....	12 00	@
8x4 ft. 11 to 10.....	12 00	@
NAILS.—		
Assorted sizes.....	3 50	@
QUICKSILVER.—		
By the lb.....	50 00	@

LEATHER.

(WHOLESALE.)

WEDNESDAY, M., Jan. 17, 1877.

Sole Leather, heavy, lb.....	\$ 26 00	@ 29
Light.....	22 00	@ 24
Jodot, 8 Kil. doz.....	48 00	@50 00
11 to 13 Kil.....	48 00	@50 00
14 to 19 Kil.....	52 00	@54 00
Second Choice, 11 to 16 Kil.....	57 00	@74 00
Cornellian, 12 to 18 Kil.....	57 00	@67 00
12 to 15 Kil.....	60 00	@67 00
14 to 16 Kil.....	71 00	@67 00
Simon Ulmo, Females, 12 to 13 Kil.....	58 00	@62 00
14 to 15 Kil.....	66 00	@70 00
16 to 17 Kil.....	72 00	@74 00
Simon 18 Kil.....	61 00	@63 00
20 Kil.....	65 00	@67 00
24 Kil.....	72 00	@74 00
Robert Calf, 7 and 9 Kil.....	35 00	@40 00
Kips, French, lb.....	1 00	@ 1 35
Cal. doz.....	40 00	@50 00
French Sheep, all colors.....	8 00	@15 00
Eastern Calf for Backs, lb.....	1 00	@ 1 25
Sheep Roams for Topping, all colors, doz.....	5 00	@13 00
For Linings.....	5 50	@10 00
Cal. Russet Sheep Linings.....	1 75	@ 4 50
Boot Legs, French Calf, pair.....	4 00	@ 4 75
Good French Calf.....	4 00	@ 4 75
Best Jodot Calf.....	5 00	@ 5 25
Leather, Harness, lb.....	24 00	@ 32
Fair Bridle, doz.....	48 00	@72 00
Skirting, lb.....	33 00	@37½
Wolk, doz.....	30 00	@35 00
Buff, ft.....	18 00	@ 19
Wax Side.....	17 00	@ 18

GENERAL MERCHANDISE.

(WHOLESALE.)

WEDNESDAY, M., Jan. 17, 1877.

BAGS.—		
Eng Standard Wheat, 8½ @ 9.....		
Neville & Co's.....		
24x36.....	8½ @ 9	
24x36.....	9½ @ 10	
Machine Swd, 24x36.....	9 00	@
Flour Sacks, halves.....	6 00	@ 7
Quarters.....	4 00	@ 5
Eighths.....	4 00	@ 5
Hessian, 60 inch.....	11 00	@ 12
45 inch.....	10 00	@ 11
40 inch.....	9 00	@ 10
Wool Sacks, 3½ lb.....	55 00	@
4 lb.....	55 00	@
Standard Gunnies.....	11 00	@ 12
Bean Bags.....	7 00	@ 8
CANDLES.—		
Grant's.....	16 00	@16½
Mitchell's.....	18 00	@20
Assorted Pie Fruits.....		
24 lb cans.....	2 75	@3 00
Table oil.....	3 75	@4 25
Jams and Jellies.....	4 25	@
Pickles, hf gal.....	3 50	@
Sardines, q box.....	1 00	@1 50
Hf Boxes.....	3 00	@
COAL.—		
Australian, ton.....	8 00	@ 8 25
Cool Bay.....	8 00	@ 9 00
Bellingham Bay.....	8 00	@
Seattle.....	9 00	@
Cumberland.....	14 00	@
MS Diablo.....	5 75	@ 7 75
Lehigh.....	22 00	@ 9 00
Liverpool.....	8 50	@ 9 00
West Hartley.....	14 00	@
Scranton.....	8 50	@ 9 00
Vancouver Id.....	10 50	@12 00
Charcoal, sack.....	75 00	@
Coke, bbl.....	50 00	@
COFFEE.—		
Sandwich Id, lb.....	21 00	@
Costa Rica.....	21 00	@
Guatemala.....	20 00	@ 21
Java.....	20 00	@ 21
Mailla.....	20 00	@ 21
Ground, in cs.....	25 00	@
Chicory.....	27 00	@
SAC TO DRY COD.....	5 00	@ 7½
Bonell's.....	8 00	@
Eastern Cod.....	8 00	@ 8½
Salmon, bbl.....	6 50	@ 7 25
Hf bbls.....	3 75	@ 4 00
2 lb cans.....	2 50	@
1 lb cans.....	1 80	@
Cl Rly, hf bbl.....	22 00	@
Ph C, bbl.....	11 00	@
Mackerel, No. 1.....	11 00	@
Hf Bbls.....	12 00	@
Extra.....	12 00	@
In Kits.....	1 25	@ 2 50
Ex Mesa, hf bbl.....	12 00	@
Pkld Herring, kg.....	3 00	@ 3 50
Boston Spink Id.....	40 00	@
LIME, ETC.—		
Lime, Sta Cruz.....	2 00	@ 2 25
Cement, Rosen.....	2 75	@ 3 50
Portland.....	4 75	@ 5 50
Plaster, Golden.....	3 00	@ 3 25
Gate Mills.....	10 00	@ 12 50
Land Plaster Id.....	10 00	@ 12 50
NAILS.—		
Assorted sizes, keg 3 25 @ 24 00.....		

Contents of Pamphlet on Public Lands of California, U. S. Land Laws, Map of California and Nevada, Etc.

Map of California and Nevada; The Public Lands; The Land Districts; Table of Rainfall in California; Counties and Their Products; Statistics of the State at Large.

Instructions of the U. S. Land Commissioners.—Different Classes of Public Lands; How Lands may be Acquired; Fees of Land Office at Location; Agricultural College; Scrip; Pre-emption; Extending the Homestead Privilege; But One Homestead Allowed; Proof of Actual Settlement Necessary; Adjoining Farm Homesteads; Lands for Soldiers and Sailors; Lands for Indians; Fees of Land Office and Commissioners; Laws to Promote Timber Culture; Concerning Appeals; Returns of the Register and Receiver; Concerning Mining Claims; Second Pre-emption Benefit.

Abstract From the U. S. Statutes.—The Law Concerning Pre-emption; Concerning Homesteads; Amendment of Law Concerning Timber; Miscellaneous Provisions; Additional Surveys of Land for Pre-emption; List of California Post Offices.

Published and sold by DEWEY & CO., S. F.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Aetna Tunnel Company.—Location of principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice is hereby given that at a meeting of the Board of Directors, held on the second day of January, A. D., 1877, an assessment (No. 1), of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 420 California Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on Monday, the 26th day of February, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 19th day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.
Office, Room 6, No. 420 California Street, San Francisco, California.

Great Bay Gravel Range Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Placer County, State of California.

Notice is hereby given that at a meeting of the Directors, held on the 22d day of December, 1876, an assessment (No. 7), of Fifty Cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary at the office of the company, Room 33 Merchants' Exchange, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid, on Monday, the 26th day of January, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 14th day of February, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.
San Francisco, Cal.

Howland Tunnel Company.—Location of principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice is hereby given, that at a meeting of the Board of Directors, held on the second day of January, A. D., 1877, an assessment (No. 1), of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 420 California Street, San Francisco, Cal.

Any stock upon which the assessment shall remain unpaid on Monday, the 26th day of February, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 19th day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.
Office, Room 6, No. 420 California Street, San Francisco, California.

Josephine Gravel Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Brushy Canyon, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 2), levied on the 6th day of December, 1876, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. shares.	Amount.
Boyd, Jno F, Trustee.....	10	1500	150 00
Boyd, Jno F, Trustee.....	11	500	50 00
Boyd, Jno F, Trustee.....	13	100	10 00
Duncan, Adam.....	21	200	20 00
Duncan, Adam.....	22	200	20 00
Duncan, Adam.....	23	100	10 00
Duncan, Adam.....	20	200	20 00
Ingersoll, J. E.....	27	400	40 00
Kates, J. F.....	24	200	20 00
Kay, Joel.....	18	50	5 00
Kay, Joel.....	32	1000	100 00
Kay, Joel.....	33	1000	100 00
Kay, Joel.....	35	500	50 00
Small, Wm, Trustee.....	31	500	50 00
Walsh, Wm.....	62	250	25 00
Walsh, Wm.....	63	100	10 00
Walsh, Wm.....	65	25	2 50
Walsh, Wm.....	66	25	2 50

And in accordance with law and an order of the Board of Directors, made on the 6th day of December, 1876, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the company, No. 531 California Street, San Francisco, on the 25th day of January, 1877, at the hour of 2 o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

WM. SMALL, Secretary.
Office, Room 1, No. 531 California Street, San Francisco, California.

Mariposa Land and Mining Company of California.

Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the sixteenth day of January, 1877, an assessment (No. 9), of one dollar per share was levied upon the capital stock of the corporation, payable immediately in United States currency, to the Secretary, at the office of the company, Room 33, Nevada Block, No. 300 Montgomery Street, San Francisco, California, or to the Assistant Secretary, at the office, No. 9 Nassau Street, New York, N. Y.

Any stock upon which this assessment shall remain unpaid on the seventeenth day of February, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before will be sold on Monday, the nineteenth day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

LEANDER LEAVITT, Secretary.
Office, Room 33, Nevada Block, No. 300 Montgomery Street, San Francisco, California.

Annual Meeting of the Sierra Iron Co.

The Annual Meeting of the Stockholders of the Sierra Iron Company will be held on Saturday, the 27th day of January, A. D., 1877, at 2 o'clock P. M., at the office of the company, No. 9, Halleck Block, 318 Sansome Street, San Francisco, to elect Trustees.

CALVIN T. FAY, Secretary.
San Francisco, January 13th, 1877.

Silver Sprout Mining Company.—Principal place of business, San Francisco, State of California.

Location of works, Kearsarge Mining District, Inyo County, State of California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the nineteenth day of December, 1876, an assessment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company in San Francisco.

Any stock upon which this assessment shall remain unpaid on the fifteenth day of February, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the fourteenth day of April, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office, Room 20, No. 328 Montgomery Street, San Francisco, Cal.

Taylor Mill and Mining Company.—Principal place of business, City and County of San Francisco, State of California.

Location of works, Garden Valley Mining District, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 27th day of December, 1876, an assessment of Twenty Cents per share was levied upon the capital stock of the company, payable immediately in United States gold and silver coin, to the Secretary at his office, No. 607 Montgomery Street, in the City and County of San Francisco.

Any stock upon which this assessment shall remain unpaid on the 28th day of January, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the 23d day of February, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.</

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,

SAN FRANCISCO, CAL.

Established for the Manufacture of
RAILROAD AND OTHER IRON

Every Variety of Shafting,

Embracing ALL SIZES of
Steamboat Shafts, Cranks, Piston and Con-
necting Rods, Car and Locomotive
Axles and Frames,

—AND—
HAMMERED IRON
OF EVERY DESCRIPTION AND SIZE.

Orders addressed to PACIFIC ROLLING MILL
COMPANY, P. O. Box 2032, San Francisco, Cal., will re-
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The highest price paid for Scrap Iron.

THE RISDON

Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,

SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour
Mill Machinery, Steam Boilers (Marine, Locomotive and
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All kinds of light and heavy Castings at lowest prices.
Cams and Tappets, with chilled faces, guaranteed 40 per
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Wm. Norris, Wm. H. Taylor, J. B. Haggin,
James D. Walker.

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JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

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MANUFACTURERS OF

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and MACHINERY

OF ALL KINDS.

Fremont Street, bet. Howard and Folsom

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AMERICAN MACHINE

AND

Model  Works

Experimental and fine Special Machinery, Dies, Taps,
Punches, Reamers and other tools made to order. Plan-
ing, Gear Cutting, Machine Repairing, etc. Models and
Patterns for Inventors promptly executed, in wood or
metals.

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CROSS' PATENT BOILER FEEDER AND SED-
IMENT COLLECTOR.

Dunbar's Patent Self-Adjusting Steam Piston
Packing, for new and old cylinders,

ALL KINDS OF MINING MACHINERY.

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Sacramento City.

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STEIGER & KERR,

IRON FOUNDERS,

Quicksilver Condensers and Furnace Castings.

Sole manufacturers of the Hepburn Roller Pan
and Callahan Grate Bars, suitable for Burning
Screenings.

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Shoes and Dies.

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All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
Sheathing Nails, Rudder Braces, Hinges, Ship and Steam-
boat Bells and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-
plings and Connections of all sizes and patterns, furnished
with dispatch. PRICES MODERATE.
J. H. WEED. V. KINGWELL.

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For Steam Boilers, Pipes, etc. Best non-conductor of heat
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LONG AS THE IRON to which it is applied, and is reason-
able in cost.

REFERENCES: United States Government Buildings and
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on the Pacific Coast; the principal mines and mills in Nevada,
etc., etc.

United States and Foreign

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(Patents issued September 4, 1869; October 5, 1869; October 4,
1870; May 9, 1871.)

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Factory: Berry Street, bet. 4th and 5th, S. F.
Nevada Agency: 38 North C Street, Virginia.

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ASBESTOS STEAM PACKING, made from pure long fiber Asbestos. Indestructible and Self-Lubricating.
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IMPROVED PORTABLE

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For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

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Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle
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Bolts, Set Screws and Tap Bolts,
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ALL STYLES OF FANCY HEAD BOLTS.

HOT AND COLD PRESSED HEXAGONAL AND
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TURNBUCKLES, ETC., ETC.

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Manufacturers of

STEAM ENGINES,

Quartz, Flour and Saw Mills,

Hayes' Improved Steam Pump, Brodie's Im-
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Amalgamators, and all
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Are prepared to make SHEET IRON AND ASPHALTUM
PIPE, of any size and for any pressure, and contract to
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ing pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special pat-
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fitted up with the improved axle and box—introduced by
this company, and guaranteed to outlast any other wheels
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All kinds of Machinery made and repaired.

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Builders of QUARTZ, SAW AND FLOUR MILLS,

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And General Machinists.

Winers' Foundry and Machine Works,

CO-OPERATIVE,

First Street, bet. Howard and Folsom, San Francisco

Machinery and Castings of all kinds.

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BOILER MAKERS AND

GENERAL MACHINISTS,

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Light and Heavy Castings of Every De-
scription Manufactured.

[Sole Proprietors and Manufacturers of

Lynch's Ventilating and Illuminating Tile,

The Only Illuminating Tile Manufactured for Light-
ing Cellars, Basements and Dark Rooms which pro-
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PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks,
Hydraulic Pipe, Oil or Water Tanks, Ore and
Water Buckets, Gasometers, Girders, Bridges
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ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the
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STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz
Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron
Tanks, etc. For sale at the lowest prices by

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Patent Riveted

Clothing,

14 & 16 Battery St.,

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These goods are specially
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FARMERS, MECHANICS,
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MEN in general. They
are manufactured of the
Best Material, and in a
Superior Manner. A trial
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San Francisco Pioneer Screen Works,

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Several first premiums received for
Quartz Mill Screens, and Per-
forated Sheet Metals of every
description. I would call special
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SLOT PUNCHED SCREENS,
which are attracting much at-
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establishment on the coast de-
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Orders solicited and promptly attended to.

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Importers of and Dealers in

ASSAYERS' MATERIALS,

Chemical Apparatus and Chemicals, Drug-
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We would call the special attention of Assayers, Chem-
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Having been engaged in furnishing these supplies since
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Our Gold and Silver Tables, showing the value per
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Deposits of bullion received, melted into bars, and re-
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Bullion can be forwarded to this Office from any part of
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Careful Analysis made of Ores, Metals, Soils, Waters,
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Ores worked by any process.

Ores sampled.

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Special attention paid to Examinations of
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INSTRUCTIONS IN ASSAYING,

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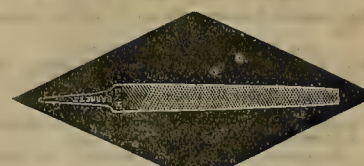
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The undersigned, owners of LESCHOT'S PATENT
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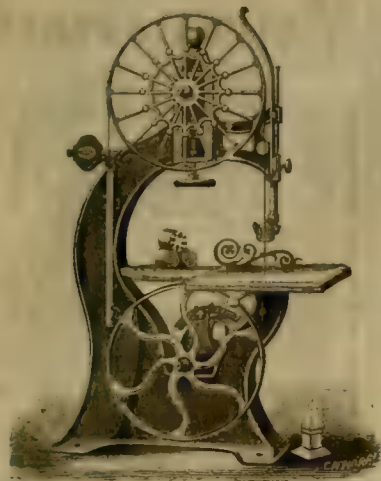
Office, No. 426 California street, Room 1.

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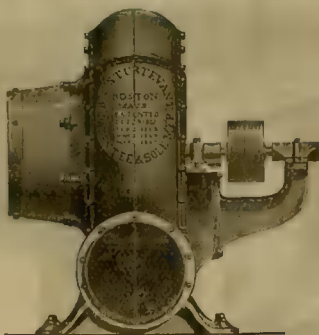
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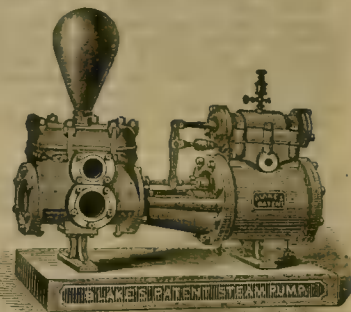
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Over 8,500 in Successful Use in the United States.

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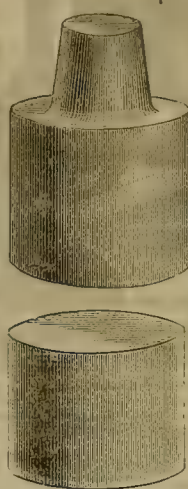
ASBESTOS ROOFING AND ASBESTOS PAINTS,
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CAST STEEL SHOES AND DIES.

Guaranteed Cheaper than the Best Iron.

IMPORTANT NOTICE.
Reduction in Price from 16 Cents to 12 Cents Per Pound.

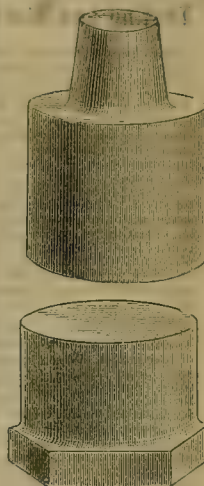
Owing to our largely increased business, the present low price of iron from which our Steel is manufactured, and the improved facilities for casting and forging, we take great pleasure in announcing that from and after this date we will supply our IMPROVED CAST AND FORGED STEEL SHOES AND DIES FOR QUARTZ MILLS at twelve cents per pound, delivered at San Francisco or Sacramento, instead of sixteen cents, as heretofore.

We also furnish Steel Plates for Blake and other Ore Crushers, Steel Cut Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

Address all orders, with dimensions or drawings, to

CAST STEEL SHOE & DIE CO.,

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THE ASBESTOS PATENT FIBER COMPANY,



TWO MEDALS OF HONOR.

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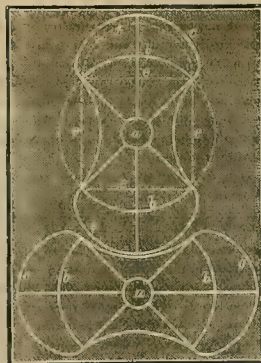
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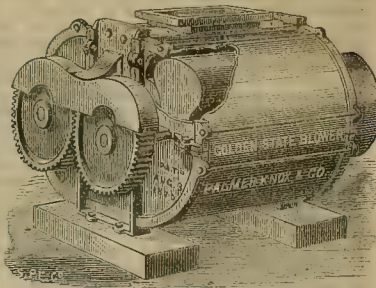
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The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Futch's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Krochne's process, etc. Under "Pulverizing Machines" are described the astrata and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc. He describes an improved retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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UNITED STATES Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

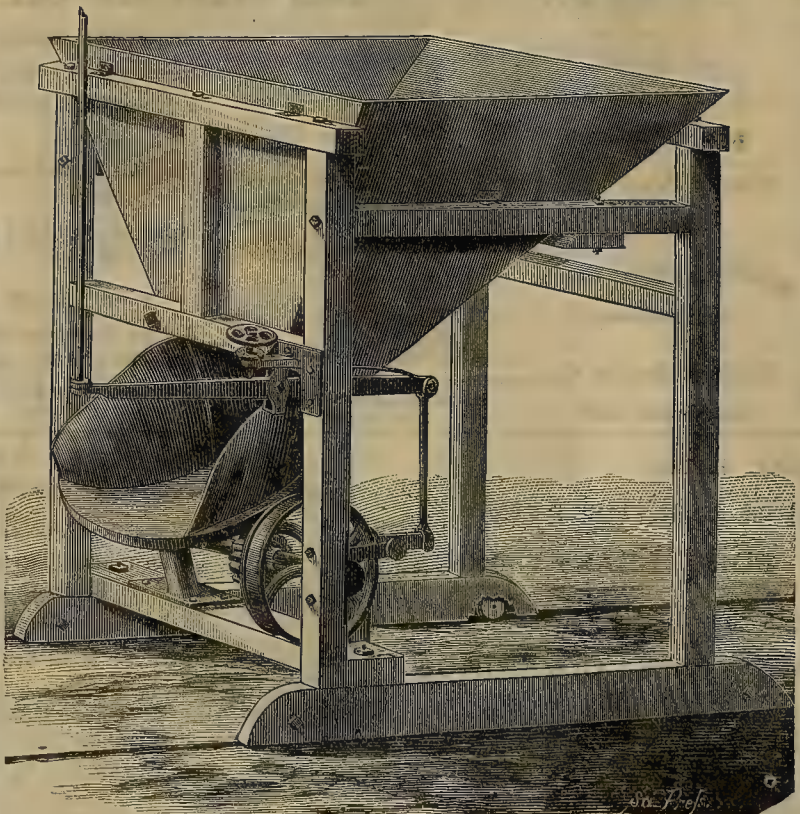
We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Register's Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Abandonment of Claim; Mineral Affidavit; Proof that No Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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REFERENCES.

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Much Obligated, Etc.

PORTLAND, OREGON, June 26th, 1876.
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BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, JANUARY 27, 1877.

VOLUME XXXIV.
Number 4.

Compound Steam Pump.

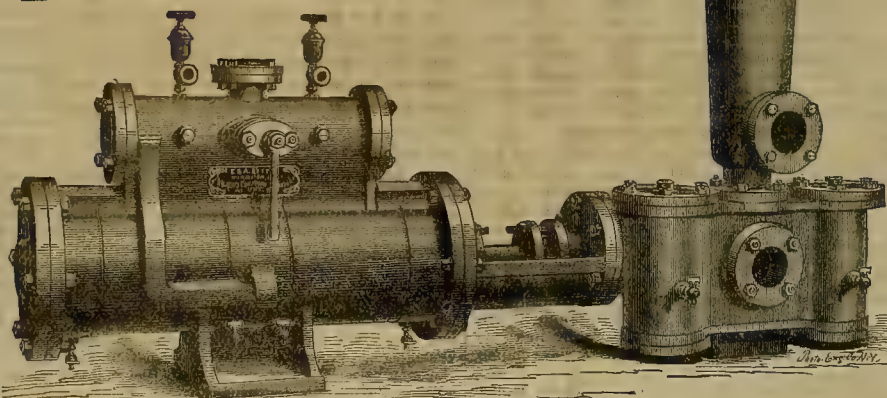
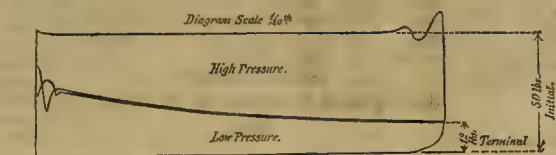
The great saving of steam, and consequently of fuel, by the expansion of steam as developed in "cut-off" and "compound" engines, is a well established fact in engineering, and one very generally known by those interested in the economical consumption of fuel. The inventor of the compound pump described here has applied the principle on which compound steam engines are constructed to steam pumps, and has done so in a highly successful manner. The mechanism, *modus operandi* and exterior appearance of this pump will be understood on reference to the perspective view, longitudinal and transverse sectional drawings on this page.

The elongated piston has two ends provided with packing, and has a cylindrical portion of a lesser diameter extending between the said ends, the said portion being fitted to work steam-tight in a central partition in the cylinder; two annular chambers are thus formed, into which steam is admitted to act upon the smaller areas of the piston ends, and it is afterward expanded into the spaces between the piston ends and the cylinder covers, to act upon the larger areas of the said piston; a double cylindrical valve regulates the movements of the steam, each half of it being formed with a passage to connect two ports through which steam passes from the annular space to the space between the piston and the cylinder head, and also with a passage which connects the larger steam space with the exhaust passage. Steam is admitted into a space between the two parts of this valve, and finds its way by suitable openings into the end spaces between the said valve ends and valve box covers; said end spaces are connected by passages with ports formed in the aforementioned partition, and as the piston moves to and fro, passages formed in the said piston establish a communication between the said ports and a port leading into the exhaust passage, thus relieving the valve from pressure on one end and causing it to be quickly pushed in that direction by the steam at the opposite end; the parts are all so arranged as to provide effectually for sufficient steam to cushion both the piston and valve so as to prevent striking under any ordinary circumstances.

The pump delivers a constant stream, will force to any height, and can be worked either with steam or compressed air. The indicator diagram given here is a fac simile of one taken from one of these compound cylinders, and a study of it will demonstrate the great economy of such a pumping engine in comparison with the direct-acting steam pumps that must use a cylinder full of steam at each stroke. Attention is called to the very short passage ways for live steam between the valve and the high pressure piston, thus insuring less waste of steam from steam passages than is ordinarily the case. The special advantages claimed for this description of pump are that it has only two moving parts, except the pump valves, thereby reducing friction to a minimum; that the steam having performed its work in the high pressure space, is afterward expanded, thereby extracting all the power possible from it, and effecting an enormous saving in fuel as compared with ordinary high pressure direct-acting steam pumps; that the high pressure and expansion are both carried on simultaneously throughout the entire stroke, thereby maintaining a more uniform aggregate piston pressure to the end of the stroke than would be possible with high pressure and expansion in one chamber, and that it is simple, compact, durable and portable, and can be used without expensive foundations.

In order to arrive at a correct estimate of the economy effected by this pump, the *Technologist*

says that Mr. J. Haug, a mechanical engineer, has made a comparison between a 12-inch compound pump with a single cylinder of the same power, and the result of a careful investigation shows that with the single cylinder pump there is an increase of consumption of 60.75% over the compound. The inventor, Mr. William Walker, an engineer of Manchester, England, has avoided the fault of complication in this



WALKER'S COMPOUND STEAM PUMP.

pump, it being as simple as any single cylinder pump, and much simpler than some of that description.

These compound steam pumps are being made

five years, but more especially the past fifteen, has made a large body of Americans good miners, and good experts as well; and it can be said, further, that the first-class American

Americans as Miners.

[Written for the Press by ALMARIN B. PAUL.]

Mining by Americans, as yet, can hardly be accepted as a business for a life-time pursuit, but more one to turn their hands to for the time being, and for trying their "luck."

This "trial of luck" during the past twenty-

never so substantial; it does not "hold forever," and he never worries if it does not. He does not work for his grandchildren, but for the present, calculating his children will have the same privileges. Two men pounding at one drill does not suit his notions of economy, therefore the idea is suggested of doing the work single-handed, and, with his giant explosive, doubles the execution at half the expense.

The American miner, in fact, is getting tired of even single-handed drilling, and is about concluding, for the future, to stand by, "boss" the machine, and save his muscle. He is an average mechanic, studies mechanism, and wonders how to get rid of hard work; and by his genius, in the coming future, close by, we are going to mine wholly by machinery. In fact, we can do it now, both on a large and small scale, by the universal adoption of the Burleigh, Ingersoll and Slater drills.

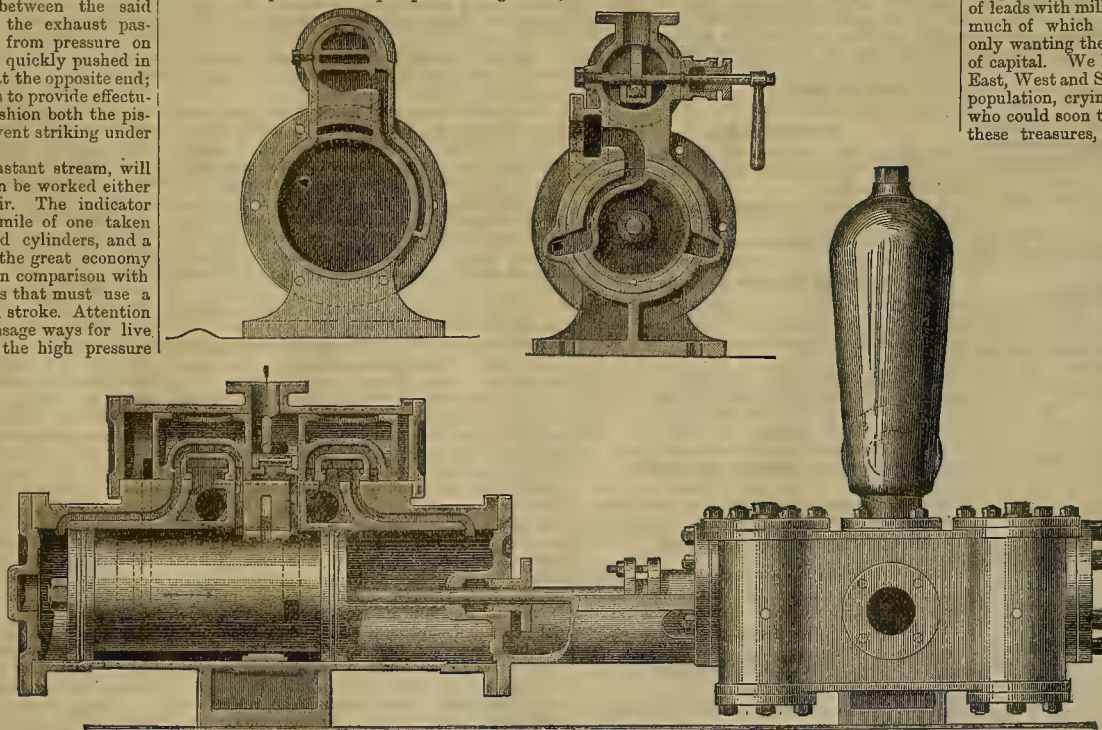
The same spirit which seeks expedition and cheapness in mining applies equally as strongly in milling the ore. When it is upon the surface, he wants the bullion from it in his safe before night, and to that end has it dumped into the mill, at will unlocks his safe, and "presto, change," there is the metal. This life and expedition of our mining operations has not been equaled on the face of the globe. It is purely American, and a condition of mining activity which every country is readily falling into, and which every foreigner of snap loves. There is no pursuit Americans are so well adapted to as mining, and why not more turn their attention to it? What will make greater prosperity for the whole Union is for the American people to accept mining as a vastly important and legitimate business, as having as much reward for labor, caution and capital as trade, agriculture, commerce or manufacture.

We have in California, Nevada, Arizona, Oregon, Colorado, Montana and Idaho, millions of leads with millions piled on millions of wealth, much of which can be had simply by locating, only wanting the hand of labor, and the favor of capital. We have also in the United States, East, West and South, a large idle yet industrious population, crying for work and prosperity, and who could soon turn a ready hand to gathering these treasures, relieving their wants and enriching all.

Mining in the past, and also in the present, has its parasites, which destroy its vigor, and this is stock gambling. A distinction must be better drawn between mining as a business and "mining" as a paper gamble. Let operations be conducted with the business vigor of manufacturing, and success will be even more certain. Let capital be more trusty to the deserving, and seek to build up legitimate mining operations, which may be accepted as the precious blood of business life.

COPPER.—By James Lewis & Sons' report on ores and metals we see that quotations for copper in Liverpool on the 1st inst. were as follows: Bars £76@76 10s, for good ordinary brands; £76 10s@77 10s for picked brands; ore, 14s 9d@15s, and regulus, 15s 3d per unit. The business transacted in Chile bars in December was on a very limited scale, the purchases being chiefly from second hands, and the fluctuations in

value have been covered by a range of £2 per ton—from £77 to £75—the closing value of good ordinary brands being £76 10s. Chile exports to December 16th are 53,462 tons fine, against 50,107 tons in 1875. Stocks of West Coast produce are 14,560 tons fine against 14,170 tons on the 1st ult.



SECTIONAL VIEW OF WALKER'S COMPOUND STEAM PUMP.

with all the ordinary sizes of steam cylinders, to meet the duty required for different altitudes and pressures. They are furnished at or about the regular prices of ordinary steam pumps. The sole agents for these pumps in this city are Messrs. Parke & Lacy, mining machinery depot, 417 Market street.

miner is more complete in his money-making operations than the average foreigner who has been reared from childhood in the work. While the latter mines by old rules, the American miner makes a rule suited to surrounding circumstances. He can turn more short corners, and do more with less money. His work is

CORRESPONDENCE.

Mining in Deer Lodge County, Montana.

(From our own Correspondent.)

Here, as in other counties of the Territory, the attention of miners is fast turning from placer and gravel mining as they grow less profitable to quartz. Near Blackfoot a fine copper lead has been opened and worked for nearly a year. From a cut along the lode it had been found to have a width of from eight to ten feet, the whole containing copper ore, with from six inches to four feet of carbonate ore, running 44% in copper. Upwards of 100 tons shipped to Baltimore brought \$4 per unit, or \$17-600 per 100 tons. The whole of the ore at the depth of 50 feet was thought to run fully 20%. Two other lodes were said to run parallel with this, all of which are owned by Messrs. Dorr & Arnold.

Some Good Placer Mines

Have been found on my way around the county, which seem worthy of notice.

The claim of Moore & Quigley, on Carpenter's bar, paid last season from \$9 to \$10 per day, or from \$2 to \$3 to the man after paying for water.

The Bedrock Fluming Co.,

Green, Pounds & Strickland, get a gross yield of about \$13,000, and made it pay well, as the principal part of the water used belonged to the company. No claim in the vicinity of Blackfoot turned out so well, perhaps, as that of Mr. Collins, which was reported as yielding \$100 to the man, and netting him about \$10,000 for the season.

The claims in California gulch, five miles from Washington, and owned principally by Messrs. Jackson, Keyes and Lusk, are well supplied with water and paid from \$12 to \$14 per day to the man. In Jefferson gulch, two miles east, the claim of Rule Bros. paid from \$9 to \$10. With a greater amount of pressure could be made to yield double the amount.

The Pioneer Co.,

At Pioneer, which have been [at work for the past ten years, have usually received for one season from \$2,000 to \$12,000 per share, the last year's return being about \$8,000. Other claims have not done so well.

At Emmetsburg,

Healy Bros. have a drift claim of 1,300 feet in length and 60 feet in width, of pay gravel, that yielded for drifting and washing, from \$9 to \$10 to the man. Messrs. Ferguson, Hennesy, and others, have one mile of bar and gulch considered good for \$5 or \$6 per day, that will last for 10 or 12 years.

Butler, Smith & Co. have a mile and a half that paid during water season at the rate of \$20 to the man. The instances given are sufficient to show that the placer mines are not yet "played out" in Montana.

Quartz in Elk Creek District.

The Radical and Lady Nixon has been opened to the depth of 80 feet, showing a two-foot vein of gold bearing quartz, lying between the limestone and the granite. The whole of the ore is worked and averages \$40 per ton. Owned by Messrs. Jones, Nixon & French.

There are four other lodes here developed about to the same extent and exhibiting rock of a similar character.

Several Promising Quartz Claims

Were heard of on Boulder Creek, 12 miles in a northerly direction from Philipsburg. The Sandy Brown, 23 feet in width, gives average assays of \$45 per ton. The Princeton, 20 feet, with eight feet of very fine ore, assaying from \$100 to \$500, according to report. The Emerson, owned by Mr. D. Emerson and others, situated on very high ground, 500 feet above the creek, is eight feet in width, giving assays as high as \$200, the ore containing some galena and said to be easily worked.

The Raritan, Saranac, Mediterranean, Crown Prince and Tigress were spoken of as good locations. The greatest depth reached in this district is probably not more than 30 feet in any case, but high hopes for its future are entertained.

Philipsburg as a Mining Camp

Stands very high in the county, and may, in fact, be deservedly ranked among the very best in the Territory. Most of the mines now worked lie in the limestone, in a belt of lodes not far from the granite. Some locations are in the granite, and sufficient developments have been made in the district to lead to the conclusion that there is a good contact vein between the two principal formations. So that if any one has a fancy for segregated deposits, pipe veins, true fissure or contact, he can be gratified, and is likely to find good ore for some time to come, in any of them.

The principal characteristic of the base milling ores is that they are enclosed in manganese, while much of the vein matter is of iron. They

are accompanied with arsenic, antimony, zinc, lead and sulphur; usually in sufficient quantity to require roasting. The black sulphurets are everywhere found and may be said to predominate as silver ores, and usually very rich. Owing to the shortness of my stay at Philipsburg, as well as to the state of the weather, only a few mines were visited, which will account for any meagerness of detail that may be apparent in reference to one or more of the most prominent of the district.

The Northwestern Company,

Mr. R. H. Lee, superintendent; incorporated stock held mostly in Philadelphia. They were at work on the Speckled Trout, sinking a shaft of three compartments (one to be used as a ladder way), with the view of facilitating their operations and making further explorations, the shaft having already reached the depth of about 200 feet. In the meantime, ore was being extracted through the incline on the vein, which kept their large 10-stamp mill busily pounding away. It is one of the best equipped in the Territory, being provided with a Blake rock breaker, four Bruckner cylinders for roasting and chloridizing, amalgamating pans, settlers and all the usual appliances for the successful working of silver ore. The Purvine pan (of which more hereafter) was first introduced here. No figures were obtained as to the present value of ores coming from the mine. Its past prosperous career is too well known to need repetition. Of its products, a beautiful specimen of wire silver was received, as a Christmas gift, from Mrs. Pardee, of Philipsburg.

The Freeman Lode,

Near the Northwestern company's mill, shaft 105 feet, and following the quartz the whole distance down. The full width of ore not yet ascertained, but thought to be fully 20 feet. Assays were reported from \$25 as high as \$250. Property of Mr. C. N. Freeman.

The Algonquin,

Lying in the same limestone belt, is opened by a tunnel of 265 feet and a shaft of 50 feet below the level of the same, and also a drift of 100 feet along the lead, showing a very large body of high grade ore, from four to nine feet in width. The walls are solid magnesian limestone, and about 175 feet apart. The outlook for the company is exceedingly flattering.

The Hope Mining Company,

Col. L. W. O'Bannon, superintendent, has two shafts—the deepest 100 feet and another of 80 feet—an incline also of 125 feet, disclosing segregated deposits of rich sulphurets ores incased in the limestone. They are free milling, and give an average of \$60 or a little upward to the ton, some rich pockets yielding from \$6,000 to \$12,000 per ton. The mine has paid well for the past year, besides leaving a large supply of all necessities on hand for future running. The affairs of the company seem to be in a very prosperous condition. They own several claims, such as the Cliff, the Comanche, Lady Bryan, Wabash and others, some of which are looked upon as very promising. Their mill is of the most substantial character, and the 80-horse engine, said to be one of the best to be found of the same capacity, having been designed and built by Mr. J. S. Collins, the present engineer at the mill. Although forgotten in its proper order, it is not too late to say that the timbering of this mine is so admirable as to deserve special mention, being seldom equaled here or elsewhere, and the entire credit being given by the superintendent to Mr. Wm. Lowry, his present efficient foreman.

The second claim on the

Comanche Lode,

Is owned by Dr. J. M. Merrell, et al.; shaft 115 feet, vein of free milling ore 5 feet, running about \$60 in silver.

The Silver Bend, the property of Messrs. Merrell & Ulrey, 1,500 feet in length, shaft 40 feet, with other developments, has 7 feet of free milling ore, also said to average \$80.

The Murray & Durfee S. M. Co.,

Have a claim one and a half miles east of Philipsburg, and above the mill of the North Western company, that has been opened by a shaft 60 feet, disclosing a body of base milling ore of rather high grade, which is, at least, five feet in width. A tunnel has also been run 250 feet in length to tap the vein when reached at about the same number of feet from the surface. The lode, from examinations made in the shaft, has every appearance of a true contact vein, lying between the granite and limestone, the former being found as a well-defined hanging wall. As no drifting had been done the distance to foot-wall could not be determined.

From 60 to 70 tons on the dump was estimated by Mr. Pardee, an experienced miner of the district, to cost \$150 per ton.

The Salmon,

Situated near the Speckled Trout and the property of Messrs. Holland & Estell, has two shafts of 30 feet and another of 46 feet, showing four feet of good milling ore, that has worked \$98 per ton.

They had about 50 tons on the dump, 1,200 patented and said to lie between the limestone and the granite, although no opportunity was had for settling the question by a personal inspection. The same gentleman also owns the Little Emma, near the Hope, that shows a vein of from eight to nine feet at the foot of shaft that has worked upward of \$70 per ton.

The Forest and Granite Mountain,

From what could be learned of it, is situated in

the granite, and looked upon as a true fissure vein of about nine feet in width.

It is represented as averaging \$150 in silver and about \$15 in gold. It is situated about one and a half miles further east than the limestone belt, and is owned by Messrs. Merrell, Holland & Estell. The Bonanza, owned by Ulrey & Co., together with many others in the district, were spoken of favorably.

Before closing my account of the mines at this prosperous camp, thanks are due to the different superintendents, and others, for needed information and frequent courtesies, and particularly to "Mein Freund Kaiser," whose delight is to make a stranger feel happy and at home. May he live long to run the Kaiser hotel.

A few condensed notes from the neighborhood of Georgetown must be given at this time, as the mines of Butte coming next in order will require a full letter.

The Pyrenees,

Kelly & Cameron owners. Tunnel 275 feet, 135 feet of which follows lode; from three to five feet of solid and continuous gold quartz, that works \$25 on average. Walls granite. Direction southwest, dip northwest, angle slight.

A dividend paying mine, the Eureka (Kidder & Merrell) eight feet—gangue, baryta. Ore carries \$100 silver and \$10 per ton gold. North Atlantic, four feet of gold quartz; runs \$30.

It is a matter of great regret that the Cable, one of the most remarkable of the Territory, is still idle from litigation, but strong hopes are entertained that a compromise will soon be effected. Splendid gold specimens are taken out near the surface, and placer mines are opened just below the mine, which have paid as high as \$600 to the box, or as much as \$39,000 a season, in a string of sluices. A. C. K.

Underground Condition of the California Mine.

In our last issue we gave briefly the annual reports of the officers of the California mine, one of the famous bonanzas. For want of space, however, we omitted that part of the superintendent's report referring to the workings of the mine, and now give them. Mr. Fair's report was as follows:

On the 1300-foot level no work has been done during the past year in the way of developing this portion of the mine, but all the drifts and winzes have been kept in repair. The northern 500 feet of this level, as well as the ground between this level and the 500-foot station, remain undeveloped.

On the 1400-foot level the drift running lengthwise in the vein has been run north, and has connected with the Ophir mine, securing ventilation. No ore of value has been found in the northern 250 feet of this drift, yet it may exist to the right or left of this drift. The proposed cross-cuts, Nos. 4, 5 and 6, have not yet been run on this level. In cross-cut No. 3 a winze has been sunk, connecting with the ore-breasts which are now being worked on the level below. This winze passed into good ore 17 feet below this level. Between cross-cuts Nos. 1 and 2 we are now breasting out high-grade ore above this level. How far it will extend upward is not known, as the level above is yet undeveloped. From the work already done it is evident that this ore body is extensive and of great value.

On the 1500-foot level much work has been done during the past year, and much ore has been extracted. Cross-cuts Nos. 4, 5 and 6 have not yet been extended to the east wall, and the full extent of the ore is so far unknown. The northern 200 feet (excepting a few feet on the north end) and the southern 250 feet of this level show bodies of ore of large extent and of great value. All the winzes above the level, also all the drifts and cross-cuts on this level are in good repair.

On the 1550-foot level, the drift running lengthwise in the middle of the vein has been extended from the south line to within a few feet of the northern boundary of the mine, passing all the way through excellent ore. The various cross-cuts run on this level at intervals of 100 feet, and the various winzes connecting with the level above, together with the northern 200 feet of the level below, show the ore to be of much greater width and of a far better quality than on any of the levels above. As the three cross-cuts in the center of the mine have not been extended entirely across the ore body on this level, the whole width of it has not been ascertained. Between cross-cuts Nos. 2 and 3 a double winze has been sunk to a depth of 128 feet, through ore of excellent quality. Owing to the flow of water a cross-cut could not be made from this winze. Within the past 10 days, however, this winze has been freed from water to the depth of 100 feet, and a drift from it started south, which is intended to connect with the drift that is now being run on the 1650-foot level of the joint shaft of the California and Con. Virginia mines. This drift from the winze has now advanced 16 feet, and continues to pass through ore of the same good quality as was found in the winze. Another winze was sunk from this level in the Con. Virginia mine to the depth of 127 feet, passing all the way down in ore of great richness. No cross-cut was made from this winze on account of the heavy flow of water. The developments made by these winzes prove that the same ore body, which exists on the levels above, continues to

these lower depths, with an increased value to the ore, and I have no doubt that it is of great width.

On the 1600-foot level the ore breast is now opened in a square of 80 by 80 feet. This breast has not yet been extended to either the east or the west wall of the ledge. Considerable ore has been taken from this locality, having been transported from the Ophir mine to the Ophir shaft. This mode of raising the ore was necessarily adopted because our own shaft (the Con. Virginia shaft) does not extend below the 1550-foot level. This ore breast is directly under cross-cut No. 6, on the level above. The north face is 30 feet from our northern boundary line, and it is now being worked northward and upward. The ore is of a very fine quality, and of a much higher grade than that above on the 1500 and 1550-foot levels. On this level we have a drift which runs south in the ore body, connecting with winze No. 5, sunk from the level above. It then continues south and connects with the deep winze which was sunk 128 feet below the 1500-ft level. This drift passes all the way through rich ore, except for a few feet, where the ore is of low grade.

The time for the convenient and advantageous working of these lower levels will come when the drift, which is now being run from the California and Consolidated shaft, on the 1650-ft level, has reached the ore body. This drift is now 610 feet from that shaft, and will reach the vein some time during the present month. Connection will then be made from this drift with the deep winzes spoken of above, which will give new facilities for extracting ore from these lower levels, and at the same time will create additional ventilation for the mine. I may here remark that this drift would have been in the ledge five months ago, had it not been for the great influx of water in the Consolidated and California shaft, which has prolonged the sinking of the shaft, and consequently delayed the running of this drift and the opening and working of the lower levels.

The Consolidated and California shaft (the joint shaft of the California and Consolidated Virginia mines) is now down 22 feet below the 1650-foot level, and the work of sinking is still going on. The progress in sinking this shaft has been slow on account of the water we have had to contend with from 200 feet from the surface down; the flow of water amounting to from 43 to 47 inches, miners' measure.

All the appurtenances to this shaft, such as the main building, an extensive machine shop, the ore house, the hoisting and pumping machinery, the pumps, pump bobs, water tanks, etc., are complete in every respect. Everything has been constructed on a scale and in a manner commensurate with the large future requirements of the two mines. The surface station of this shaft and the stations in the shaft have been made double, one immediately above another, and two cages, called a double-decker, are employed for hoisting ore, so attached one above the other as to exactly meet these divisions of the stations; both cages being loaded in the mine and unloaded at the surface at the same time. By this method time is economized in raising ore. From the surface station, two substantial railways, one directly over the other, are laid to the California mill, near by, over which the ore as it comes to the surface can be taken to the mill. This mill is capable of reducing 300 tons per day. An ore house of 3,000 tons capacity has recently been erected, from which ore can be shipped by railroad to other mills.

The facilities for landing wood, timber, and other mining supplies, and for shipping to mills the ore raised through this shaft, have been much improved by the construction of a branch track from the Virginia & Truckee railroad, which passes on both the upper and lower sides, in close proximity to the works.

The cost of this shaft and all its appurtenances, together with all the real estate acquired for the purposes of the shaft, amounts, up to January 1st, 1877, to \$820,000. Protection of these works against fire has been secured by a complete system of water pipes, hydrants and hose, with a plentiful supply of water under heavy pressure.

A portion of the ore extracted from the mine during the past year, has been raised through this shaft, having been transported from the mine through a drift which connects directly with this shaft on the 1500-foot level. This is a large drift, well timbered, and laid with a T-rail track, the same as is used in all the drifts and cross-cuts on the 1500-foot level. In addition to being a convenient thoroughfare for the transportation of ore, this drift aids materially in the ventilation of the mine.

Our supply of wood and timber is ample for present requirements, and without any addition to it is sufficient to meet our wants in the event of a storm of a month's duration.

We have facilities for the melting and assaying of all the bullion produced from the mine in the department which has been constructed for that purpose, in the immediate vicinity of the mining works, and which has been furnished with all the requisite apparatus and materials for doing that work, both for this and the Consolidated Virginia mines.

With the expectation of soon overcoming all the impediments which have been hinted at above, as having stood in the way of our operations in the mine, and that the necessary connections will soon be made for working the lower levels to advantage, I anticipate, from the indications which are before us, that the work of the present year will be crowned with unparalleled success.

SCIENTIFIC PROGRESS.

Light and the Eyes.

Prof. J. Dewar lectured on the 16th inst., at the London Institution, on "Light and the Eye." The drift of the lecture, says *Iron*, was to show that the action of light on the eye can be estimated by its electrical effects. The chemist knows that in chemical changes heat changes are manifested, but as electrical tests are now so much more delicately constructed, these can show changes which our present heat measures cannot. For the purpose of the lecture a Thompson reflecting galvanometer was used. The first experiment shown was the effect of light on two plates of metal coated with chloride of silver, and arranged to show the electric effect by the action of the galvanometer. The experiment proved that the electric effect of light was great, the reflection of the galvanometer indicating that beyond the usually recognized photographic effect there was a decided electrical effect. The question what kind of light produced this effect was then considered, and colored lights were used on the plates. Red, which has a small photographic effect, was shown to have a small electric effect, while violet and ultra-violet, which have a large photographic effect, had a great electric effect. The next point referred to was the electrical effects produced by muscular action. This was shown by having two troughs of gutta-percha filled with a saline solution. A skein of cotton-wool, soaked with the solution, connected the two. By the means of clayey electrodes, a circuit was completed with a battery; and when it was shown the connection was complete, every "putting-on" of the battery produced a movement of the connected galvanometer. Then the professor used his own body in place of the skein to complete the circuit, and in place of battery action used the muscular contraction of his hand. The muscular contraction had the same effect on the galvanometer as had a battery action. The electric effect of muscular action being shown in this and other ways, the passage of electricity through the eye was illustrated, the eye of a recently-killed frog being used to show the effect of light on it in producing electrical effects. The eye was placed in contact between two electrodes, such as were used with the skein of cotton. When light was thrown on it from a lime-light, the electric effect, as told by the galvanometer, was unmistakably seen. Prof. Dewar said that a lobster's eye was very favorable for such an experiment. He had also had it tried on himself. He lay on his back, and a "pudding" was made round his eye, in which a saline solution was poured. One electrode was put in this, and his hand made the other. An observer let in varying amounts of light on his eye, and noticed the effect on the galvanometer with which he was connected. The results quite accord with those of an eye from a recently-killed cold-blooded animal. Such work as this, with carefully-recorded tabulated results, must increase our knowledge of what the action of the eye really is.

Chemistry in America.

During the last year there was formed in New York City a society of chemists, under the title of "The American Chemical Society." Dr. John W. Draper delivered the inaugural address before the society, on November 16th, which is given in full in the *Popular Science Monthly* for January. The address was not only an able one, but, in some of its parts, most beautiful. No synopsis would do it justice, but we give a paragraph, which speaks more particularly of what has been done in chemistry. "Of our own special science, chemistry, it may truly be affirmed that nowhere are its most advanced ideas, its new conceptions, better understood or more eagerly received. But how useless would it be for me to attempt a description in these few moments of what Prof. Silliman found that he could not include on more than 100 closely-printed pages, though he proposed merely to give the names of American chemists and the titles of their works! It would be equally useless and, indeed, an invidious task to offer a selection; but this may be said, that among the more prominent memoirs there are many not inferior to the foremost that the chemical literature of Europe can present. How unsatisfactory, then, is this brief statement I have made of what might be justly claimed for American science! Had it been ten times as long, and far more forcibly offered, it would still have fallen short of completeness. I still should have been open to the accusation of not having done justice to the subject."

MAKING FABRICS UNFURNISHABLE.—The credit belongs to Mr. Dion Boucicault, in Wall-lack's theater, for practically demonstrating to deputies of the Fire Department, fire insurance companies and others that canvas scenery prepared with tungstate of soda and silicate of soda was totally unfurnishable, that a gas flame made scarcely any impression when it came in contact with it, and when submitted for a long time to a very large gas jet, all that happened was disintegration of the parts subjected to the gas flame, they falling in the form of ashes on the ground; but in no case was any flame communicated, nor could the fire possibly spread, from want of any inflammable material, canvas, ropes and wood-work being all made absolutely unfurnishable.

The Diamond Drill in English Geology.

The museum of the Yorkshire Philosophical Society, says the *Colliery Guardian*, has just received an interesting addition to its geological department by the gift of some specimens of rock, four inches in diameter, and varying from a yard to a few inches in length, showing the various strata which lie below Masham to a depth of more than 400 feet. They are the "cores" from an artesian well, which was bored last winter at the Well Garth brewery, Masham, to get an increased water supply for brewing purposes, and the owner, Mr. Thomas Lightfoot, instead of leaving them in some merely local collection, has just presented them to the York museum, where, in the course of a few days, they may be seen by the public, and will be most easily accessible for any geological investigation. The boring was done by the Diamond Rock Boring Company's process, which cuts the rock by means of a revolving circular metal crown studded with diamonds, and the portion cut out is drawn up in the form of small round pillars. These were carefully preserved in the order in which they came out of the ground, and they are, therefore, accurate samples of all the rocks in the particular district to the depth bored, and no similar collection is known in any museum in the neighborhood. The total depth of the artesian well from which the "cores" came is 435 feet, and it descends through shales and sandstones of various kinds in the carboniferous system to the millstone grit, which was found to be saturated with water, and from which there has been flowing, ever since it was struck, an unintermittent natural stream, without mechanical aids, of very pure, bright, soft water, at the rate of about 1,800 gallons an hour. The specimens are contained in eight large boxes, and are undergoing a careful examination by the honorary curator of geology at the museum (Mr. Reed, F. G. S.), preparatory to the society's monthly meeting, when they will form the subject of discussion. So much of our knowledge of the geology of any district is derived exclusively from an examination of the outcrops of rock, that it is especially interesting, more particularly in a neighborhood where there is hardly any mining, to be able to see actual specimens of the rocks which exist directly beneath a given place, and geologists everywhere may be thankful to Mr. Lightfoot for having made these specimens public property; while to the Yorkshire Philosophical Society—which, although intended to aid science generally, was formed more especially to promote the study of the geology of Yorkshire—they are of very great value, for the society's collection contains nothing which is at all like these "cores," which, during the last week, have been handed over to it.

Mica Scale Pans.

The following note read at the late meeting of the American Chemical Society, by W. L. Land, will be interesting to our workers in laboratories: Our best analytical balances of 200 grammes capacity are usually fitted with a pair of movable glass pans, or watch-glasses of three inches diameter, and weighing about 30 grammes. To relieve the delicate bearings of the instrument from this unnecessary weight, and also to increase the capacity of the same in a commensurate degree, I employ as a substitute for these glasses a pair of three-inch mica disks, which weigh less than two grammes, the "gravity bob" if necessary being adjusted to this change. After three years' daily use, I find these mica pans as good as at first. The abrasion of the mica surface by a platinum spatula (used in weighing), during this period is scarcely visible. The mica used for this purpose is a pure, hard article found in North Carolina. It is as clear or transparent as flint glass when split sufficiently thin for the purpose to which it is here applied. Another great advantage of the mica is found in its flexibility, which enables one to dispose of weighed material with rapidity and exactness, as by bending the mica into a semi-cylindrical form it can be adapted to the mouth of a flask, crucible, etc., with the greatest ease.

Small discs of this material also form excellent transparent covers for platinum crucibles and capsules, where the heat applied does not exceed low redness, as in the conversion of oxalate into carbonate of lime, etc. I feel confident that no member of this society will ever abandon the use of mica scale pans, after a thorough trial of the same.

BURIED FORESTS.—The discovery of a subterranean forest just below the surface of the Thames river, is attracting a good deal of attention in England. The oak, the alder and the willow are the principal trees found. These retain their vegetable character, but other signs show that the forest belongs to the period of the elk and the red deer in the south of England. There is such a subterranean forest in the New Jersey flats; it consists chiefly of cedar trees, which have become very hard, and in some instances have paid the cost of extraction. The time of their burial has not yet been determined, but the cause is undoubtedly due to the slow subsidence of the State of New Jersey, which, it is authoritatively stated, sinks now at the rate of about 16 inches in a century. If this sinking has been uniform, 3,000 years would have caused a sinking of 40 feet, and thus the forest may, 3,000 years ago, have been 30 feet above tide water, while now it is 10 feet below, and buried under the deposits carried on top of it by every flood.

MECHANICAL PROGRESS.

Sand in Iron.

The *London Mining Journal* gives an interesting article on the presence of sand in iron, and of the way in which it is proposed to escape the evil: Silica in iron is sand in the wrong place. In one form or another sand is found in most of our minerals; it is certainly dispersed throughout our coal and limestone seams, and it is combined with our iron ores. It is so refractory that it is not to be got rid of by the process of calcining either in the open or closed hearth, and it passes as a constituent of the coke, the lime and the iron ore into the blast-furnace, where it is impossible to wholly expel it, for it holds possession as silicon. The puddler and the other operators in the forge and the mill have to do battle with it, when it is desired from the pig to produce wrought iron of first quality as a malleable product. True, its presence will contribute to the making of a quality of sheets suitable, for example, to the making of cut nails, or strips for making gas tubes; indeed, will help to make puddled steel, for it has a tendency to deposit carbon, but when have said this we have pretty much exhausted the category of good service which, in iron-making, silicon is capable of rendering. The benefit of its services it will be seen is hardly more than negative in the best of cases, since the value of nail-sheets and tube strip is only trifling.

It should not, therefore, be surprising that iron-makers should generally desire to rid themselves of the ingredient. Blast-furnace proprietors would gladly rid themselves of it in other than exceptional instances, but how to succeed is not clear so far as the ingredient is part and parcel of the pig. Less difficult, however, would be the attempt to cleanse the surface of the pig from the presence of sand. In truth, in this there is no practical difficulty. For silica as an incrustation upon pig iron the sand bed into which the contents of the blast-furnace is tapped is responsible. Running the molten iron of the blast-furnace into sand, thereby to shape the pig, is a practice which, though of very extensive application, would be more honored in the breach than the observance. It is impossible but that iron must pick up considerable quantities of sand, and thereby becomes seriously polluted. It is within the experience of men who use such iron in the forge and mill that the pollution may occasionally be calculated at one pound of sand to 100 pounds of raw iron.

The theme was some time ago ably discussed by foremost iron-masters in the Cleveland district, and it is now being taken up by the practical iron-makers of South Staffordshire, where the Forge Managers' Association have this week had one discussion upon it, raised by one of their number, and they are stated to have had so much to say upon it that it was found expedient to adjourn the debate. The remedy of the evil consists in that which the leading iron-masters pointed out—the tapping of the blast-furnace into chills of iron, and not into beds of sand. Doubtless the first cost of chills would be much greater than of sand, but it is not clear that in the long run the employment of chills would not prove as economical as the use of sand beds; for when the chills had become worn out they would be capable of being used up, either in the blast-furnace itself or in the refinery, whilst the improvement in the purity of the pig would increase the market value of the iron. Mr. I. Lowthian Bell has spoken upon the great economy which would follow upon the elimination of phosphorus from Cleveland iron and the transmuting of it into phosphoric acid. The day is not very remote when it will be resolved to further economize the refining of iron in the forge and the mill by the shaping of raw iron in chills and not in sand beds; and when that has come about puddlers will be deprived of sources of complaint pregnant of much dissatisfaction and ill-feeling, and many thousands a year will be saved in the British iron trade.

The Locomotive at Sea.

The *Iron Age* gives the following interesting account of an experiment to introduce locomotive engines in marine architecture:

Not long since the steamer *Novelty* was run ashore in New York harbor, near Fort Wadsworth. The steamer, which had been used as an excursion boat from Newark, New Jersey, during the summer, was on her way to Florida, where she was to run upon the St. John's river. Before she was out of the harbor she was struck by a schooner, and an eight-foot hole knocked in her bow, making it necessary that she should be beached to prevent her from sinking. The vessel was built at Chester, Pa., in 1869, for a novelty, by Mr. Gould, an Eastern man. The following are her principal proportions: Length, 216 feet; breadth of beam, 24 feet; and depth of hold, five feet. She is built of iron, and was of 339 tons burden.

In some respects this was one of the most novel vessels ever built. Her peculiarity was in her machinery, which consisted in two pairs of what might be termed locomotive engines, of

16-inch cylinder and 24-inch stroke, and two locomotive boilers 18 feet long and 54 inches in diameter. The idea was to use a light, fast running engine of the locomotive type, and so obtain great power with light weight and small boilers.

In railway practice it is found that an engine of 1,000-horse power is not much more bulky than the marine boiler of the same power. It has often been proposed to build a marine engine upon the plan of the locomotive, which should not only be light but powerful, and occupy very small space. To accomplish this, it is of course necessary that the engine be geared. Mr. Gould's idea was a good one, but unfortunately the vessel which he built was by no means fast; in fact, as a speedy boat she was a failure. Other engineers had the same idea, and one in this city was making arrangements to build a steamer with engines upon this plan at the time the *Novelty* made her trial trips; her failure in speed was so great that the gentlemen for whom the boat was to be built wished the plan altered. The difficulty was not, however, in the plan but its execution. To obtain the power from such small engines it is necessary that they should run very fast. It is said that the paddle wheels and gearing of the *Novelty* were not properly proportioned for the peculiar service, and "locked up" the engines, i. e., made them run too slow, hence a lack of power and loss of speed. Judging from appearances the hull also was not of a very good model. Probably at some future time, when this failure is forgotten, another experiment may be made in the same line, and if the calculations are correctly made, a fast, light and economical boat will be the result.

Using Putty.

A wood-worker writes as follows in an exchange: A good joint is not all required in making a complete finish on wood-work, and one of the greatest troubles met with by unskilled workmen is the removing all appearance of nail or screw heads, having been sunk beneath the surface.

Putty, unless rightly put in, answers a very poor purpose, especially when the work is ever to be exposed to heat. Heat expands iron, and the nail or screw head will lift the putty and make it show a prominence on the surface of the work.

Tacks or small nails may be driven so deep that putty will not necessarily reach the head, leaving a vacuum for the expansion, but for large nails or screws the plugging mode is the best. Sink the screws at least one-fourth of an inch below the surface, then square the hole and insert a plug of the same wood, precisely, as that in which the incision is made, and have the wood exactly correspond, that is, the grains to run the same way. Fit the plug with slightly beveling sides, so tight that when it is driven in solid, it will not reach the head of the nail or screw.

Apply glue to the sides of the plug before driving, and when well set, plane off the surface and sandpaper until the surface is level and smooth.

When putty is used it will be found an advantage to sandpaper thoroughly before filling the cavities, as dust of wood will partly fill the holes and prevent the putty setting in a solid bed upon the iron heads, and will be less liable to get lifted by expansion. Where large checks or cavities are to be filled with putty, the use of hot glue will greatly add to its durability. Moisten the putty with glue, just as it is inserted, and do not attempt to smooth up until it is thoroughly hardened.

HOISTING APPARATUS AND STAMP HAMMER.

The improved apparatus invented by Mr. P. Teiter, of Heilbronn, Wurtemberg, comprises a stamp hammer which is raised by hoisting or winding-up mechanism, and falls by its own weight between suitable guide rails. The said winding-up mechanism transmits the movement of a shaft which always revolves in the same direction to the hammer in such manner that the same is raised several times in a minute to any desired height, and the same in falling is not arrested by any obstacle. The working of the machine will be better understood when it is explained that it is driven by a strap running on a pulley, by which a regular rotation of the said shaft and a worm fixed on the same is obtained. The worm moves a worm wheel fixed on a hollow shaft, whereon is also fixed a ratchet wheel. For transmitting this regular rotating movement to the hammer he employs the following parts: A double crank, the shaft of which turns in the hollow shaft, pawls fixed on the double crank, and a driving pulley around which the cord for raising the hammer is wound. This cord is fixed by one end to a tension pulley, and by the other end to a hammer passing around the driving pulley and guiding pulleys. The lowest position of the hammer corresponds with the position occupied by the double crank as long as the cord is kept in tension. As soon as the hammer has fallen two teeth of the ratchet wheel will pull the two pawls, and in consequence thereof give to the crank a rotating movement. This movement is also imparted to the driving pulley fixed to the crank, and the cord is pulled during half a rotation of the ratchet wheel and the hammer raised. The foundation plate receives the bearings for the rotating parts of the machine.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Jan. 4.	Week Ending Jan. 11.	Week Ending Jan. 18.	Week Ending Jan. 25.
Alpha.	22 1/2	21	19 1/2	14 1/2
Alta.	22 1/2	21	19 1/2	14 1/2
Andes.	15	14	13	12
Baltimore Con.	15	14	13	12
Belcher.	11	9 1/2	10	9 1/2
Belmont.	11	9 1/2	10	9 1/2
Best & Belcher.	21 1/2	19 1/2	18 1/2	17 1/2
Bullion.	13	11 1/2	12	11 1/2
Caledonia.	13	11 1/2	12	11 1/2
California.	45 1/2	44 1/2	44 1/2	43 1/2
Challenge.	78	74 1/2	70 1/2	67 1/2
Confidence.	10	10	10	10
Con Imperial.	190	175	172	171
Crown Point.	38 1/2	35 1/2	34 1/2	34 1/2
Crook.	61	61	61	61
Dayton.	21	21	21	21
Eureka Con.	16	14 1/2	15	15 1/2
Exchequer.	9 1/2	9 1/2	9 1/2	9 1/2
Geddes & Bertrand.	50 1/2	50 1/2	50 1/2	50 1/2
Gen Thomas.	50 1/2	50 1/2	50 1/2	50 1/2
Grand Prize.	4	4	4	4
Globe.	70 1/2	65 1/2	65 1/2	65 1/2
Golden Chariot.	12 1/2	11 1/2	11 1/2	11 1/2
Gould & Curry.	7 1/2	5 1/2	4 1/2	3 1/2
Hale & Norcross.	50 1/2	50 1/2	50 1/2	50 1/2
Hussey.	21 1/2	19 1/2	18 1/2	17 1/2
Justice.	21 1/2	19 1/2	18 1/2	17 1/2
Jackson.	8 1/2	8 1/2	8 1/2	8 1/2
K K Con.	8 1/2	8 1/2	8 1/2	8 1/2
Kentuck.	1	1	1	1
Knickerbocker.	1	1	1	1
Kossuth.	1	1	1	1
Lady Bryan.	62 1/2	50 1/2	50 1/2	50 1/2
Lady Wash.	5 1/2	4 1/2	4 1/2	4 1/2
Leopard.	87 1/2	75 1/2	70 1/2	65 1/2
Leviathan.	13	11 1/2	12	11 1/2
Leeds.	13	11 1/2	12	11 1/2
Modoc.	10 1/2	8 1/2	8 1/2	8 1/2
Manhattan.	14 1/2	13 1/2	13 1/2	13 1/2
Meadow Valley.	50 1/2	50 1/2	50 1/2	50 1/2
Mexican.	19 1/2	18 1/2	17 1/2	16 1/2
North Con Virginia.	800	700	620	570
Old.	26 1/2	22 1/2	21 1/2	20 1/2
Northern Belle.	26 1/2	22 1/2	21 1/2	20 1/2
New Coso.	31	31	31	31
Occidental.	23 1/2	23 1/2	23 1/2	23 1/2
Overman.	119	105	110	105
Pacific.	22 1/2	21 1/2	20 1/2	19 1/2
Phil Sheridan.	22 1/2	21 1/2	20 1/2	19 1/2
Proctor.	50 1/2	50 1/2	50 1/2	50 1/2
Prospect.	50 1/2	50 1/2	50 1/2	50 1/2
Raymond & Ely.	31	31	31	31
Rock Island.	60 1/2	50 1/2	50 1/2	50 1/2
Savage.	19 1/2	18 1/2	17 1/2	16 1/2
Seg Belcher.	81	72 1/2	60 1/2	52 1/2
Serra Nevada.	94 1/2	94 1/2	94 1/2	94 1/2
Silver Hill.	84 1/2	74 1/2	64 1/2	54 1/2
South Chariot.	14 1/2	13 1/2	13 1/2	13 1/2
Succor.	60 1/2	50 1/2	50 1/2	50 1/2
Trojan.	75 1/2	60 1/2	50 1/2	45 1/2
Union Con.	104 1/2	94 1/2	84 1/2	74 1/2
Utah.	14 1/2	13 1/2	13 1/2	13 1/2
Wells Fargo.	15 1/2	14 1/2	14 1/2	14 1/2
Woodville.	1	1	1	1
Yellow Jacket.	15 1/2	14 1/2	14 1/2	14 1/2

Sales at S. F. Stock Exchange.

FRIDAY, A. M., JAN. 19.	600 Sierra Nevada.	8 1/2	25
425 Alpha.	17 1/2	18 1/2	19 1/2
1183 Best & Belcher.	32	32 1/2	33
600 Belcher.	5 1/2	5 1/2	5 1/2
1500 Bullion.	11 1/2	11 1/2	11 1/2
2355 Con Imperial.	18 1/2	18 1/2	18 1/2
505 Crown Point.	34 1/2	34 1/2	34 1/2
2415 California.	44 1/2	44 1/2	44 1/2
3465 Con Virginia.	45 1/2	45 1/2	45 1/2
725 Confidence.	15 1/2	15 1/2	15 1/2
2500 Chollar.	67 1/2	67 1/2	67 1/2
2235 Exchequer.	50 1/2	50 1/2	50 1/2
1590 Gould & Curry.	13 1/2	13 1/2	13 1/2
1550 Hale & Norcross.	22 1/2	22 1/2	22 1/2
60 K. K. Con.	8 1/2	8 1/2	8 1/2
320 Mexican.	17 1/2	17 1/2	17 1/2
900 Ophir.	21 1/2	21 1/2	21 1/2
1040 Overman.	85 1/2	85 1/2	85 1/2
805 Savage.	19 1/2	19 1/2	19 1/2
1150 Sierra Nevada.	8 1/2	8 1/2	8 1/2
20 Seg Belcher.	63 1/2	63 1/2	63 1/2
225 Utah.	12 1/2	12 1/2	12 1/2
670 Yellow Jacket.	15 1/2	15 1/2	15 1/2
AFTERNOON SESSION.			
125 Andes.	1	1	1
770 Belmont.	30 1/2	30 1/2	30 1/2
870 Best & Belcher.	33 1/2	33 1/2	33 1/2
75 Bullion.	11 1/2	11 1/2	11 1/2
230 Baltimore Con.	11 1/2	11 1/2	11 1/2
2300 Caledonia.	10 1/2	10 1/2	10 1/2
4235 Con Virginia.	50 1/2	50 1/2	50 1/2
2200 California.	45 1/2	45 1/2	45 1/2
200 Crown Point Ravine.	30 1/2	30 1/2	30 1/2
160 Chollar.	67 1/2	67 1/2	67 1/2
475 Dayton.	11 1/2	11 1/2	11 1/2
200 Dardanelles.	11 1/2	11 1/2	11 1/2
200 Eureka Con.	16 1/2	16 1/2	16 1/2
100 Gila.	50 1/2	50 1/2	50 1/2
50 Geddes & Bertrand.	2 1/2	2 1/2	2 1/2
200 Grand Prize.	4 1/2	4 1/2	4 1/2
420 Golden Chariot.	12 1/2	12 1/2	12 1/2
50 General Thomas.	30 1/2	30 1/2	30 1/2
330 Julia.	41 1/2	41 1/2	41 1/2
1655 Justice.	11 1/2	11 1/2	11 1/2
100 Jefferson.	30 1/2	30 1/2	30 1/2
500 Knickerbocker.	50 1/2	50 1/2	50 1/2
710 Leopard.	87 1/2	87 1/2	87 1/2
1150 Leeds.	13 1/2	13 1/2	13 1/2
20 Lady Washington.	20 1/2	20 1/2	20 1/2
420 Leviathan.	13 1/2	13 1/2	13 1/2
1115 Modoc.	10 1/2	10 1/2	10 1/2
840 Manhattan.	11 1/2	11 1/2	11 1/2
540 Mahan.	17 1/2	17 1/2	17 1/2
925 North Con.	61 1/2	61 1/2	61 1/2
1525 Northern Belle.	25 1/2	25 1/2	25 1/2
150 New Coso.	31 1/2	31 1/2	31 1/2
40 New York.	75 1/2	75 1/2	75 1/2
30 Occidental.	14 1/2	14 1/2	14 1/2
300 Poorman.	10 1/2	10 1/2	10 1/2
50 Phil Sheridan.	21 1/2	21 1/2	21 1/2
100 Prospect.	35 1/2	35 1/2	35 1/2
150 Rock Island.	60 1/2	60 1/2	60 1/2
100 Silver Hill.	84 1/2	84 1/2	84 1/2
700 Trojan.	77 1/2	77 1/2	77 1/2
705 Union Con.	104 1/2	104 1/2	104 1/2
310 Yellow Jacket.	12 1/2	12 1/2	12 1/2
SATURDAY, A. M., JAN. 20.			
780 Alpha.	21 1/2	21 1/2	21 1/2
240 Belmont.	31 1/2	31 1/2	31 1/2
2035 Best & Belcher.	33 1/2	33 1/2	33 1/2
150 Bullion.	11 1/2	11 1/2	11 1/2
140 Baltimore Con.	11 1/2	11 1/2	11 1/2
1515 Caledonia.	10 1/2	10 1/2	10 1/2
4555 Con Imperial.	19 1/2	19 1/2	19 1/2
300 Confidence.	15 1/2	15 1/2	15 1/2
6535 California.	45 1/2	45 1/2	45 1/2
5205 Con Virginia.	45 1/2	45 1/2	45 1/2
1590 Crown Point.	34 1/2	34 1/2	34 1/2
11 Chollar.	67 1/2	67 1/2	67 1/2
75 Dayton.	11 1/2	11 1/2	11 1/2
2650 Exchequer.	50 1/2	50 1/2	50 1/2
1395 Gould & Curry.	13 1/2	13 1/2	13 1/2
190 Hale & Norcross.	22 1/2	22 1/2	22 1/2
1830 Justice.	11 1/2	11 1/2	11 1/2
850 Julia.	41 1/2	41 1/2	41 1/2
425 Kentuck.	1 1/2	1 1/2	1 1/2
2075 Mexican.	17 1/2	17 1/2	17 1/2
120 New York.	75 1/2	75 1/2	75 1/2
315 Overman.	85 1/2	85 1/2	85 1/2
1150 Ophir.	21 1/2	21 1/2	21 1/2
200 Rock Island.	60 1/2	60 1/2	60 1/2
625 Savage.	19 1/2	19 1/2	19 1/2

295 Baltimore Con.	21 1/2	21 1/2	21 1/2
1835 Caledonia.	10 1/2	10 1/2	10 1/2
100 Challenge.	1 1/2	1 1/2	1 1/2
200 Dardanelles.	11 1/2	11 1/2	11 1/2
830 Dayton.	11 1/2	11 1/2	11 1/2
1640 Eureka Con.	20 1/2	20 1/2	20 1/2
300 Geddes & Bertrand.	2 1/2	2 1/2	2 1/2
100 Gila.	50 1/2	50 1/2	50 1/2
280 General Thomas.	30 1/2	30 1/2	30 1/2
260 Golden Chariot.	12 1/2	12 1/2	12 1/2
100 Grand Prize.	4 1/2	4 1/2	4 1/2
250 Hussey.	25 1/2	25 1/2	25 1/2
1605 Justice.	11 1/2	11 1/2	11 1/2
1755 Julia.	41 1/2	41 1/2	41 1/2
260 Knickerbocker.	50 1/2	50 1/2	50 1/2
50 Kossuth.	1 1/2	1 1/2	1 1/2
315 Leeds.	13 1/2	13 1/2	13 1/2
1140 Leopard.	87 1/2	87 1/2	87 1/2
190 Lady Washington.	20 1/2	20 1/2	20 1/2
50 Lady Bryan.	62 1/2	62 1/2	62 1/2
1000 Leviathan.	13 1/2	13 1/2	13 1/2
1220 Manhattan.	11 1/2	11 1/2	11 1/2
3200 Modoc.	10 1/2	10 1/2	10 1/2
415 Northern Belle.	25 1/2	25 1/2	25 1/2
1175 New Coso.	31 1/2	31 1/2	31 1/2
210 New York.	75 1/2	75 1/2	75 1/2
2260 North Con Virginia.	61 1/2	61 1/2	61 1/2
3000 Phil Sheridan.	21 1/2	21 1/2	21 1/2
350 Prospect.	40 1/2	40 1/2	40 1/2
100 Raymond & Ely.	31 1/2	31 1/2	31 1/2
320 Rock Island.	60 1/2	60 1/2	60 1/2
350 Silver Hill.	84 1/2	84 1/2	84 1/2
2195 Trojan.	77 1/2	77 1/2	77 1/2
1180 Union Con.	104 1/2	104 1/2	104 1/2
315 Woodville.	1 1/2	1 1/2	1 1/2

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M., JAN. 18.	THURSDAY, A. M., JAN. 25.
Alpha.	17 1/2
1585 Bullion.	11 1/2
1460 Best & Belcher.	32 1/2
1135 Belcher.	5 1/2
720 Crown Point.	34 1/2
2400 California.	44 1/2
3465 Con Virginia.	45 1/2
725 Confidence.	15 1/2
2500 Chollar.	67 1/2
2235 Exchequer.	50 1/2
1590 Gould & Curry.	13 1/2
1550 Hale & Norcross.	22 1/2
60 K. K. Con.	8 1/2
320 Mexican.	17 1/2
900 Ophir.	21 1/2
1040 Overman.	85 1/2
805 Savage.	19 1/2
1150 Sierra Nevada.	8 1/2
20 Seg Belcher.	63 1/2
225 Utah.	12 1/2
670 Yellow Jacket.	15 1/2

AFTERNOON SESSION.

35 Andes.	1 1/2
700 Belmont.	30 1/2
125 Baltimore Con.	11 1/2
3125 Con Virginia.	45 1/2
2400 California.	44 1/2
725 Caledonia.	10 1/2
200 Dayton.	11 1/2
200 Dardanelles.	11 1/2
200 Eureka Con.	16 1/2
100 Gila.	50 1/2
50 Geddes & Bertrand.	2 1/2
100 Grand Prize.	4 1/2
100 Jackson.	4 1/2
50 K. K. Con.	8 1/2
40 Kossuth.	1 1/2
500 Knickerbocker.	50 1/2
200 Lady Washington.	20 1/2
420 Leviathan.	13 1/2
600 Leeds.	13 1/2
1000 Manhattan.	11 1/2
2340 Modoc.	10 1/2
945 Nevada.	25 1/2
1125 N Con Virginia.	50 1/2
290 New York.	75 1/2
130 Prospect.	40 1/2
100 Phil Sheridan.	21 1/2
20 Raymond & Ely.	31 1/2
10 Rock Island.	60 1/2
100 Silver Hill.	84 1/2
640 Union Con.	104 1/2

Pacific Board—Latest Sales.

WEDNESDAY, A. M., JAN. 24.	265 Andes	1 1/2
20 Andes	1 1/2	1 1/2
200 Atlantic	18 1/2	18 1/2
100 Alpha	18 1/2	18 1/2
90 Bullion	11 1/2	11 1/2
120 Belcher	5 1/2	5 1/2
375 Best & Belcher	32 1/2	32 1/2
120 Bullion	11 1/2	11 1/2
145 Con Imperial	15 1/2	15 1/2
170 Con Virginia	45 1/2	45 1/2
100 Chollar	70 1/2	70 1/2
490 California	44 1/2	44 1/2
700 Justice	11 1/2	11 1/2
145 Dayton	11 1/2	11 1/2
260 Exchequer	50 1/2	50 1/2
310 Hale & Norcross	22 1/2	22 1/2
150 Julia	41 1/2	41 1/2
200 Knickerbocker	50 1/2	50 1/2
265 Mexican	18 1/2	18 1/2
205 Ophir	21 1/2	21 1/2
340 Rock Island	62 1/2	62 1/2
150 Savage	9 1/2	9 1/2
130 Sierra Nevada	8 1/2	8 1/2
100 Santa Fe	35 1/2	35 1/2
120 Twin Peaks	11 1/2	11 1/2
20 Utah	10 1/2	10 1/2
65 Yellow Jacket	14 1/2	14 1/2
100 Washoe session	18 1/2	18 1/2
10 Alpha	18 1/2	18 1/2
230 Andes	1 1/2	1 1/2
830 Best & Belcher	30 1/2	30 1/2
80 Belcher	5 1/2	5 1/2
100 Baltimore Con	9 1/2	9 1/2
315 Bullion	11 1/2	11 1/2
75 California	13 1/2	13 1/2
345 Con Imperial	2 10 1/2	2 10 1/2
100 California	10 1/2	10 1/2
180 California	41 1/2	41 1/2
23 Dayton	11 1/2	11 1/2
300 Eureka Con	20 1/2	20 1/2
75 Exchequer	50 1/2	50 1/2
565 Gold & Curry	11 1/2	11 1/2
495 Justice	12 1/2	12 1/2
80 Leopard	4 1/2	4 1/2
100 Mexican	17 1/2	17 1/2
20 Mexican	17 1/2	17 1/2
20 Manhattan	12 1/2	12 1/2
200 North Star Belle	25 1/2	25 1/2
100 New Coso	9 1/2	9 1/2
20 New York	8 1/2	8 1/2
155 Ophir	21 1/2	21 1/2
200 Ophir	21 1/2	21 1/2
150 Raymond & Ely	7 1/2	7 1/2
20 Sierra Nevada	8 1/2	8 1/2
30 Savage	9 1/2	9 1/2
100 Santa Fe	35 1/2	35 1/2
10 Union Con	9 1/2	9 1/2

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

EXCELSIOR MILL.—*Alpine Chronicle*, Jan. 20: The improvements at this mill are making good progress. The new 10-stamp battery is in, making it an 18-stamp mill. The furnace building is being inclosed, and next week Mr. O'Hara will make the necessary connections with his new furnace, preparatory to making a run, as the mill will soon be ready for active operations. The new boarding house is rapidly approaching completion. It will be very commodious and comfortable.

AMADOR.

VOLCANO TUNNEL.—*Amador Ledger*, Jan. 20: The tunnel of the Volcano company, intended to provide an outlet for the tailings so as to hydraulic the gold bearing deposits in Volcano basin, is now in nearly 350 feet. A full complement of men are busy pushing the work the whole 24 hours round. The rock gets harder and progress from henceforth must be necessarily slow. The tunnel advances at about the rate of one set of timbers, covering five feet, every two days. Nearly 1,900 feet remain to be excavated.

VOLUNTER.—All the water has been taken from the shaft. The work of prospecting is fairly under way. When work was suspended a year ago, the ore body almost pinched out. The present company have been drifting for the ledge, with gratifying success. Quartz of good quality has been struck during the week. The rock shows black veins all through it, and contains plenty of sulphurets. It is expected to improve in quality as the exploration of the ore body proceeds.

MOSTRUARD.—The clean-up of this mine at the Volunteer mill averaged, we are told, in the neighborhood of \$12 per ton—a very satisfactory crushing.

GRAVEL MINING.—The copious ruins which have fallen in the last few days will have the effect of starting the gravel claims throughout the county. The large mines at Fiddletown and Volcano have been idle for some time for lack of water. We expect to see these in full blast again.

Quite a number of miners have also been working along the creeks and in the gulches, taking out pay dirt ready for washing. They will now be enabled to clean up and realize something for the labor of months gone.

IONIA VALLEY COAL.—The Railroad Company control both the coal mines of Buckeye and Ionia. Nearly all the coal so far offered for sale outside of the county has been taken from beds at Buckeye. It would seem that this coal is of a much inferior quality to that of the Ionia mine, and the placing it on the market has not created a favorable impression of the adaptability of the valley fuel for locomotive, steamboat or household purposes. Now that the damage has been done, the company are trying to retrace the false step by shipping from the Ionia mine. Over 100 tons were sent below this week, and it is confidently expected that it will meet with a better reception than former consignments. The Amador Consolidated mining company have declared another dividend of 25 cents per share. The new hoisting works of the North Governor are completed.

CALAVERAS.

NEW TUNNEL.—*Calaveras Chronicle*, Jan. 20: A new tunnel is being run in the Brown gravel claim, Tunnel ridge, a little below the site of the old Mercer garden. The tunnel has already been driven nearly 200 feet in bedrock. The entire distance to be run, before reaching the channel, will approximate 600 feet. The new tunnel will permit the working of ground at the upper or northern end of the claim which cannot be conveniently got at through the old workings at the southern extremity. It can also be used for washing through if the owner of the claim should conclude to hydraulic instead of drifting as formerly. Mr. Brown is persevering and energetic in the prosecution of mining ventures, and we are perfectly willing to hear that his new tunnel has uncovered a bonanza any day.

NEW QUARTZ MILL.—The Hughes brothers have lately erected a 10-stamp quartz mill, at the gravel mine near the junction of the Ionia and the North Governor. The purpose of utilizing the machinery previously employed in running the hoisting works at the gravel claim. The mill is entirely completed and would have been in operation a couple of weeks ago but for the scarcity of water. The recent rain has increased the water supply so that crushing can be immediately commenced. The ledge from which the mill is supplied is located on the ridge beyond the Junction, to the right of the road leading to San Andreas. It has been pretty thoroughly prospected and the indications are good that it will develop into a valuable mine. Something like 30 tons of ore has already been hauled to the mill, and now that water can be obtained to run the machinery, we presume the stamps will be put in motion and kept at work.

UNION COUNTRY MINES.—*Notes.*—Work is progressing upon two new quartz mills at West Point. Messrs. Carey and Hall are the builders. One of the mills is being put up on the old Zacator mine and the other on the old Doyle ledge. Both mills will be run by steam. Favorable developments continue to be made at the Mina Rica. Fifty-four tons of rock, taken from the old Holmes mine near Mosquito, owned by Griswold & Co., crushed in Garland's mill, paid \$12 per ton.

EL DORADO.

ST. LAWRENCE.—*El Dorado Republican*, Jan. 18: The St. Lawrence still continues to look as well as it has at any time during the past two months, and the mine may now be said to be in thorough working order. A larger force will now be supplied on the 15th of February, and the mill will be started up, with a fine prospect of being constantly supplied with ore from that time forward. The first run may be counted on for from anywhere between \$50,000 and \$100,000.

NEVADA.

MOUNTAINEER.—*Nevada Transcript*, Jan. 21: One of the new and most promising developments recently made in quartz, in this vicinity, is on the ledge known as the Mountaineer, situated about 600 feet east of the Nevada and Province mines, on the north side of Deer creek, and running parallel with them. It was opened about two years ago, and over a year ago a contract was let to Jack Stiles and Thomas Miner to take out 500 tons of ore. They have been at work ever since, and have made good headway. Some of the crushings have yielded \$100 per ton, and it has all averaged over \$40 per ton. The ledge is 18 inches thick. There are about 30 tons on the dump now, and good judges say it is the finest looking of any rock ever taken out in the district. The owners are J. F. Carr, George Smith and John Miner. It is a very promising property, and the owners are justly pleased with it.

CONFIDENCE LEDGE.—We saw some very fine specimens of rock, recently blasted out of the Confidence ledge, in Washington township. It is a continuation of the Yuba mine. At this point the ledge is about three feet in width. The rock is very fine, and shows fair quantities of free gold, and we are told all rock taken out of the ledge thus far looks well. The owners of the mine are J. F. Carr, Mike Carver, H. A. Lord and others. The quartz interest of Washington township is attracting the attention of capitalists, and promises to be the best part of the county for mining.

YUBA MINE.—The Yuba mine, situated in Washington township, is looking up very encouraging now, and the company are in shape to do extensive and profitable work. A new 25-stamp mill has been erected, and is ready for operation. An Ingersoll drill is on the ground ready for work. The company employ between 60 and 70 men. The ledge is from four to eight feet in width, and the rock, we understand, pays in the neighborhood of \$30 per ton. The fortunate owners reside mostly in Grass Valley,

and the Coleman brothers are large stockholders.

THE GEORGIA MINE.—We noticed a few days since that the claim known as the Amos Laird ground, situated at the gap of the Sugar Loaf, and on the old river channel, was to be worked. A company has incorporated and will soon be ready for operations. The stock is divided into 50,000 shares, of the par value of \$10 each. The trustees are A. H. Hanson, J. L. Holland and Francis Hanson. The ground is called the Georgia mine. It is bounded by the Live Oak, Manzanita, Nebraska and Downey claims. There is an incline now down 400 feet to bedrock, and machinery is in place ready for work. The outlay required to be worked will be to run drifts.

MR. BECKMAN. while prospecting in the vicinity of Wood's ravine, the other day, picked up a piece of quartz about three by four inches and two inches thick, containing about 800 worth of gold.

A LONG TUNNEL.—*Grass Valley Union*, Jan. 20: The Deer Creek mining company are engaged in running a large tunnel, through which their claims at Mooney Flat will be worked. The tunnel is now in about 2,250 feet, and is in very hard rock. Two Ingersoll drills are kept constantly at work, and good progress is being made. When the tunnel is completed a large body of rich gold bearing gravel will be ready for the hydraulic process. Mooney Flat has the same character of gravel that has made Sucker Flat so famous. Mooney Flat is in Nevada county, a part of the claims of the Yuba. **GOOD CLEAN-UP.**—*Grass Valley Union*, Jan. 23: The Centennial mine is located on Osborne hill, and on the highest part of the prominence. Several crushings have been taken from this mine, and all of them have "cleaned up" large amounts of gold. Last Saturday a crushing was completed at John Smith's Orleans mill and a clean-up made. The ore crushed was 140 tons, and the yield from it was \$1,000, or over \$7 to the load. This is without counting the valuable sulphurets that have been saved, which will add considerably to the yield. The Centennial can now be placed on the list of dividend payers.

PLACER.

THE STORM.—*Dutch Flat Forum*, Jan. 10: The long looked for storm set in on Tuesday morning, and our miners are all wearing pleased countenances again. Owing to the continued drouth, the various claims in this section have been lying idle waiting for water, but will now probably soon be washing under full headway. The recent severe cold snap froze up the water in the ditch of the Cedar Creek mine, so that but about 40 inches is coming down. The superintendent took advantage of the circumstance and cleaned up a portion of the sluices in the Baker claim, so that that claim is now off fitting up and preparing to fire a powder blast in the solid gravel, which is nearly within reach.

BEAR RIVER.—The Centennial and Crisman companies are still making good headway in breasting and washing out the gravel, with satisfactory results. Whipple claims the gravel taken from this mine at present is said to be very rich. Some of the pieces of gold found weighed as high as an ounce. The indications are that this rich deposit of gravel is quite extensive. The Dom Pedro company as yet is having very poor success.

ALTA MINES.—The Shady G & I claim, owned by Andrew Larson, embraces 140 acres of ground, the northwest line of which is south, or immediately behind Barnard's hotel, and runs southeast to the Canyon Creek sawmill. The channel which passes through this mine is known to be a continuation of the Nary Red channel, which runs southeast, and has been traced by Mr. Larson and other miners several miles, via Canyon Creek mill, Hoy's Back, the Williams mill ranch to the bank of the American river, opposite Green Valley, where all traces of it are lost. From this point to the Hot Springs Back there was considerable prospecting done years ago by several companies in sinking shafts, running tunnels, etc., but the gravel was found to carry only gold enough to pay for hydraulic, for which purpose it is being held by its present owners. Canyon Creek passes through about the center of Mr. Larson's claim, cutting square across the channel, at which place the depth of gravel to the bedrock is only about 22 feet. From this enabling him to prospect the channel thoroughly by sinking 11 shafts, three of which were sunk near the center of the channel, showing the gravel to carry sufficient gold to pay for drifting, for which purpose a tunnel is now being run. The tunnel starts on the south side of the channel, in Canyon creek. It has passed through 100 feet of rim rock, and tapped the shaft zone deep in the top, which the gravel has stood and is being deepened. The gravel is of fine quality, and the ledge increases in size. The clean-up for the month of December was very near \$11,000, and a dividend of \$1.50 per share has been paid, with good prospects for regular monthly dividends hereafter.

THE RISING SUN mine at Colfax has again given evidence of its reliability as a permanent mine. The shaft zone deepened and deeper the ore improves in quality and the ledge increases in size. The clean-up for the month of December was very near \$11,000, and a dividend of \$1.50 per share has been paid, with good prospects for regular monthly dividends hereafter.

ANOTHER QUARTZ MINE.—*Placer Herald*, Jan. 14: An old quartz mine on Stewart's flat, about two miles below Newcastle, that for some cause had been abandoned for years, has, we learn on reliable authority, passed into the hands of a new company, composed of San Francisco capitalists and Placer county miners, who propose to reopen it at once. An old five-stamp steam mill stands at the mine, which will be fitted up and made to do service for the present. The shaft, which now is well filled with water, is about 150 feet deep. A short time only will be required to pump out the water and sluice both all in readiness, he expects to be able to be washing dirt in about three weeks. As the gravel in place reaches a depth of 185 feet, all of which shows gold, Mr. Larson expects to have it a paying hydraulic as well as a remunerative drift mine in a few years.

PLUMAS. **COMPLETED.**—*Plumas National*, Jan. 13: The Maxwell mining company have finally got the water through their new ditch and flume to Soda Bar. They have been at a vast expense and have labored long and well. We hope they will now reap the fruits of that labor, by finding that any amount of rich ground awaits their operation.

SIERRA.

GOLDEN STAR.—*Mountain Messenger*, Jan. 20: We are reliably informed that a channel has been found at last in the Golden Star claims below Allegheny. It will be recollected that William Hanley ran a long tunnel into the ridge but found nothing. He did not give up in despair, but came back within 800 feet of the mouth of the shaft zone, and there he found a ledge of 38 feet, found gravel which prospects well. It is cemented gravel and the gold is visible to the naked eye. It is further said that a tunnel to tap the channel will not necessarily be more than 800 or 1,000 feet long.

MICHIGAN.—The Michigan company have at last got their tunnel in and have tapped a body of paying gravel, and the prospects well. The company will now proceed to develop the mine as rapidly as possible. It is located between Newark and Gibsonville.

NORTH AMERICA.—The fine weather has enabled the lessees of the North America mine, whose buildings were recently burned, to get in a good supply of timbers, etc., enough to last them all winter, probably.

SWEEZEY. Parties are running a tunnel into the slide south of Klockner & Bro's old store at Port Wine, and believe they have a good thing.

DRY.—This is one of the driest winters ever experienced in this section. Port Wine, which usually has more water than many mining camps, is experiencing a water famine.

IOWA.—The company have their shaft down to gravel, but have not reached bedrock at last advice.

TUOLUMNE.

YANKEE HILL GRAVEL CLAIM.—*Tuolumne Independent*, Jan. 20: This claim, which was supposed to be worked out, is doing exceedingly well. A short time ago, Messrs. Brown and Johnson sold this ground to a San Francisco company. The first move was to put up a "giant"

hydraulic, which uses up some 500 inches of water. The work that has been done since, even with the scarcity of water, is wonderful—a cut at least 200 yards in length has been washed out over 80 feet deep and 200 feet wide. The superintendent, informed us that the claim, notwithstanding the heavy expenses it has been at to open it, has cleared itself (within \$300) in cash already taken out, and said if he had sufficient water to clean up the loose stuff already pried down, that he would not turn his hand over, but that he would clean up in three days \$8,000. The strata is of the character which miners term "bedrock," and is of the nature of coarse gold, while others have nothing but fine. The claim is down now over 80 feet, with "bedrock pitching" still. There are two channels on the right or west side, which Mr. Barron thinks eventually will come together. The ledge rises abruptly on the right, and close to its rise is the richest spot in this part of the claim, and is of a dirty olive green color, mixed with mill or country rock. At present there is not water enough to work to advantage, or to clean up what is down. From the outlook, it promises to be one of the best paying mines in this section of our country.

ITEMS.—*Union Democrat*, Jan. 20: The claim of Messrs. Brown, Macomber, Otis and Myers, at Caldwell's ranch, on Shaw's Flat, is doing well, and is showing a steady improvement. The Caldwell ranch diggings continue to increase in good pay at the rate of from 12 to 18 ounces per day, or \$5 per pan. The shafts on Shaw's Flat do not strike bedrock. The bedrock is apparent all over the Flat now. Messrs. J. Street & Co.'s new canal carrying water from the reservoirs (Phoenix) below the North fork of the Tuolumne, is in process of completion. Estimated cost, \$30,000. Fresh diggings have been made in the section with Sonora. The diggings paying well and the people are disputing as to whether the town is in Tuolumne or Stanislaus county. Another ditch company organized to carry water to Keeler's Ferry diggings on the Stanislaus river.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, Jan. 24: Daily yield, 235 tons of ore. The ore breasts going southward and eastward on the 1400-ft level are showing a steady improvement. The other ore-producing sections of the mine show little if any change. The enlargement of the drift connecting with the Gould & Curry mine on the 1550-ft level is going steadily forward, and is doing much toward affording the needed ventilation in that part of the mine. The west drift from the C. & C. shaft, on the 1650-ft level, out through the east wall and entered the ore vein during the first part of the week. According to measurements and calculations, made in accordance with the dip of the vein on the 1550-ft level, the ore was reached by a distance of 80 feet sooner than was expected. The dip of the vein at the point where it was struck is about 46°. The east wall is regular and perfect in its formation. The ore where it was first encountered gave assays ranging from \$30 to \$250 per ton. This drift is now in 23 feet, with every indication that the ore will prove richer with each foot that the drift is advanced. The appearance of the ore in this drift, when taken in connection with the solid and rich character of that found in the southeast drift from the deep winze in the California mine, gives an almost positive assurance that the 1650-ft level will prove equal, if not superior, to any level yet opened in the mine. No prospecting of this ledge has yet been attempted through the north drift on the 1700-ft level, the least being so great that such an attempt would be almost useless.

LEVATHAN.—The ore development mentioned last week has led additional encouragement and impulse to the work of opening up the resources of this mine at the 600-ft level. A fine streak of ore was cut through in the face of the north drift, and a cross-cut east was started to examine it. We visited the mine yesterday and found the cross-cut in a distance of 30 feet, with nearly the whole face in ore, some streaks of which give high assays. In fact, the whole assays from \$2 to \$30 to the ton. It is evidently an important development and very liable to lead to a good paying ore body.

CALIFORNIA.—Daily yield, 500 tons of ore, keeping all the mills steadily running. By prompt and active exertions the steady work of the mine has been cleared up, and the ore supply of the mills kept up, so that there is no apparent chance for any delay whatever in the crushing operations of the mine. The ore breasts on the 1400, 1500 and 1600-ft levels never looked more prosperous than at this time. In fact, the entire mine is looking far better than it did at the date of the payment of its first dividend. The south drift on the 1600-ft level is making steady progress, the face still in good ore. The main southeast drift from the deep winze on the 1650-ft level, is being pushed forward at as rapid a rate as the great heat will admit of, the full size of the drift still in rich ore. Sinking the C. & C. shaft is making slow progress, the flow of water at the bottom being fearfully strong.

BEST & BELCHER.—In cross-cut No. 1, on the 1700-ft level, the diamond drills have penetrated a distance of 305 feet, which, if we add the length of the drift—30 feet—would make a total of 335 feet prospected to the eastward. At that point the drills stuck, and their use had to be discontinued. A number of low assays were obtained from the drillings, but nothing that would seem to exhibit a prospect of a paying body of ore. The best of experts, however, coincide in the opinion that the drills have never yet penetrated far enough to the eastward to reach the ore vein now being opened upon in the Con. Virginia mine. The drills will now be placed in cross-cut No. 2, where the distance to the ledge is not supposed to be near as great as in cross-cut No. 1.

SILVER HILL.—The main incline has reached a point 100 feet perpendicularly below the 650-ft station, at which a new station is being opened preparatory to opening a new level.

CALEDONIA.—Sinking the main shaft has made fair progress during the week. The flow of water is still very strong. The 1350-ft level has been reached. The north drift on the 1150-ft level has completed a connection with the south drift from the Overman, securing a ventilation of the mine to that depth, and securing an escape of the workmen from either end in case of conflagration.

THE PROSPECTING drifts on both the 1300 and 1400-ft levels are steadily advancing with indications of the most favorable description. The flow of water is now easily handled by the new pumping machinery. The south drift on the 1200-ft level completed the connection with the Caledonia north drift yesterday, affording a long sought and much needed ventilation of the mine to that depth.

HALE & NORCROSS.—Everything at this mine is centered for the present in completing the reparation of the connecting drift with the Savage on the 1900-ft level.

JUSTICE.—Daily yield, 340 tons of ore, keeping the mills all steadily running. The ore breasts on the 500, 600 and 700-ft levels show no material change in either quality or yield of ore.

SURFLOUT.—The heavy flow of water from the shaft coming down through the roof of the tunnel being run beneath it from the ravine, renders the progress of drifting rather slow at present, but the water is rapidly draining out.

SIERRA NEVADA.—The north drifts on both the 1500 and 1700-ft levels are steadily advancing, the face of each showing a fine body of ore that will pay for milling. The prospects for ore in that portion of the mine are evidently growing better every day.

OHIO.—Sinking the main incline is being pushed forward with all the force that can be profitably employed in the prosecution of the work. Cross-cuts have been started on both the 1600 and 1700-ft levels to prospect the ledge. A small amount of ore is being extracted from the old workings on the 1500-ft level.

NORTH CON. VIRGINIA.—The heavy flow of water recently encountered at the 1100-ft level has been drained. The new pump station has been completed at the depth of 1150 feet. Sinking the main shaft will now be resumed. Diamond drills have been provided and are to be used in both the east and west drifts at the 1100-ft level in drawing off the water and assisting the progress of the drifts.

BALTIMORE AND AMERICAN FLAT.—Sinking the north winze below the 1050-ft level is making rapid headway, the vein of ore in the bottom still showing finely. The north drift on the same level is showing some good ore, affording rich assays.

DARDANELLES.—Under new and more favorable auspices a new working shaft has been started to open this mine at the proper point, and develop the merit of its lower depths to the best advantage. This is a first-class, three-compartment working shaft, and is being sunk about 400 feet southeast from the old shaft of the company.

BRONZE.—Daily yield, 130 tons of ore. The ore slopes show but little if any change. Sinking the main incline is considerably impeded by the flow of water. Opening the 1300-ft station in the combination drain shaft is being pushed with great vigor.

LADY WASHINGTON.—A lateral drift north from main east drift or cross-cut in 125 feet to-day; face in low grade ore. The winze from this drift is now down 30 feet, and is passing through very encouraging streaks of good vein material.

SOUTH COMSTOCK.—The lateral drift following the vein to the northward at the 300-ft level is now in 23 feet and the whole face in low grade ore.

MINT.—Sinking the main shaft is making excellent progress.

UTAH.—A fine large working station is being opened at the 1150-ft level, 750 feet below the 400-ft station, the last level opened and prospected in the mine. In the meantime another heavy lift pump is being put in at the 900-ft level, preparatory to starting the prospecting drifts at the 1150-ft level.

BECKEY.—The extraction of ore from the slopes north of the shaft on the 350-ft level is going forward as usual. The vein at that point varies from four to eight feet in width, and is proven to extend without interruption to the level above, a distance of 100 feet.

BULLION.—The south drift on the 1500-ft level is showing some fine quartz. The east drift on the 1000-ft level is to all app. arance just about ready to cut the ore vein at that point.

GOULD & CURRY.—The east drift on the 1700-ft level is again being driven forward. The winze below the 1700-ft level has been repaired, and is in good working order down to the 1800-ft level.

SAVAGE.—Everything is being done that is possible to complete the air communications with the Hale & Norcross, and as soon as that is done, draining the water below the 1900-ft level will be resumed.

CHOLLAR-FOTOS.—Sinking the main incline is making the usual fair rate of progress. Daily yield of ore, 100 tons, the assay value of which is \$39 per ton.

UNION COX.—Sinking the winze on the ore vein below the 1300-ft level is making excellent progress.

JULIA.—The south drift from the west cross-cut on the 1800-ft level is showing better every day as the drift advances.

MEXICAN.—Cross drifts for prospecting the ore vein are being started on both the 1000 and 1700-ft levels.

HOMESTEAD.—It will soon become necessary to erect machinery in order to expedite the sinking.

ALBUQUERQUE & ARGENTINA.—Shaft down 116 feet to-day. The entire bottom is in very promising vein material, some streaks of which give good assays.

CROWN POINT.—Sinking the main incline is making the best progress. The rock in the bottom blasts well, and the work is being forwarded with all the energy possible. The 2000-ft level will soon be reached at the present rate of speed.

YELLOW JACKET.—Sinking the new shaft is going steadily forward and is making the best of headway.

LADY BRYAN.—Nearly the whole of the new pumping machinery is in place ready for a trial trip.

FAIR GORE.—Face of main west drift still in porphyry, quartz and low grade ore, the quality of which, as indicated by assays, shows some little improvement.

SUCCESS.—The new pumping machinery is working splendidly and is keeping the water down.

KOSKUTI.—The south drift on the 600-ft level is steadily advancing, the face in very favorable ground.

FAIR TUNNEL.—Face of header continues to show hard porphyry, with occasional streaks of quartz and clay.

TOTAL LENGTH of tunnel this morning, 14,937 feet.

AMAZON & GLASGOW.—The north drift on the 400-ft level is being pushed vigorously forward, the face in quartz and ledge material of a very encouraging description.

PROSPECT.—West drift at the 400-ft level pushing ahead in ledge material with good streaks of quartz.

FLORIDA.—The shaft is now down 736 feet.

TROJAN.—The ore bodies on the 240 and 300-ft levels are opening up finely.

COSMOPOLITAN.—Face of north drift from bottom of winze continues in good ore.

SILVER CITY.—Excellent progress continues to be made in the development of the ore and bullion merits of the lower level, through the incline.

JETT DISTRICT.

NEW MINING FIELD.—The Belmont *Courier* publishes a lengthy descriptive account of the mines in Jett district, showing the amount of development, assays of ore extracted, etc. There are several mines opened in that district sufficiently to warrant an outlay of money in their further development. It is rumored that Jett & Davenport, the owners of the Idlewild, and discoverers of the district, are negotiating with parties for the sale of their interest. If the sale is effected, the purchasers will doubtless prosecute the work of opening up these mines more rapidly, and a new mining field of considerable importance will be added to this section of the State.

Arizona.

MINING NOTES.—*Wallapai Enterprise*, Jan. 13: Great activity is shown in the different camps throughout Turkey Creek district. In the Peck and Bradshaw districts a large force of men are at work—the Peck company alone employing over 40 men. The drift north from the level of the tunnel is in a distance of 100 feet, showing in places a body of very high grade ore, over three feet in width. The bottom of the main shaft, now down over 225 feet, shows a body of ore fully as large and equally rich. The amount of ore already in sight in this, the king of Arizona mines, is, in itself, a handsome stake for the lucky owners. The Black Warrior is producing some very rich ore, and the pay streak is growing as the work progresses. Stopping has been commenced, and ore is being taken out at a rapid rate and shipped by Dan Martin's pack train to the Agua Fria furnace. Work is being carried on, day and night, on the Silver Prince. Five tons of ore from this mine is now being treated at the Azilian mill. In the Bradshaw region, Jim Roach and others are at work on several claims owned by Luke & Co. The Idlewild has a fine body of gold-bearing quartz, over two feet wide, which will go over \$50 per ton. Several other parties are at work on their claims in this district. Mining throughout the Hassayampa and Groom Creek districts is brisk and active as ever. The Crook mill keeps pounding away, day and night, on ore from the Gen. Crook mine, with satisfactory results. Five stamps of Frederick's new mill have a fine body of gold and are working. Stopping has been commenced, and ore is being taken out at a rapid rate and shipped by Dan Martin's pack train to the Agua Fria furnace. Work is being carried on, day and night, on the Silver Prince. Five tons of ore from this mine is now being treated at the Azilian mill. In the Bradshaw region, Jim Roach and others are at work on several claims owned by Luke & Co. 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THE ENGINEER.

Turning Baths into Ice Factories.

It appears that our English friends succeed so well with their artificial skating rink (glaciarium) that they propose to freeze up their baths when the water becomes too cold for plunging. *Iron* says: Our readers will doubtless remember that on the 7th of last January skating was commenced on Mr. John Gamgee's first sheet of ice, 430 square feet in extent. A thousand square feet—the size of the glaciarium at Chelsea, which is still frozen—was the second attempt, and now 3,090 square feet of solid and transparent ice may be seen and used at the floating swimming baths on the Thames at Charing Cross. The floating baths were handed over to Mr. Gamgee on the 20th of October last, and within two months two complete sets of machinery, with all the accessories necessary for a glaciarium, have been satisfactorily erected. The general principles of the floating glaciarium consist of the circulation of a current of glycerine and water through a series of metal tubes immersed in water, which is converted into ice and maintained in that condition. The details, however, are different. These are two ice machines with the necessary engines, one at each end of the structure. Each machine absorbs over 100,000 heat-units per hour, and it is stated that this immense effect is obtained by utilizing about six-horse power per machine. The water of the Thames, at a temperature of about 40° or 42° Fah., pumped freely through the condenser, maintains the pressure in the machine at a minimum of one atmosphere and three-quarters, whereas the pressure in the refrigerator is only nominal, and corresponds to the temperature of about 0° Fah. A rotary pump drives about 4,000 gallons of glycerine and water per hour through each refrigerator, and this cold liquid traverses through the tubes of the glaciarium, and water outside them is thoroughly frozen. The special difficulties in maintaining congelation at the Charing Cross baths arise from the great radiation from the iron structure, which is caused by its immersion in the waters of the Thames and by the extensive area of glass roof covering the whole in, which greatly raises the temperature of the internal atmosphere, and is antagonistic to the development of artificial refrigeration. The desired result, however, has been attained, and ice two inches thick has been already formed, and skated upon, in the first instance, by two ladies. The machines act as twins. One supplies each alternate tube of 115 feet in length, and the glycerine, having passed through this, gravitates into the other machine, and, having been conducted through the refrigerator, passes back through the adjacent tube. In this way Mr. Gamgee secures what he terms his "direct alternative" circulation, which is the special improvement in the floating glaciarium. Each machine is capable of controlling the entire circuit of pipes, so that, in the event of one failing, the other insures the continuance of the process of congelation. It has been demonstrated, in fact, during the process of making the ice, that one machine is about sufficient to absorb the heat of radiation, which is exceptionally great in the floating structure. There is over a mile of wrought-iron flat tubing, which has been made under a very perfect system by the Metal Tube Company in the Euston road. The freezing machines have been constructed by Messrs. Raoul, Pietet & Co., the patentees of liquid sulphurous acid, with whom Mr. Gamgee is in co-operation. The general contractors for the works are Messrs. Emerson, Murgatroyd & Co., of Stockport. It is so arranged that when the bathing season again approaches, the ice machinery and apparatus will be taken down and stowed away, to be replaced for active use after the summer season.

Telegraph Engineers.

At a late meeting of the English Society of Telegraph Engineers, *Iron* says there was the usual extensive display of telegraphic instruments and other apparatus connected with telegraphy, but only one or two objects could be regarded as coming within the category of new inventions, and of these the most interesting appeared to be a new form of cable grapnel, exhibited by the Western and Brazilian Telegraph Company, and explained by Mr. A. Jamieson, who has for some years past been associated with the operations of foreign telegraph companies. Cable-lifting being an operation moved far beyond the sphere of ordinary observation, most people are ignorant of the peculiar difficulties by which it is surrounded. Of these, the breaking of grapnels is one of the most frequent and serious; and Mr. Jamieson's invention which is designed to overcome this difficulty, can hardly fail to prove a boon to foreign telegraph companies, of which so many have sprung into existence in recent years. The ordinary grapnel is furnished with rigid prongs, which, although perfectly well calculated to seize and bring a cable to the surface, are also liable to become fastened to rocks and other substances, and to break with the slightest strain of the ship. Of such frequent occurrence is this, indeed, that all cable ships are compelled to carry a very large stock of grapnels on board, and have often to return to port without accom-

plishing their task, owing to loss and breakage. Mr. Jamieson has furnished his grapnel with hinged prongs governed by a spring, which yields at a given strain, so that the moment a rock is "hooked" the grapnel slides off and comes to the surface. It is, in fact, an octopus-like machine, which puts forth its "feelers" in search of the real article, and draws them back the moment any counterfeit substance seeks to entangle them. This, with the new mariners' compass exhibited by Sir William Thomson, was perhaps the most interesting and valuable feature of the display made at Willis's rooms on Monday evening. The Society of Telegraph Engineers, which now numbers upwards of 800 members, was founded by Major Frank Bolton (the present water examiner of London), and Major C. E. Webber, of the Royal Engineers. The Society is in possession of the library bequeathed to it by the "father of telegraphy," the late Sir Francis Ronalds. This library (of which a catalogue is now being prepared), took Sir Francis Ronalds 40 years to get together, and it contains the finest collection of works on electricity to be found.

The Working of the Jetties.

New Orleans papers continue to bring evidence of the success of Captain Eads's engineering in the mouth of the Mississippi. The *Picayune* says: We learn that for some time past the channel between the jetties, at the South Pass, is everywhere more than 200 feet wide for a depth of 20 feet at average flood-tide, and that in the middle of this wide channel the depth is more than 22 feet. This is equal to from 22½ to 23 feet at the highest tide at South Pass, when a range of three feet tide, with a channel depth of 19½ feet, from 80 to 100 feet in width, is usually reported at Southwest Pass. Therefore it will be seen that the jetties have given, though yet in an incomplete state, a magnificent channel across the South Pass bar to sea, twice as wide and several feet deeper than has ever been obtained across the Southwest Pass bar. If this is considered as any indication of a failure of the jetty system, then we should welcome all such failures; they are what we should pray for earnestly. All through South Pass, from its head to the jettied channel over the bar, as is generally known, the depth exceeds 30 feet for more than 200 feet in width.

We are informed that the works required to confine the flow of water from the main river, above the common head of the passes, into South Pass, so as to secure a like deep channel entrance to South Pass over the river middle-ground shoal about its head, are being energetically prosecuted with every prospect of early success. Already, notwithstanding the low stage of the river, the one-dipper dredge boat at work there to expedite the cutting out of a deep channel entrance, has succeeded, as we are assured, in obtaining a depth of inlet of from 20 to 22 feet across this shoal, which the tidal current suffices to maintain and widen. Soon, we are told, two more powerful dredges will be put to work there and with three boats working together, an entrance channel across this hard sand middle-ground shoal, of sufficient width and depth for the largest class of ocean steamers, even at the present low river stage, may be expected at an early date. With the river at the height it was three months ago, we would have, even now, a clear and unobstructed channel of more than 22 feet in depth, from New Orleans to the sea, through South Pass.

REVERSING ENGINES.—There are now building in England for the Cleveland Steel Works a powerful pair of high-pressure reversing engines, on Ramsbotham's principle, being put down by Messrs. Thwaites & Carbutt, of the Vulcan iron works, Bradford. *Iron* says these engines are intended to drive the ingot cogging mill trains, and are placed parallel to each other on massive cast iron beds, whose weakest point is one foot nine inches deep, and the strongest (viz., the gearing end) three feet three inches deep. The diameter of the cylinder is 36 inches, and the stroke four feet six inches. The centers of the beds are 12 feet apart, and the total area which they occupy is 43 feet long by 17 feet wide. The engine beds are truly planed, so as to have a thorough bearing upon the foundation, the top of which is composed of ashlar stones, three feet thick, below which there is a solid mass of concrete, 19 feet deep, and they are held down upon this foundation with 24 three-inch bolts, 25 feet long. The crank shaft, second motion shaft, piston rods and crank pins are all of Krupp's steel. The cranks are wrought iron, and have solid balance weights opposite the cranks. The connecting rods are also of wrought iron, nine inches diameter in the center; the gearing is in the ratio of three to one. The large wheel, which weighs 20 tons, is 12 feet eight and seven-eighths inches diameter, and has eight-inch pitch and 20 inches breadth of tooth. The steam valves are pistons packed with simple cast iron rings. The steam ports are very short to save steam, and the exhaust ports very large to maintain a free exhaust. The total weight of the engine will be 130 tons, and it can be reversed up to as many as 60 times per minute with great ease by one man. The makers of this engine are also supplying six powerful double-ended rail straightening machines, each of which is furnished with a self-contained engine, so that it can be worked independently.

Prospects in Eureka.

The presence of a number of the mining magnates from San Francisco in our midst for the past few days has caused considerable curiosity to be evinced by all parties. The rumors current for a week past of extensive bodies of ore being discovered in three different mines on Ruby hill, are now generally conceded to be true, and those in a position to give accurate information do not deny but what the developments brought to light within the past few days have been of a nature entirely satisfactory to the stockholders of the mines referred to.

The discovery of a large body of high grade ore in the Eureka Consolidated, and the well sustained raise in the value of the stock at the rate of two dollars a day, is the subject of general congratulation among the citizens of Eureka, who recognize the fact that it is the herald of better times for our town. The company has always dealt justly and liberally with its employees and the business men, and the mine itself is identified with our prosperity. The discovery of an ore body on the lower levels, and its contiguity to the Richmond settles effectually the problem of permanence to the vein and the importance of deep working. The Base range has suffered more from ill-digested theories of scientific sharps than any mining region, and, like the Comstock, we have had to work out our own salvation. Nature has done a great deal for us, and pluck and perseverance a great deal more, and those who have had the faith to cast their fortunes with us will reap a rich reward. As to the extent or value of the discovery time alone can tell. We do not imagine that the president or superintendent will reveal it; mines are not managed in that way, but the most casual observer can note the signs and draw his own conclusions, and the community have made up their minds that there is good grounds for the belief and rejoice accordingly. The presence of the president, General Dodge, and that irrepressible mining sharp, J. Corrigan, the arrival of ex-president J. Zeile and John W. Shaw, and the general good humor of the party is very significant. Under the intelligent management of Superintendent Donnelly the mine will yet rank as one of the great mining properties of Nevada.

The K. K. is also coming in for its share of attention, showing in return the largest and finest body of ore ever discovered in the mine. The latest developments were made on the fourth level near the top or cone of the ore body. A winze is being sunk on the same, and Superintendent Arrington, writing to the directors in San Francisco, says: "I have the greatest faith in this strike proving a valuable discovery. No estimate can be made of the actual extent of the bodies of ore discovered, but enough has been ascertained to know that to-day the K. K. possesses a body of ore second to none of its neighbors."

Reports of a similar strike in the Jackson are circulated on the street. No definite information as to the reported discoveries, or of the character of ore found, is given.—*Eureka Sentinel*.

Mining in Arizona.

The arrival in Los Angeles of Col. James M. Barney, of Yuma, and Mr. Mason, has given the *Los Angeles Herald* an opportunity for a very interesting conversation on Arizona and her prospective mining development. Col. Barney is understood to have purchased from Mr. Mason a half interest in the famous Silver King mine for \$300,000. He describes that mine as very rich, and says that if it proves to be of a permanent character it will surpass the bonanza mines themselves. Of course its durability can only be ascertained by time, as it cannot as yet be said to have been even prospected, the trifling depth—short of 150 feet—to which it has been pushed, being a mere "starter." Should the lode hold out in its present richness to great depths, it would eclipse all recorded mines in its outcome, except such as are described in the fables of early mining development of Mexico and Peru. We have heretofore described the location of this mine in the Pinal mountains.

The owners of the Silver King mine are at present only shipping to San Francisco ores which average \$1,000 to the ton. Seventy-five or 100 tons of this rich rock are now en route to San Francisco, via the steamers of the Colorado River Navigation Company. It costs to haul the ore to the Colorado river from the mine \$65 a ton. The steamers transport it to San Francisco for \$10, as they are glad to get it for ballast. They carry ore from Ehrenberg for \$15 per ton.

Colonel Barney informs us that mining in all sections of Arizona has received a decided impetus of late, and that the prospectors are pouring in there in great numbers. The Territory shows this activity in every direction, about Tucson, Prescott and up in the Mohave country. The greatest animation, however, is observable in the Globe district, where a great number of claims have been taken up, and where the indications are certainly very promising.

The completion of the railway to Yuma will shortly stimulate every kind of development, and will make that town a very lively place. It will probably benefit by a large Mexican trade. While the railroad company in all likelihood cannot afford to carry ores to San Francisco any cheaper than the Colorado Steam Navigation Company, there will result a marked benefit to the miners in the expedition with which their

ores can be transported to the reduction works at San Francisco by the railroad. Now, if the teams miss the steamers, the ore shipments have to wait 30 or 40 days for the next steamer.

For the last three or four years Col. Barney has shipped 100 or so tons of Castle Dome ore to San Francisco monthly. The Castle Dome rock is a lead ore, for which the San Francisco smelters pay about \$60 a ton. They work it with the rich Silver King ore to decided advantage. The Castle Dome ore goes about \$30 to the ton in silver, and averages 75% in lead. By a combination of the two ores the "flux" is readily obtained and the greatest possible percentage of profit is thus secured.

It is our informant's opinion that reduction works will shortly be established in this southern country, possibly at Los Angeles, but probably at some point in Arizona, thus dispensing with the expensive carriage of ores. There is abundance of fuel for this purpose within easy reach of the mines.

Col. Barney confirmed Mr. Pomroy's statements about the Globe and other districts relying upon New Mexico for supplies. He says that the loss to California of the trade of those camps will be repaired measurably by the completion of a wagon road from the mines to Yuma, a distance of 245 miles. This road will be finished shortly. In reply to a question as to whether Arizona would not depend largely on Los Angeles county for produce of various kinds, Colonel Barney said that the people of the Territory were amply capable of raising all the vegetables and cereals that would be consumed by them. Of course, our wines, brandies and semi-tropical fruits will have full swing, and there is no reason why our commercial relations with Arizona should not be indefinitely expanded.

The deepest mine which has thus far been sunk in Arizona is the Vulture, and that is only down to a depth of 300 or 400 feet. A development is now going on which will test the vexed question as to whether or not the Territory is as rich, minerally, as Nevada. As Arizona is an important portion of the "back country" of Los Angeles, we trust the question will be decided in the affirmative, and from the complexion of the reports which reach us from that quarter we believe it will. Miners are now rushing there from Colorado, Utah, California and Nevada, and the result of this experiment cannot be long in coming to our ears.

Southern Humboldt.

Two individuals, one of them a representative of the *Silver State*, boarded a freight train at the depot, last Friday night, and were landed before midnight at

Mill City.

The shipping station for Unionville, Star, Dun Glen and Central mining districts. In early days, Mill City was selected as the terminus of the Humboldt canal, which was to convey water taken from the river 40 miles above to run a number of prospective quartz mills, hence the name. It boasts of a good hotel, a freight house, several dwellings and out-houses and a first-class foundry, where anything in the line of castings is turned out to order on the shortest notice. George M. Miller runs a daily stage between this point and Unionville, carrying passengers, mails and Wells, Fargo & Co.'s express. Twelve miles south on the road to Unionville is

Star City.

In 1863 the most populous and prominent mining camp in the county. At present there are but few mining enterprises carried on in the district, the principal one being the Sheba, on which there are hoisting works and an Ingersoll drill, run by water. The drill, which has just been put in place in the mine, makes 200 revolutions a minute and bores a hole two or more inches in diameter, and 12 inches deep, in solid quartz, in six minutes. The drill is run by compressed air, but water is the power used in compressing the air, and a stream of that liquid which, under pressure, is not more than an inch in diameter, runs the hoisting works and drill. The mine is producing some very rich ore, but at present it is limited in quantity.

Eight miles south of Star is

Unionville.

The most extensive and prosperous mining camp in the county. The ruinous discount on bullion during the last year, which discouraged prospecting and retarded the development of mines in all parts of the State outside of the Comstock, has seriously affected Unionville, and at present the only mine worked is the

Arizona.

Which, under the management of J. C. Fall, withstood the pressure to which other mining enterprises succumbed and is now looking and paying better than at any time during the last year and a half. Two of the four mills in the place are running steadily on Arizona ore. To supply these mills with fuel, six six-mule teams are constantly employed in hauling sage brush. The brush is chopped and gathered in winrows by Indians and Chinese, who work in separate gangs, and between whom there is a considerable rivalry in the business. A large pile of cedar and nut-pine wood is held in reserve near the mills, to supply them in the event of accident or delay to the brush teams. The valley for miles in every direction from the mills is denuded of brush, and the bare circle is being daily enlarged. Everybody in Unionville is at work.—*Silver State*.

Kern County Mines.

Erskine Creek.

The Kern County *Courier*, in a series of articles on the interests of the county, says: The Erskine creek mines are on a creek of that name that in the spring pays tribute to Kern river, some eight or ten miles below Kernville, running through Hot Spring valley. Several rich leads have been found on this creek and some work has been done, but, although the rock is so extraordinarily rich, assaying as high as \$700 in gold to the ton, but little else than prospecting has been done. The holders have been somewhat embarrassed and unable to prosecute operations successfully. A short time since, however, these mines, consisting of several locations, all under one management, have passed into the hands of enterprising parties in San Francisco, who have the means and disposition to place this property in productive condition. They are now perfecting arrangements to that end, moving their mill, opening their mines, etc., and in a short time we may expect to see another prosperous settlement on Erskine creek, that will probably dispute the honor of supremacy with both Kernville and Bull Run.

Piute and Sageland, situated in the same range, are both good mining camps. The Bright Star at Piute, and the St. John at Sageland, have yielded largely of the precious metals, and will, if properly worked, continue to do so. Northwest, and on the western slope of the great Sierra, and in the foothills, the Long Tom mines are located. They have been very profitably worked, and large amounts extracted from them. At present there is not much doing, owing to mismanagement and litigation. They are universally recognized as valuable, and much impatience is manifested at the policy that prevents their operation. If the difficulties were removed, probably 150 persons would find profitable employment.

In the southern enclosure of the great valley, in what are called the San Emidio mountains, where the Sierra Nevada and Coast Range meet and merge into the Sierra Madre, is a region of which comparatively little is known, other than that it is rich in various minerals. Rich gold placers have been found and worked in Lockwood valley, on the Piru creek and its tributaries, the scarcity of sufficient water for washing purposes during the greater portion of the year being the only drawback. Valuable deposits of tin, antimony, silver-bearing galena and gold-bearing quartz have been found. Boushay & Co., of Los Angeles, have erected works, and are now successfully working the antimony mines. Another Los Angeles firm, Eggleston & Co., are erecting a mill at the Frazier mine. This is a quartz mine which has been extensively prospected with arrastras, by which process it yields an average of \$60 per ton in free gold. A well authenticated tradition exists that a very valuable silver mine was found in these mountains and worked by the Indians under the direction of the Mexican padres long before the American occupation of the country. The crafty padres, however, kept the location a profound secret, which it remains to this day, notwithstanding much search has been expended in the endeavor to recover the lost mine. The valuable church plate of the mission of San Luis Obispo was brought from this place. The remains of the old furnaces employed for reducing the ores have been found, but all efforts to discover the mines have proven futile. The surface of this part of the country is exceedingly rough, lofty and inaccessible mountains and precipitous and impenetrable chasms impeding the progress of the explorer at every turn. Still, enough is known about it to warrant the assertion that it would richly repay the adventurous prospector, and the time is not far distant when it will team with a prosperous population and yield abundant returns of mineral wealth. Further west, in the extreme southwestern corner of the county, are the Buena Vista petroleum works. They were erected some years ago by a Mariposa company, but for some reason the enterprise was suspended and still remains so. Great quantities of asphaltum and oil are constantly oozing from the earth and flowing away; the oil being very volatile soon evaporates, leaving the dry, hard residuum on the ground. At several other places in the valley and the foothills there are oil springs of the same character. One has been discovered in the bed of Kern river a few miles above Bakersfield. It discharges into the river, where the oil may be seen floating on the water. Operations are about to be commenced on this spring to find the reservoir that is believed to exist. Now that the railroad reaches within 40 miles of the Buena Vista oil works, it is believed that they could be worked with large profit to the company. The mountains are also rich in vast deposits of gypsum, marble, limestone and slate of the finest quality, which will shortly become valuable commercial products. East of the Sierras are great fields of borax, which have been worked to some extent. A large home consumption will be found for this product as the mines of the country become developed, especially in Inyo county, where as an auxiliary in fluxing the galena ores of that section it will be greatly needed.

AN IMPROVEMENT IN THE FILTER PUMP.—Dr. Walker Hempel, of Germany, suggests, as a means of quickening the action of the filter pump, that a series of five radial lines be etched in the funnel, below the top of the filter to the neck. By this system of little canals the action of the apparatus is claimed to be considerably accelerated.

USEFUL INFORMATION.

Seasoned Timber May Shrink.

The *Manufacturer and Builder* says: Scraping off the paint from a panel in a door will cause it to shrink, even when it has been unaltered for years, and supposed to be perfectly seasoned. Even the various most valuable kinds of timber will shrink more or less every time the surface is dressed off even a small fraction of an inch. Wheelwrights, accustomed to work in oak, are well aware of this fact, and a correct appreciation of it often enables them to turn out work of a superior character, even of ordinary materials, by first blocking out the pieces roughly, then allowing the timber to season, and working the various parts by degrees, as the seasoning becomes more and more complete.

White oak spoke timber, for example, may be allowed to remain in a rough state for half a score of years, under shelter, without becoming seasoned so thoroughly that the timber will not shrink after the spokes have been dressed out. Carriage wheels have often been made of the choicest quality of oak timber after every spoke has been seasoned for several years, and to the great surprise of the wheelwright, every spoke would work in the joints before the vehicle had run three months. The defect in such instances could not be attributed to inferior timber, nor to perfunctory workmanship, but simply to this one circumstance, that the parts of the wheel were put together before the timber had ceased to shrink.

To prove that the best quality of oak will shrink after a spoke has been dressed out, let a tenon be made on one end and be driven immediately into a mortise; after a few days' exposure in a warm workshop the spokes may be withdrawn with little difficulty. The same fact will hold good in the manufacture of wood work of any kind where oak is employed for tenons. In order to make joints that will never start, the piece on which the tenons are to be made should be dressed several times, until the shrinkage has ceased; then let the tenons be made. After these have shrunk, while exposed to the drying influence of a warm workshop, the spokes or other parts may be driven into their respective places, with the assurance (especially if they are dipped in oil paint previous to driving) that timber will shrink no more.

Many kinds of farming implements, in the manufacture of which oak and ash are employed, render very unsatisfactory service, simply because the seasoned timbers were not allowed to shrink before the tenons were driven into the mortises. In like manner, oak chairs and other furniture will frequently shrink to such an extent that the pommels, rungs, dowels, pin and banisters will all work loose if the precaution we have described is not observed.

IRON OF ANTIQUITY.—The oldest pieces of iron (wrought iron) now known are probably the sickle blade found by Belzoni under the base of a sphinx at Karnac, near Thebes; the blade found by Col. Vyse embedded in the masonry of the great pyramid; the portion of a cross-cut saw exhumed at Nimrod by Mr. Layard, all of which are now in the British Museum. A wrought bar of Damascus steel was presented by King Porus to Alexander the Great, and the razor steel of China for many centuries has surpassed all European steel in temper and durability of edge. The Hindoos appear to have made wrought iron directly from the ore, without passing it through the furnace; from time immemorial, and elaborately wrought masses of iron are still found in India, which date from the early centuries of the Christian era.

UTILIZATION OF SAWDUST.—Sawdust can be converted into a pasty state, and afterwards into a solid, flexible, and almost indestructible mass, which when incorporated with animal matter, rolled, and dried, can be used for the most delicate impressions, as well as for the formation of solid durable articles, in the following manner: immerse the dust of any kind of wood in diluted sulphuric acid, sufficiently strong to affect the fibers, for some days; the finer parts are then passed through a sieve, well stirred, and allowed to settle. Drain the liquid from the sediment, and mix the latter with a proportionate quantity of animal offal, similar to that used for glue. Roll the mass, pack it in molds, and allow it to dry.

LIQUID WHICH WILL STAND HEAT AND COLD.—It is often necessary to surround the pipes of heating or evaporating apparatus, and hot-air apparatus, ovens, stoves, etc., with a liquid which will not boil at a temperature of 212° F.; it is also often necessary to make use of baths which will not easily boil or freeze. The liquids usually employed for this purpose are water in which sea salt has been dissolved, oil baths, etc. Instead of these various agents, it is now proposed to make a solution of chloride of lime in glycerine, a solution which does not boil below 572° or 626° F., and has the further advantages of never attacking metals nor congealing.

SIZE OF WAGON WHEELS.—Experiments made many years ago on the European continent, and recently repeated in England, verify practically the conclusion which a common sense mechanical theory suggests, that wagons are most easily drawn, on all kinds of roads, when the fore and hind wheels are of the same size, and when the pole lies slightly lower than the axle.

COLORING CEMENT FIT FOR GRINDING AND POLISHING.—Colored cements are used to give cast goods of zinc or brass the appearance of burlwork, and to fill up the holes made by etching in zinc door-plates, street numbers, coats of arms, etc. They are also, with advantage, employed for making casting-models of more artistic objects, as well as for mosaics on metal ground; but they may be further found useful in engineering works for isolators, large rings and plates. According to Stach, the following procedure is necessary in their preparation: A solution of soluble glass of 33° Beau, is mixed with fine whitening, with the addition of the materials mentioned below, until it assumes the tenacity of a thick plastic mass, and thus different colored cements, hardening in six or seven hours, of considerable strength, and very useful for the purposes above quoted, are obtained. By adding gray sulphuret of antimony a black cement is obtained; this may be polished with agate, and has a metallic onyx-like luster. Another black cement is prepared by mixing equal parts of sulphuret of antimony and iron filings (finest) with the above soluble glass; but the cement can only be ground. Carbonate of copper, pure chrome green, green; cobalt blue, blue cements. (Ordinary ultramarine is not fit for use, because it forms Glauber's salt and scatters the mass.) Red lead gives orange cement, sulphide of cadmium citrine, cinnabar bright red and cochineal-lac violet cement; zinc dust and alcoholized iron give a brown cement and powdered manganese acts in the same manner. An especially valuable gray cement, which may be polished with the agate to a metallic luster, and used in the repair of damaged zinc ornaments—whether cast or of sheet zinc—is produced by mixing pure most finely-sifted zinc dust with soluble glass. Hitherto these mixtures have been used solely for imitating marble, but the cements are also of great value in the metal-ware industry.

PAINTING GILT PAPER.—We wished to paint, with water colors, a monogram on gilt paper, but could not get the paint to lie, not even when mixed with gum; it either scaled off, or was patchy. After trying various expedients, we scratched all over the surface of the monogram with a hard lead pencil, and we then found that the water colors could be easily painted on the surface. Their effect on the gold ground was very great, and perhaps some of our "illuminating" readers may thank us for illuminating them with this "wrinkle."—*Printers' Register*.

GOOD HEALTH.

Curiosities of Eating.

An old beau, formerly well known in Washington City, was accustomed to eat but one meal in 24 hours; if after this he had to go to a party and take a second dinner, he ate nothing all the next day. He died at the age of 70.

A lady of culture, refinement and unusual powers of observation and comparison, became a widow. Reduced from affluence to poverty, with a large family of small children dependent on her manual labor for daily food, she made a variety of experiments to ascertain what articles could be purchased for the least money, and would at the same time "go the furthest," by keeping her children longest from crying for something to eat. She soon discovered that when they ate buckwheat cakes and molasses they were quiet for a longer time than after eating any other kind of food.

A distinguished judge of the United States Court observed that when he took buckwheat cakes for breakfast, he could sit on the bench the whole day without being uncomfortably hungry; if the cakes were omitted, he felt obliged to take a lunch about noon. Buckwheat cakes are a universal favorite at the winter breakfast table, and scientific investigation and analysis has shown that they abound in the heat-forming principle; hence nature takes away our appetite for them in summer.

During the Irish famine, when many died of hunger, the poor were often found spending their last shilling for tea, tobacco and spirits. It has also been observed in New York, by those connected with charitable institutions, that when money was paid to the poor, they often laid it all out in tea or coffee, instead of procuring more substantial food, such as meal, flour and potatoes.

On being reproved for their apparent extravagance, the universal cry was in both cases identical; their own observation had shown them that a penny's worth of tea, tobacco or liquor would keep off the sense of hunger longer than a penny's worth of anything else. Scientific men express the idea by saying: "Tea, like alcohol, retards the metamorphose of the tissues; in other words, it gives fuel to the flame of life, and thus prevents it from consuming the fat and flesh of the body."

If a person gets into the habit of taking a lunch between breakfast and dinner, he will soon find himself getting rather faint about the regular luncheon time; but let him be so pressed with important engagements for several days in succession as to take nothing between meals, and it will not be long before he can dispense with his lunch altogether. These things seem to show that, to a certain extent, eating is a mere habit. Whole tribes of Indians, hunters and trappers have been known to eat but once in 24 hours and that at night.—*Hall's Journal of Health*.

Do Not Face the Light When at Work.

Statistics kept by oculists employed in infirmaries for eye diseases, says the *Builder*, have shown that the habit of some persons in facing a window from which the light falls directly in the eyes as well as on the work, injures their eyes in the end. The best way is to work with a side light, or, if the work needs a strong illumination, so that it is necessary to have the working table before the window, the lower portion of the latter should be covered with a screen, so as to have a top light alone, which does not shine in the eyes when the head is slightly bent over and downward toward the work.

In the schools in Germany this matter has already been attended to, and the rule adopted to have all the seats and tables so arranged that the pupils never face the windows, but only have side lights from the left; and as a light simultaneously thrown from two sides gives an interference of shadows, it has been strictly forbidden to build school-rooms with windows on both sides, such illumination having also been proved to be injurious to the eyes of the pupils.

We may add to this the advice not to place the lamp in front of you when at work in the evening, but a little to one side; and never to neglect the use of a shade, so as to prevent the strong light shining in the eyes. This is especially to be considered at the present time, when the use of kerosene lamps, with their intensely luminous flames, becomes more and more common.

CARBOLIC ACID IN DIPHTHERIA.—W. H. Kempster, one of the health officers of London, writes to the *Lancet* as follows: "On reading Dr. George Johnson's admirable paper on diphtheria in your late issues, in which he advocates local disinfectants in the treatment of that disease, I was surprised to observe that while he recommends the use of chlorine, permanganate of potash, sulphurous acid, and more especially perchloride of iron, no mention is made of carbolic acid—an agent tried by me some years ago in despair at the almost invariably fatal termination of cases treated by the agents recommended by Dr. Johnson. Since that time, by using carbolic acid, given in the form of a mixture of *Acid. Carbolic. Opt.* (Calvert's), one to five minims (according to age), with a drachm or two of syrup of orange and water (thus getting rid of gargles and the painful operation of swabbing the throat, the act of deglutition bringing the medicament into contact with the fauces and other parts affected), I have lost but one patient out of some 30 or 40, in which case the air passages were affected from the first. It is well to state that in all these cases the characteristic exudation was visible, and they were not cases of ordinary croup." Mr. Kempster writes at a later date, that numerous cases since treated on the above plan have all recovered; in very severe cases he obtains good results by local application of No. 1 carbolic and glycerine (1 to 4) with a camel-hair brush.

HOT WATER FOR INJURIES AND BRUISES.—The New York *Medical Journal* reports this case: The patient was engaged in a machine shop, and while his hand was upon the anvil of a trip-hammer, the hammer—weighing 700 lbs.—fell. It so happened that a file was on the anvil, and in this way the force of the hammer was arrested about half an inch before it reached the bed. When the hand was examined it was found that the whole palm was a mass of pulp. The metacarpal bones were comminuted extensively, and there was, apparently, but small chance of saving the hand. It was, however, placed in hot water, and kept there for two or three weeks, and then taken out and dressed. In three months the patient was sufficiently well to leave the hospital, and now—nine months after the accident—he is able to move the fingers and has quite a useful hand. Bruises and injuries do much better when treated with hot than with cold water. The temperature should be about 103° Fahrenheit. Another case is reported of compound fracture and discoloration of the ankle joint, in which the proximal end of the first metatarsal bone protruded from the foot. The dislocation was reduced and the foot placed in hot water. At the end of a week it was taken out and dressed in the ordinary manner. The foot is now doing well and promises a good return.

HYGIENIC INFLUENCE OF COMPRESSED AIR.—It has been supposed by some that the effects of compressed air on workmen were injurious, but Siebe, an eminent German hydraulic engineer, has established, by a series of experiments during several years, the fact that workmen working in caissons, attain, in a short time, a remarkable degree of comfort; and that their chests become strengthened to a remarkable degree. He has also ascertained that pulmonary complaints become cured by thus working under water. In consequence of this, Dr. Carlo Farinacci, of Milan, has established an erotherapeutic establishment, for the treatment of pulmonary complaints.—*Revue Industrielle*.

SIMPLE REMEDY TO STOP BLEEDING.—Mr. F. E. Forster cut himself, and trying to stop bleeding, he did not succeed, notwithstanding he tried to do it in several ways; finally the idea struck him to put on some dry plaster of paris, which happened to be at hand. It stopped the bleeding at once, while it only caused some stinging sensation, lasting a minute or two, but no ill effects were experienced.



W. B. EWER, SENIOR EDITOR.

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THE ORIGINAL ARTICLES in this paper are mostly set in
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ADDRESS all letters to the firm, and not to individual
members, or others, who may at any time be absent.

Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, Jan. 27, 1877.

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CALIFORNIA INSURANCE COMPANY.—The an-
nual statement of the California Insurance
Company shows the capital stock, \$300,000, to
be all paid up. The total assets are \$560,704.39,
and the liabilities \$100,206.39, the surplus as
regards the policy holders being \$160,498.03.
During the year fire losses to the amount of
\$27,452.85, and marine losses to the amount of
\$37,283.59, were incurred.

BULLION.—The leading producing mines
produced the following amounts in December:
Belcher, \$112,000; California, \$128,211;
Chollar-Potosi, \$63,971; Consolidated Virginia,
\$351,717; Justice, \$276,497; K. K. Con-
solidated, \$55,000; Leopard, \$66,000; Manhattan,
\$90,500; Modoc, \$93,570; Northern Belle,
\$171,748; Ontario, \$30,000; Ophir, \$60,000;
Tybo Consolidated, 68,300. Total, \$2,732,514.

The Miners' Association of Cornwall and Devon
have classes for the purpose of teaching var-
ious branches of science, and have decided to
have a medal struck, to be awarded to the stu-
dents who distinguish themselves in those
classes. The young miner must have worked
underground twelve months previously before he
is entitled to the medal.

The Nevada bank has loaned \$600,000 to Al-
vinza Hayward and \$300,000 to Milton S. La-
tham, at nine per cent. per annum.

LEAD in Liverpool on January 1st was £21 15s
@22 5s for good ordinary brands, and £21 @21 5s
for Spanish soft silver.

THE Empire mining company of Grass Valley
shipped bullion for November account, \$13,682.
62, and for December account, \$15,130.96.

Mining and Farming Ground.

In many places in the foothills of this State,
where mining was carried on in early days, and
the ground turned over and over in search for
gold, it is again made to yield wealth in the
shape of agricultural products. It used to be
supposed that ground once disturbed by mining
entirely lost its usefulness for other purposes,
but time and experience have proved the fallacy
of the idea. Hundreds of instances might be
cited where old mining ground has been turned
into farms. Districts formerly giving support
to miners alone, now, in many cases, have a pop-
ulation almost entirely agricultural in its char-
acter. The foothills of California, long consid-
ered worthless for anything, furnish the best
fruit in the markets, and the "red lands" prove
their value by yielding as abundant crops of cer-
tain products as the apparently richer lands of
the valleys.

In some parts of the State the owners of the
land get both mineral and agricultural products
from the same tract, working sometimes as
miners and sometimes as farmers. Of course
this is not general, but the fact may be cited as
showing the wealth of certain districts. It is
also a refutation of the charge against miners
that they utterly destroy the land on which
they work, and, unlike the farmers, get only
one "crop." In fact, a large portion of the
placer ground in California has been worked
over two or three times, and a good deal is now
being worked again by Chinamen, who make a
fair living by it. It has also been found that
underlying the placers of early days, long since
worked out, in many places lies ground nearly
as rich, but covered by a capping of rock, under
which the miner must work to get out the au-
riferous gravel deposited there ages ago.

We used to think that when the placers were
gone mining was nearly done for. Then we
found the gravel or hydraulic mines, a branch of
industry which, although now large in extent,
is growing from year to year, and which will
continue to be prosecuted by future generations.
Immense hills of gravel, acres and acres in ex-
tent, still lie untouched in the mining regions of
California, waiting patiently their turn to be
swept into valleys, yielding their golden metals
in the process. A large part of that ground
will even then be in a condition to yield support
to our people, though in a different way from
what it does now. The farmer will plow, sow
and reap where the miner has blasted, washed
and cleaned up, and the ground which has
yielded its stored-up mineral treasures will, in
process of time, develop agricultural riches as
well.

But nothing except the immediate future can
greatly interest the present owners; few of them
are planting acorns for future oaks, but are get-
ting what the ground will produce in as rapid a
manner as possible, in accordance with the uni-
versal California theory and practice. The peo-
ple referred to previously, who can mine and
farm both, consider themselves lucky in making
the land yield in more than one way; for if a
man can grow fruit over a substratum of gold
he can afford to let a part of his land lie fallow
on the surface each year while he strips it from
below. Only this week we noted in the Cala-
veras Chronicle that a Mr. J. R. Strange, who
some time since discovered an immensely rich
stratum of gravel in his lot in the suburbs of
Mokelumne Hill, is preparing for further devel-
opments. There is no question, the paper says,
but that Mr. Strange is in possession of a portion
of the old French Hill lead, one of the richest
deposits of auriferous gravel ever found in the
State. The only drawback to its working being
that he has an orchard of fine fruit trees grow-
ing on the ground. To get at the bonanza with-
out ruining his orchard is Mr. Strange's object,
and as he is an experienced miner he will un-
doubtedly accomplish it. There are not many
places in the world where mining and farming
are so closely connected pursuits as in this
instance.

The regents of Michigan University wish the
Legislature to make some provision for the
School of Mines, and ask for \$2,500 a year for
the purchase of books for the general library,
\$6,000 a year for support of the dental school,
and for several additional buildings. Edward
L. Walter, who has been assistant professor of
Latin in the University since 1863, has just
been awarded the degree of Doctor of Philoso-
phy by the Leipzig University.

THE VIRGINIA CITY papers draw a gloomy
picture of the destitution prevailing there.
Hundreds of men have been thrown out of em-
ployment, who throng the streets pleading for
work without being able to obtain it. Many of
these are men with families, who are thus de-
prived of support. This is attributed to the
depression in the mining share market, causing
slack work in the mines.

DISPATCHES from Sioux City, Iowa, state that
news has been received at Fort Randall
that twenty miners, returning from the Black
hills, have been killed by Crazy Horse's band,
at a place about 30 miles east of the hills.

The Nevada Transcript quotes rumor to the
effect that miners' wages in some of the mines
on the Ridge are to be reduced next month.

California State Geological Society.

The above-named society has been incorpo-
rated under the laws of this State for the pur-
pose of making a collection of mineral products
of the Pacific coast. The collection will be
donated to the State of California when it shall
become worthy of acceptance, upon the condi-
tion that proper care shall be taken of it, that
it shall be placed on exhibition free to all, and
that it shall not be removed from the city of
San Francisco. The second purpose of the so-
ciety is to encourage the study of geology in all
its branches.

Miners and prospectors have long needed
some place where, when visiting the city, they
could study the characteristics of the different
ores and minerals of the Pacific coast, and could
compare the varieties of ores. The society will
be able no doubt to give much valuable infor-
mation to those about to engage in new mining
and manufacturing enterprises by making known the
localities of useful ores and minerals.

The society has issued a circular appealing to
miners and those connected with mines to send
specimens of such minerals or metals as they
can obtain from any mine or deposit on this
coast, and also wall rocks, interesting minerals,
fossils, etc. It is desired that every mine on
the Pacific coast which has a name shall be re-
presented in the collection. A careful record
will be kept by the society of all specimens re-
ceived, showing the date, locality, donor's name,
and such other information as may be necessary.
The objects of the society are purely for the
benefit of the State and coast, and the manager
of Wells, Fargo & Co. has generously consented
to transport all packages addressed to the so-
ciety free of charge. It is requested, however,
that persons sending specimens send only such
as are characteristic and worthy of a place in
the collection.

The society is composed of the following gen-
tlemen: Melville Attwood, S. Heydenfeldt, Jr.,
Aug. J. Bowie, Jr., Thos. J. Owens, H. A. Cobb,
Jos. Roberts, Jr., Henry G. Hanks, Tod Robin-
son, and Ferdinand Vassault. The Directors
are: Henry G. Hanks, President; H. A. Cobb,
Vice-President, and S. Heydenfeldt, Jr., Secre-
tary. These gentlemen hope, by individual ex-
ertion and the assistance of others, to make a
collection worthy of the name; and as it will be
kept in this city, it will be available to all. It
is not intended to compete with or detract from
the large and growing collection at the State
University, but as that is at Berkeley, it is
practically inaccessible to the ordinary visitor
to this city, and a collection here will be much
more convenient. The bias of this society will
be in the direction of economic geology, and to en-
courage the development of all mineral products.
The gentlemen who have organized it will do
everything in their power to gather a fine, large
collection, and persons in a position to aid the
object need have no hesitation in forwarding
specimens, as they may feel assured that they
will be applied to the legitimate purpose for
which they are intended. The proper address is—
"California State Geological Society," San
Francisco, Cal.

Mining Stocks.

The mining stock market of this city has
been in rather a mixed-up condition of late, and
the newspapers are full of articles and commu-
nications concerning the various branches of
the subject. Stocks kept going down until the
bottom nearly dropped out, as the phrase is,
when suddenly prices started up with a jump,
catching a great many "shorts," and causing
financial embarrassment in various quarters.
The advance, curious to relate, seems to have
caused a great deal more disaster than the de-
cline. The long-continued decline and depres-
sion caused a depreciation in values which was
very alarming in the aggregate amount. At
one time the depreciation on several leading
stocks from highest prices in March to lowest
prices this month amounted to over one hun-
dred and twenty millions of dollars, or nearly
70 per cent. The depreciation in the two bo-
nanza mines was over sixty millions, or about
60 per cent.

There has been some pretty severe criticism
indulged in concerning the action of the cele-
brated mining firm of Flood & O'Brien, who
control the destinies of the bonanza mines.
It was stated that they could have sustained
the market during the late bad break, by stat-
ing publicly the exact condition of the mines
under their control, and denying the rumor
that Consolidated Virginia would pass the di-
vidend; or on the other hand, giving the reason
for not paying the dividend. We have pub-
lished the proceedings at the annual meeting of
the company, so that our readers are familiar
with the controversy which occurred there.
We are not aware that it has ever been the
custom for mining trustees or controllers of
mines to state to the public what they were
doing or about to do, except at the annual
meeting, and by the weekly or daily letters of
the superintendents on file at the offices of the
companies. As for assenting to or denying
street rumors authoritatively, it is seldom done.

That a time will come when the knowledge of
the doings of a mine will be as much the prop-
erty of one stockholder as another, we sincerely
hope, but it has not been a common custom
heretofore.

Without intending any special defence of the
firm mentioned, we are unable to understand
why, because the market is depressed, they
should shoulder the whole blame, any more
than they deserved the whole praise when
everything was up. They were praised without
 stint when they prophesied dividends for many
months ahead, but we cannot see why it is their
fault that dividends cease. We must say, with-
out prejudice, that as we understand the thing
these bonanza mines have been managed in a
first-class and at the same time economical
manner. We are not aware of any previously
worked mines giving even a proportionate
record. The history of mining management on
this coast is not so brilliant as to furnish many
examples of so large a proportion of gross earn-
ings paid to stockholders in dividends. Many
examples might be cited to show that when
large earnings were really made, the outside
stockholders got none of them. If the bonanzas
hold out dividends can be paid, but if ore gives
out, water comes in, ventilation is bad, and
hoisting facilities are not available, dividends
cannot be paid unless these difficulties are re-
moved.

It seems to have become quite the correct
thing to vilify the persons named if anything
goes wrong in any direction. It is a penalty
they pay for their positions as managers of the
leading mines. But the idea that any one or
two men can exercise supreme control over a
market such as this is absurd. They are re-
presented as having striven eagerly to depress
their own property, or that of which they own
more than any one else. The mines come into
prominence simply from their wonderful devel-
opments, and when the ore gives out the mine
must be worth less than it was. The stock
speculations of the bonanza firm they may keep
as private as they choose, but the mining devel-
opments are bound to come out and, as far as
we know, the work in the mines has been very
systematically and economically carried on.

The proof of this is shown in a statement by
a writer on the Commercial Herald, where it is
stated that 72% of the gross yield of the Con-
solidated Virginia and California mines has been
paid out to stockholders in dividends under the
present management, while the very best man-
aged among other mines on the Comstock, has
never paid more than 50% of the gross yields to
shareholders. In July California sold at \$56 per
share, and since then has paid dividends to the
amount of \$12 per share, while its selling price
on the 13th of January was \$45 per share.
Con. Virginia sold in July at \$45 per share, and
on the 13th of January at \$35 per share, having
in the meantime disbursed dividends of \$10 per
share. In other mines the depreciation was
still greater. For instance, Alpha in July was
\$47, and January 15th it was \$12. In the same
time Belcher fell from \$18 to \$8; Bullion from
\$42 to \$8; Exchequer from \$17 to \$4; Con. Im-
perial from \$6 to \$1.37; Justice from \$26 to
\$9.50; Kentuck from \$13 to \$4; Ophir from \$50
to \$16.50; Savage from \$22 to \$7.50; Sierra
Nevada from \$17 to \$5; Union from \$17 to \$7;
Mexican from \$40 to \$14; Yellow Jacket from
\$30 to \$9.50; Crown Point from \$12 to \$4.75,
and Chollar from \$100 to \$46.

Reports of all kinds are prevalent in the
present state of the market, and people who
gamble in stocks must take their chances.
When they lose, however, they should grin and
bear it, and not lay the blame on others. We do
not care to give any great amount of space to a
record of stock manipulations, but are always
glad to chronicle the facts connected with leg-
itimate mining operations.

Decision in the Debris Case.

Judge Sexton delivered his charge to the jury,
on Monday, in Sacramento, in the case of
Atkinson vs. The Amador mining company, to
recover damages for injury to his land by the
mining debris of the company, telling them that
they had nothing to do with the question of
titles raised by the defence, but were simply to
decide whether any damage had been done to
the land in question, and assess such damages.
After being out three hours the jury brought in
a verdict of \$4,000 for plaintiff. The judge
granted a stay of proceedings for 60 days.

THE PICKERING GOVERNOR.—Messrs. Neylan
& Young, agents of Cameron's pumps, machin-
ist's tools, wood working machinery, etc., are
also sole agents for the Pickering governor,
now being introduced on this coast. This gov-
ernor has received medals and awards at various
international and local exhibitions, some of which
are mentioned in the advertisement in another
column.

LAST season the Mackey & Fair flume brought
down from the summit of the Sierras 15,000,000
feet of timber and lumber, and 75,000 cords of
wood. All of this has reached the Comstock
via Huffaker's and per the Virginia and Truckee
railroad, and most of it has been consumed.
About 500 men have been employed this season
in preparations for next season's run.

THE Superintendent of the bonanza mines has
a complete miniature five-stamp quartz mill as
an appropriate toy for his boys to play with.

A MINING district called "Goldopolis" has
been organized in Inyo county.

Comstock Papers.—No. 14.

The Name and but Little Besides

As we have seen, the various mines situated on the Comstock lode were named, for the most part, after the men who first took up claims thereon, or those who purchased from these original locators. Both of these parties, with a few exceptions, disposed of their interests at an early day, not a single one of the men whose names are attached to these mines having long remained a large owner in any of them. It is probable enough that these pioneers do not today own so much as a share in a Comstock mine, unless it be some of the very low priced ones. More than one-half of these men are, in fact, now dead, few of them while living having been distinguished for that foresight and thrift, without which scarcely any secure wealth.

The Men of Nerve and Courage Come In for a Share.

Before dismissing this branch of our subject it may, perhaps, be proper to mention still another class of adventurers, who, repairing early to these new-found silver mines, managed, without money or hard labor, to secure small and sometimes very considerable interests in some of the most valuable and actively productive claims on the great mother lode. These men belonged to that class, numerous in frontier countries and rough communities, who, preferring excitement and danger to the drudgery of hard work, are apt to be chosen to fill the offices of marshals, sheriffs, constables, etc., positions which more quiet and peace-loving citizens do not often covet, and for discharging the duties of which they are not always well fitted.

Now, so it was, many of these pioneer claim-holders were a good deal this stripe of persons themselves, or a kind whose experience lead them to readily sympathize with the bold and adventurous. Some of them, too, were a little uneasy as to the tenure whereby they held their possessions, being nothing loth to strengthen the same by an alliance with these practitioners under the shotgun and revolver code. Hence the transfer to these latter of divers and sundry feet in the rich claims at Gold Hill was a thing of frequent occurrence. As a general thing, these were not men of a noisy and turbulent manner or quarrelsome disposition, given to bluster and exhibitions of brute violence. On the contrary, they were more often noted for their quiet and even gentlemanly deportment, but of firm nerve and cool and desperate courage. Many of them had been engaged in deadly affrays, but these had mostly occurred in the discharge of their official duties, or, if of a personal kind, had not often been provoked by themselves.

Tom Peasley, John Blackburn and Tom Andrews

Might be cited as good examples of this school of men. Blackburn was killed at Carson City, December, 1861, by Bill Mayfield, a desperado and gambler. He was at the time marshal of the Territory, Mayfield having been led to commit the assassination through apprehension of being arrested by the officer. The killing was done in the early evening, in a well-lighted and crowded saloon, and was an act of wonderful daring on the part of the murderer, who approached his victim openly and while surrounded by his friends, and stabbed him to the heart, after which he marched out, flourishing his bloody knife in defiance and made good his escape through the aid of confederates outside. Blackburn, as he saw his adversary approach, drew his pistol, and would probably have killed him, had not his own friends, by injudiciously interfering, defeated his purpose. With his last gasp he leveled his weapon upon the retreating assassin, but fell dead before he could draw the trigger, his eyes burning with a fearful desire for vengeance. Blackburn, when entirely himself, was averse to acts of violence, though one of the bravest men that ever lived. When excited with liquor, however, as occasionally happened, he was a most dangerous man, attacking, without discrimination, his friends and his foes. Only a few days before his death, being slightly under the influence of liquor, he assailed and would have killed Wm. M. Stewart on the streets of Carson, but for the prompt interposition of Thomas Hannah, then with Stewart, a member of the Territorial legislature. The provocation given for this deadly assault was not only trivial, but almost wholly imaginary. Mayfield, after being for sometime concealed in Carson City, and nearly perishing with cold, his limbs having been badly frozen, was arrested, but afterwards succeeded in making good his escape

and fled to Montana, where he was killed in some gambling or other brawl a year or two later.

Peasley, while being the peer of Blackburn in point of courage, was at the same time a most genial, kind-hearted and companionable sort of person. He was also noted for his splendid physical powers, being at the same time a young man of intelligence, and by no means deficient in fine moral qualities. The incidents connected with his death were not very unlike those that attended the killing of Blackburn, the moving cause consisting in part of a personal grudge and in part of political differences. He, too, was killed in a saloon in Carson City, his assailant coming upon him unawares and shooting him fatally. With a pistol ball through his most vital part, such was the strength and will-power of the wounded man that he seized his murderer and, crashing him through a closed door, drew his pistol and deliberately shot him dead, falling the same instant, himself a corpse, upon the

Mechanics' Institute Concerts.

The trustees of the Mechanics' Institute have arranged to give a series of eight instrumental and vocal concerts, the object of which is to replenish the treasury of the Institute, which has become exhausted in consequence of the recent purchase of books and expensive alterations. The concerts will be given each Saturday evening, in a hall 200 by 100 feet especially fitted up in the Industrial Pavilion, and will be on a scale of unequalled excellence. The services of Mr. Rudolph Herold have been engaged as musical director and Mr. W. A. Andoe, many years manager of Gilmore's celebrated band, has been selected as the business manager.

A subscription list has been opened at the librarian's desk, and at the principal music stores of this city, the price of the season tickets having been fixed at four dollars, entitling

(Copyrighted.)

Mechanical Ore Concentration and Separation—No. 19.

(Written for the Press by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.)

Six, or at least four, sizes should be determined on to be acted upon by the jigs, and all of one-half millimeter (a millimeter equals 1-25 of an inch), and smaller sizes should be kept out and treated as slimes, of which I shall speak specially. Experience has proven that proper series for classification are to be considered, viz., one, two, four, six and eight millimeters, or one, two, three, four, six and nine millimeters; or for finely disseminated ores, one, one and a half, two and three millimeters, or one, one and a half, two, three, four and five millimeters.

To illustrate a proper arrangement I select the series, one, two, four and six millimeters. To effect this arrangement the dry screen under the rollers should have perforations of six millimeters in diameter, so as to pass back by re-elevation what is not broken to this size at least. All that has passed the six millimeter perforations should drop into a single screen of three millimeter perforations in order to divide the entire bulk between two other screens, of which one is a single one with one and a half millimeter perforations, and the other a double screen, having inside one and a half millimeter perforations and outside, half a millimeter perforations.

This will result in the following: For cleaning table (a) slimes less than one-half millimeter; material for jigs (b), fine sand (one-half millimeter to one and a half millimeter); (c) coarse sand (one and a half millimeter to three millimeters); (d) fine grains (three millimeters to four and a half millimeters); (e) coarse grains (four and a half millimeters to six millimeters).

The single screens are best of the construction heretofore referred to—conical. For the double one the accompanying engravings show the proper style. The speed should not be in the middle of the screen, at circumference, more than from four to six feet per second. Figures A B and C show the double screen with stuffing-box attachment, the shaft being a wrought iron pipe, with holes so as to sprinkle water over the entire inside of the screen. The hopper delivers the ore on one side of the shaft, or over it on two sides, as indicated.

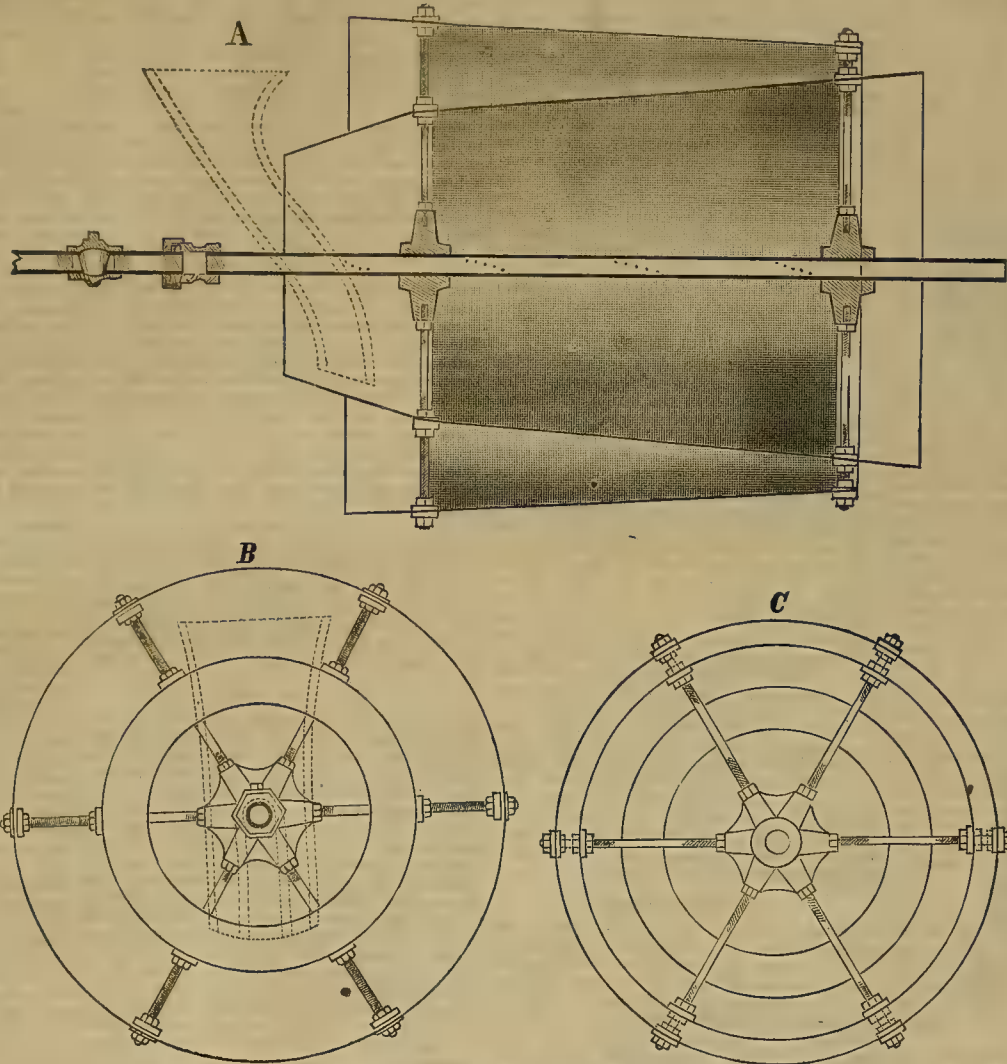
Screens made of wire cloth do very imperfect and unsatisfactory work. They should be perforated steel or copper, and of as heavy material as the perforation will permit. The screens with horizontal or inclined center shaft have been in general use for a long time. The author experimented largely with funnel-shaped screens, revolving on a vertical shaft fed in small streams all around their rim, and for jiggings sizes only they have more capacity than any others.

WEBSTER'S UNABRIDGED DICTIONARY.—It has now stood the test of time, and received in approval not only that popular verdict which in the United States has called for over 50,000,000 copies of the Webster series, but the thorough endorsement of our best scholars, as put forth individually, and in the pages of the authoritative periodicals. It is not only, to quote Professor Stowe, "in many respects the greatest literary work which America has ever produced," but it is in many respects the greatest literary work produced by any nation or age.—*New York Mail*.

LUMBER.—The Seattle Tribune says: The Port Gamble saw mill cut in 1875 40,000,000 feet of lumber, 16,000,000 laths, loaded 88 ships, and bought (by the Puget Mill Company) 54,000,000 feet of saw logs. At Port Blakely, 30,000,000 feet of lumber, and 10,000,000 laths were cut and 70 cargoes sent abroad. The report from Port Ludlow is of 20,000,000 feet cut. Schooners and barkentines of an aggregate tonnage of 1,600 were built at that place from lumber cut in the mill.

The Northern Belle company paid its twentieth dividend on the 15th inst. During the two years the mine has been worked it has netted \$1,300,000; at least it is so reported. It is now claimed that the February dividend will be increased to \$1.50, leaving a surplus on hand.

The shipments of Seattle coal during the first thirteen days of January ran up to 5,700 tons, or, not including one Sunday not worked, at the rate of 475 tons a day.



REVOLVING WET DOUBLE SCREEN.

floor. Both Peasley and Blackburn had been quite largely interested in different properties on the Comstock lode, and were at the time of their deaths owners in some of the more valuable mines along it. Andrews, of whose name we have made mention, was also at one period interested in some of the Gold Hill grounds. After many rough and varied experiences these interests have slipped away, but the owner still survives, with seemingly a good many years of active service still in store for him.

We might adduce many other examples of men belonging to this class, but need not multiply them here, the cases already cited sufficiently illustrating the anomalous condition of affairs that made it possible for such valuable interests to be secured by considerations and services of the kind alluded to.

COAL IN LOS ANGELES.—A dispatch from Los Angeles says: Parties are engaged in prospecting for coal in the Arroyo Seco, immediately adjoining the city on the east. Some fine specimens have been discovered, and the prospectors expect to strike a vein in a few days. Coal has now been found near Lyon's station, in the Cañuena range, near Santa Monica, at several points in the San Fernando mountains, and in different sections of the southern portion of this county, with surface indications at various points in the neighborhood of this city. The matter is attracting the attention of capitalists, and prospectors are urgently invited to bring specimens to the city in order that they may be tested. If the test is satisfactory, a large amount of capital will immediately be invested in developing the claims already located, and prospecting for others will become lively.

ANTIMONY is selling in Liverpool at £55@57 per ton for French star regulus.

the holder to one reserved seat during the entire season. Lovers of music will have here a fine opportunity to indulge their taste, and at the same time aid a worthy object. The seating capacity of the hall will be for 3,500 persons. The most complete arrangements have been made to make the concerts a success, and the best available home and foreign talent has been engaged. The object is a deserving one and we hope that all who can will purchase one or more season tickets, even if they cannot attend all the series.

BULLION SHIPMENTS.—Since our last report shipments from the prominent mines have been as follows: Modoc, January 17th, \$5,630; California 18th, 19 bars bullion, valued at \$75,108.82—total to date, \$209,004.73; Con. Virginia, 18th, 13 bars bullion, valued at \$45,442.94—total to date, \$209,395.93; Comanche, 16th, \$6,106; Northern Belle, 16th, \$10,361.21; California, 20th, \$80,181.99—total to date, \$289,186.72; Modoc, 19th, \$5,080—total to date, \$82,277; Con. Virginia, 20th, \$16,118.88—total to date, \$225,514.81; Modoc, 21st, 230 bars, valued at \$5,390—total to date for January, \$87,667; Tybo Con., 17th, \$5,810.62—total to date, \$31,390.50; Arizona, 21st, \$1,853; Chollar, 22d, \$6,860.88; Con. Virginia, 23d, \$49,622.73—January account to date, \$275,137.54; California, 23d, \$198,673.43—January account to date, \$487,865.15; Northern Belle, 18th, 7 bars, valued at \$12,019.95; Manhattan, 24th, \$12,500.

SINCE the cessation of the rain the work of erecting the Southern Pacific work shops is being vigorously pushed at Los Angeles. Over 300 men are now employed on the grounds. The framework of the machine shops was placed in position Tuesday.

Base Bullion.

Smelting Works in Utah.

The Salt Lake Tribune in an article on the above subject gives the following list of smelters in Utah.

The Flagstaff Smelter.

Situated at Sandy station, on the line of the Utah Southern railroad, is conducted in first class style. Everything about the premises goes forward with the regularity of clock work. Each man knows his duty and performs it. The discipline is regular, and strict compliance is exacted from all. A man who gets intoxicated is at once dismissed, and is never again employed, and like Squeers, the management compels everybody engaged about the smelters to take a dose of medicine before breakfast as a preventive against leading. Ninety men are employed about the works, and 120 tons of ore is reduced every 24 hours, yielding about three car loads of base bullion daily, a greater quantity than is produced at any other smelter in the Territory. The property is owned by the Flagstaff mining company, and for the space of about a year prior to the middle of last September, was lying idle, when Messrs. Mathier & Geist, of Salt Lake City, leased it and fired up one furnace. This enterprising firm, with Mr. Mathier doing the business in the city, and Mr. Geist, who is an educated as well as a practical smelter, managing the works, at once commenced making the needed repairs, preparatory to running all four of the stacks. In less than three months improvements at a cost of nearly \$40,000 had been made, and all four of the furnaces fired up. One of the largest and most valuable improvements put in by the lessors, is an 80-horse power engine, while the old one, which is in excellent repair, will be kept in condition in case of accident to the other. The whole blast of the smelter is now 120-horse power. Fume condensers have been put in, so that the smoke from each furnace is forced through a series of chambers, where the dust, which assays about 35 per cent. lead and 24 ounces in silver, is saved, and after being properly prepared, is put through the furnaces with matte. A reverberatory furnace for roasting matte and refractory ores, has just been completed and fired up. A considerable quantity of broad and narrow gauge railroad switches have been put down about the works, and extensive ore platforms constructed. Two large reservoirs at a considerable cost have been built east of the smelter, so that a supply of water in any weather may not be wanting. Other improvements are being made, and when the company gets a new system of roasting refractory ores successfully, the Flagstaff will be one of the institutions of the country.

This smelter is running all the ore produced from the Flagstaff mine and portions of that from the leading mines of Little Cottonwood and Bingham. From these ores the short time the smelter has been in operation 200 car loads of base bullion, worth \$2,000 per car, have been produced. At the present time there are about 5,000 tons of ore on the platform ready for smelting, while an immense supply of coke and charcoal is in sheds for a long winter's run.

The Germania Smelter

Is situated on Little Cottonwood creek, about six miles south of Salt Lake City, and on the line of the Utah Southern railroad. It is owned by a foreign corporation, and perhaps is one of the most complete works of the kind on the Pacific coast. It is conducted with skill and energy, and turns out the purest lead bullion produced in Utah.

The machinery about this establishment is of the best manufacture, and does its work constantly and without stoppages. The engine, which has been in use four years, is a very fine one, of 40-horse power, being of ample capacity to keep up the blasts of both the furnaces, while the pump, by the timely use of which the works have been saved several times from destruction by fire, is one of the neatest to be found at any of the smelters. It is capable of throwing 300 gallons of water per minute. During the past year new improvements have been made. A new steam boiler to supply the place of the old one has been put in; new refining works for separating the silver from the base bullion have been constructed and will be in operation in the course of a few months, and other improvements of a minor character have replaced less convenient and substantial things about the place. At present the Germania has both of its water jacket furnaces in full blast. They are in point of safety to the health and lives of those employed about them, unsurpassed by any furnaces at the smelters of Salt Lake county. The fume condensers are almost perfect, so that the poisonous dust arising with the smoke is caught before it reaches the open air, while the feed doors of the furnaces are so arranged as to make it impossible for the fumes to escape into the building and lead the men. The ores smelted at these works are brought from various parts of the country. Besides those produced from Utah mines, which form the basis of the supply, a considerable quantity of high grade ores from Montana and Idaho is used in connection with the low grade lead ores from our own mines, for the purpose of raising the percentage of silver in the bullion turned out above the standard of 110 ounces to the ton, which gives the bullion a readier sale in the market.

The process of preserving the

Standard of Bullion

Is done in a manner peculiar to the Germania.

When the contents of the several classes of ores have been ascertained by sampling, a given quantity from each lot is spread out on the floor in layers one upon the other, until a pile of fifty or a hundred tons of all the requisite classes is accumulated, and then from this the furnaces are supplied, one pile being used up while another is being built. In this manner the grade of bullion produced is always kept approximately near to the required standard, so that the managers have an idea from day to day what will be produced for a week ahead.

On an average, 40 men are constantly employed, running two shifts every 24 hours. But the works are so perfect about the Germania, that leading is very rare.

During the past year this smelter has produced 1,700 tons of base bullion of the average value of \$235 per ton, or a total valuation of \$262,500.

The Sheridan Hill Smelter

Is situated at West Jordan on the Bingham Canyon railroad, and is built on one of the most eligible sites to be found in the country, with an ample and inexhaustible water-power privilege. It is understood to be the property of three Salt Lake gentlemen, it having fallen into their hands on a mortgage from the original owners. It is a good piece of property, and with some needed repairs and improvements in the style of the furnaces, it would rank among the best smelters of the country. Yet it has done, with its three stacks running only a portion of the time, a good year's work, giving employment to an average of 20 men the entire 12 months, and it has turned out 173 car loads of base bullion of 11 tons to the car, worth, according to Superintendent Rumfield's calculation, \$2,000 to the car load, or a total value of \$346,000. One smelter has been run on custom ores from the mines of Bingham and Cottonwood.

The Galena Smelter

Is situated at the same place as the Sheridan Hill and almost joins it on the north. This smelter, which is now in the hands of Captain Selfridge, has seven furnaces; three of them have been leased to Mr. L. E. Holden, who has torn out the old stacks and is replacing them with others of an improved pattern. They will be ready to fire up early in the spring. Of the four remaining stacks, two and some of the time only one is kept running, but they are large and of sufficient capacity to reduce all the ores the company may desire to handle during the coming season. In the last year 235 car loads of base bullion, or 2,470 tons, of an average value of \$1,600 to the car load, have been produced from the yield of the Jordan mine and custom ores from the Cottonwoods and Bingham. The Jordan company have in connection with the smelter a sampling mill, where they have sampled every fifth sack of the 12,350 tons of ore run through their smelter in the past year, as well as having much work of the same character for other parties. At present they sample about 300 tons each month, including that which they purchase for their own use. The business is under the able supervision of Captain Selfridge, who is running the concern to win, while Mr. G. P. Lockwood is in charge of the smelter and the gang of workmen, some 30 in number.

The Saturn Smelter

Is situated at Sandy station, and is one of the oldest smelters in the country. It is running only one stack, but since it has been under the control and management of Mr. John W. Kerr and other Salt Lake parties, it has been well conducted. One hundred and sixty car loads of \$2,000 to the car, is its product of base bullion for the last year. The old dump of slag is being overhauled for the malt in it, and will be put through the furnace with ore. At present the works are shut down for repairs and improvements, but they will be started up again in the course of a few days. This smelter is under the immediate supervision of Mr. A. A. Ganschatz.

The Mingo Smelter.

Or the Mountain Chief, which adjoins the Saturn, and has been lying idle for several years, has been leased by a Pittsburg company and put in repair. Two large furnaces have been built from the ground up, new machinery put in and other extensive and substantial improvements made. It is now one of the neatest and most convenient smelters in the country, of a capacity of 15 tons of bullion daily, and is under the management of men who have had life-long experience in the business.

The Wasatch Smelter

Is situated on the north bank of the Little Cottonwood stream opposite the Germania. It is the property of R. P. Lounsberry, and has been idle for a number of months. Recently, however, Conklin, Jones & Co., have leased it, put in a new water jacket furnace, erected a roasting oven, and made such improvements generally as will enable the lessees to do good and rapid work. They have a contract to run on a portion of the ore from the Old Telegraph mine in Bingham, and although it is found by other smelters that this ore is refractory, it is proposed to work it at the Wasatch by a process which will enable them to smelt it separately. The furnace has only been running one month, during which time about 100 tons of bullion have been produced. Seventeen men are employed at this smelter.

The American Smelter,

Situated at the same place, though about a mile off the line of the railroad, has been shut down for many months. It is understood, however, that an effort will be made to fire up its stacks

in the spring, by Mr. Oliver Durant, who holds a controlling interest in it.

The Morgan Smelter.

Situated on the south bank of the Big Cottonwood stream, and close to the line of the Utah Southern railroad, is a new work, and considering it has but one furnace, it is a very superior smelter, if the quality and not quantity of bullion produced by it are facts to judge from. It has been completed and running about 30 days altogether, during which time some 35 car lots of bullion have been turned out, the average capacity of the one stack being 16 tons every 24 hours. But owing to the limited supply of ore to be had at present, 12 tons is its average daily product. When it was first fired up, to test its capacity, it was put under full blast and given all the ore it could take. The result was, two car loads every 24 hours were produced.

A breakage in the machinery delayed operations for a week early in December, and the fact that a sufficient supply of ore is hard to get, cut the number of tons they could have produced in one month down to 350. Of course the furnace in this smelter is the chief feature, being the largest stack in the country. It is a water-jacket furnace, on which Mr. Morgan has a patent. Each of the four sides is hung to the deck beam by hinges, and the whole are kept in position by an iron belt, which may at any time be removed, thus permitting the jackets to be swung up to the roof of the building to allow of the repairs to the furnace, causing only a few hours' delay. Another improvement is found in the style of the tuyeres, the nozzles of which are so arranged as to keep themselves from burning out or clogging up with slag.

The blast power of this furnace is received from a turbine water wheel, run by a canal, four miles long, from the Big Cottonwood creek, and discharging at the mouth of the flume 1,000 cubic feet of water per minute. The machinery is all first-class, the buildings and coal sheds conveniently and substantially built, and when all the designed improvements are finished this will be a paying smelter, turning out a superior quality of lead bullion. Twenty-five picked men, all of extensive experience in smelting, and none other, are employed. They work eight hour shifts, and the company pays the highest wages. The smelter is the property of B. W. Morgan & Co.

The Davenport Smelter.

At the mouth of Little Cottonwood canyon, is at present shut down. It was run by Mather & Geist, the first nine months of the year, on Flagstaff and other Cottonwood ores, and during this time 200 car loads of bullion was produced, worth about \$400,000, but when the firm leased the Flagstaff smelter, they closed down the Davenport.

The Pascoe Smelter,

Situated above the Warm Spring bath house, within the limits of Salt Lake City, has run during the entire year with success, producing 190 car loads of base bullion of \$2,000 to the car. One water-jacket furnace only has been run, but another large one of a new pattern, the invention of Mr. Pascoe himself, is being put in, and will be fired up within a few days. A new roasting furnace is being built, and also a smoke stack and fume condenser. In connection with the smelter, a newly patented ore concentrator is in course of construction. It is an invention of Mr. Pascoe's own, and possesses some points of improvement. The jigger in a tub, crushing roller, rotary screen, and tossing tubs combined to constitute a continuous series of manipulations, by which the ore and waste material are separated, and all the mineral saved. And in these points the superiority and improvements consist. There is no doubt about the successful operation of the machine, as it has been tested and found to work to a charm. It will be put in operation in February, with some other improvements attached, which have not yet been patented. Mr. Pascoe is a gentleman who shows commendable enterprise in inventions looking to the successful reduction of our low grade ores, and in the concentrator, as well perhaps as in the style of his blast in the furnace, success has crowned his efforts.

The Chicago Smelter,

Owned by an English company, is situated at Rush lake in Tooele county, and is one of the most successful concerns of the kind in the Territory. It is complete in point of machinery and all the modern improvements, is ably managed by Mr. William S. Godbe, and has been conducted during the past year with enterprise. Out of custom ores and those from the Queen of the Hills, 240 car loads of base bullion of the average value of \$2,000 per car have been produced. The report of the 11 months ending November 30th, 1876, shows the product to be 4,778,691 lbs. of lead, 232,672 ounces of silver, 5803 ounces of gold. The estimate for the 12th month would raise the product to 2,217 tons of lead, 254,815 ounces of silver, and 643 ounces of gold.

The Watterman Smelter

Is situated on the head of Rush lake at Stockton, in Tooele county, and is owned by Isaac S. Watterman, of Philadelphia. It is a smelter of two stacks, both of which have been running during the greater part of the past year with perfect success, on the product of the Hidden Treasure mine, and custom ores from Dry canyon and Ophir. Since the 1st of January, 1876, 2,100 tons of base bullion has been turned out at the average value of \$200 per ton, or of a total value of \$420,000.

The Longmaid Smelter

At Rush lake, turned out a large quantity of

bullion while it was running, but unfortunately it has suspended operations. It was leased by Mr. Longmaid, together with a number of mines in Ophir and Dry canyon, in the fall of 1875, and was kept in active operation from the time it fired up until it was closed down, and was purchased by the Chicago mining and smelting company. The parties who were conducting the enterprise are now going through the bankrupt court, and of course have a delicacy about disclosing the state of their business, but well informed gentlemen estimate the product of the smelter for 1876 at 1,700 tons of bullion, of \$340,000 value.

The Bullion Smelter

Is situated in Dugway district, 60 miles southwest of Stockton in Tooele county. It is the property of Adams, Smith & Son, of Chicago, who own a number of valuable mines in Dugway district, and are operating there as an incorporation, styled the Bullion mining and smelting company of Chicago. The smelter consists of but one stack at present, and has been in operation only a week, but it is the intention of the company to build an additional furnace as soon as needed.

The Mariposa Estate.

The following account of the operations of the Mariposa land and mining company is from a recent issue of the *Stockton Independent*, the editor of that journal having visited the ground lately:

Probably no tract of land in California has afforded subject for more comment than the tract known as the Fremont grant, in Mariposa county. This tract was located under a Mexican grant and is the only one of those unpopular land titles located in the mineral belt of California. During the earlier mining era, when the gold seekers were exploring every river, gulch and ravine in their search for the precious metal, the fact that the Fremont grant was all claimed as private property was the cause of much complaint, and Fremont was severely censured by a class who then were unalterably opposed to the sale of mineral land by the government, for appropriating too large a tract, and the government and its courts shared with Fremont the curses of the miners, who were restricted from freely mining on this estate. Fremont, however, was unable to make his acquisition of any particular value, and although he attempted to open and work some of the rich quartz lodes then known to exist thereon, his efforts were not peculiarly successful. Trenor W. Park finally obtained control of the property and with his usual energy and enterprise proceeded to develop the mines. Although his policy was to make the most of this possession in the least possible time, his administration of the affairs of that estate was generally more satisfactory than any before or since. He constructed mills, built roads, and opened up and worked mines, employed many hundred men at good wages and gave to Mariposa county, or especially that portion of it covered by the grant, the liveliest times it has ever seen. During his administration Bear Valley, Mount Bullion, Princeton and Mariposa were populous and prosperous mining camps, and the result of his enterprise was undoubtedly very satisfactory to himself, as he must have extracted vast amounts of gold. When he retired from the management the mining interests seemed to decline. The property passed into the hands of a joint stock company, being principally owned in the Eastern States, but on account of injudicious and extravagant management it has been a very unprofitable investment. Scientific superintendents, with large salaries, have been placed in charge of the property and expensive mills and machinery erected and placed in operation, but the ore worked has not paid for the outlay. Dodge Brothers, of San Francisco, having demands against the company, secured control of the estate for a short time in order to collect their debt, and it is generally believed that they succeeded in making the property productive, but of course such management was of no particular benefit to the Eastern stockholders. During all the years from Park's administration down to the present, the property has been regularly deteriorating in value. The improvements in the shape of mills, etc., have been going to decay, several camps that were once populous have become deserted, comparatively few men have been employed and oftentimes the finances of the company have run at a very low ebb. Little work has been done excepting what has been done on the Pine tree and Josephine lodes, situated near the town of Bear Valley, on the northwest side of Mount Bullion. Immense amounts of gold have been taken from these two veins, the rock having been transported down the mountain to the mills on a railroad constructed during Park's administration. Work was commenced on these veins at a point nearly 2,000 feet above the river and a grade was built by Park thence to the river, a distance of four and one-half miles, and the cars loaded with the ore ran down by their own gravity, a brakeman conducting the train and regulating its velocity. The cars were hauled from the mill back to the mine by mules. With this way of working, the rock paid very handsomely, even after a depth was reached below the upper end of the railroad and it had to be raised for a considerable distance by steam power.

A Change in the Management of the Affairs of the Company

And a thorough examination of the situation caused them to come to the conclusion that

raising for a considerable distance merely to drop it a greater distance to the mill was not good policy, and consequently it was decided to commence a tunnel at high-water mark on the Merced river and run it into the mountain until the lodes were reached, and thus work the ore beds from the level of the mill and save the expense of hoisting. As there are numerous leads of quartz running through the mountain it was reasonable to suppose that other valuable deposits might be struck before the objective points, the Pine Tree and Josephine lodes, were reached. The tunnel was commenced and work thereon has been energetically prosecuted with all the improved appliances now in use, and it now extends into the mountain 2,300 feet from its mouth on the river bank. Much exceedingly hard rock has been encountered, yet the boring goes on at the rate of 50 feet per week. The drilling is done with what is known as the

Burleigh Drill, Worked by Compressed Air.

This is comparatively a new invention and in our estimation one of the most important made within the last score of years. At this mine the compressor is located at the mill on Merced river and worked by water power, the air is compressed into a receiver from which a two-inch wrought iron pipe runs into the tunnel. Standing upon wheels resting upon a railroad track, is an iron frame-work supporting the machinery for operating the drill. This frame-work can be moved backward and forward upon the track, the connection between the iron pipe conducting the compressed air to the machinery being made with heavy gutta percha hose. The machinery for driving the drill is constructed upon a similar principle to that of a steam engine, the compressed air taking the place of steam. It is so arranged that a hole can be drilled anywhere in the tunnel at any angle. The drill moves backward and forward, like a piston to a steam engine, and strikes the rock with great force at a velocity of 300 blows per minute, penetrating the hardest rock at the rate of one foot per minute. To prevent the drill from heating by this excessive friction, small water pipes are arranged which force a stream of water into the drill hole and it also removes the rock chippings made by the drill. At present two drills are used and a number of holes are bored in the face of the tunnel at the same time. Then the frame-work supporting the drills is moved back in the tunnel, the holes are charged with giant powder and all exploded at once by means of a galvanic battery. By this means the whole expansive force of the powder is utilized, and the result of the explosion is much more satisfactory than it would be if the charges were separately exploded. There can be no question as to the ultimate result of the systematic and thorough prospecting of

This Rich Mineral District.

Which is now being made by the managers of the Mariposa estate. The tunnel has already cut veins of quartz that would pay for working, and last week a six-foot vein was struck that is rich in gold, and pronounced to be similar in character to the ore formerly taken out of the Pine Tree vein, if it is not actually that vein. Arrangements are now being made to commence working the ore from the veins already opened, while work upon the main tunnel will be continued. A new compressor, the largest ever constructed, is now being erected, which, when completed, will afford sufficient power to run at least six drills. The iron pipe leading the air into the tunnel from this compressor will be six inches in diameter. Complete arrangements have been made for exhausting the tunnel of foul air and the powder smoke which otherwise would greatly retard, if not entirely prevent, the prosecution of the work. A large galvanized pipe has been extended to within a short distance of the farther end of the tunnel, and at the lower end of this pipe is a fan mill, run by water at a great velocity, which draws the foul air from the tunnel and thus causes a current of pure air to circulate through it from its mouth. In fact all the arrangements for prosecuting this great work are complete and the latent wealth of Mount Bullion will soon be developed. The company are now erecting a new mill and as soon as the machinery of the new compressor is in position, numerous stamps worked by the extensive water power furnished by the Merced river will be pounding the hard rock to powder in order that the precious metal it contains may be extracted and made to add to the wealth of the enterprising men who have manifested so much energy in prosecuting this great work. Unless the present outlook is very deceptive, before the next three years the Mariposa estate will be one of the best mining districts in California, and the impecunious miners who will then be able to obtain work at fair wages and the stockholders who will begin to draw dividends from their investment will undoubtedly agree that it is better for the interests of the State to have the mineral land of the United States sold so that capital can be obtained to develop its mineral wealth.

Successful Working

We are pleased to be enabled to chronicle the entire success which has attended the operations, since it commenced running, of the mill at Pinto, which has been leased by the Geddes & Bertrand company. It was feared that ore from the company's mine at Secret canyon could not be successfully worked by the mill process, at least without a long and expensive series of experiments, but the operations of last week have demonstrated beyond cavil that such fears were

groundless. The mill has 20 stamps, but thus far only 10 have been running, and during the time 11 tons per day have been worked, yielding upon an average \$90 per ton without roasting. It worked fully up to 78° of the pulp assay and Mr. Mee, the superintendent, is confident that when some necessary changes have been made in the pans, it will work to a considerably higher figure. The other 10 stamps will be started to-day, raising the crushing capacity to from 20 to 25 tons per day. There are at present about 500 tons of ore at the mill, about the same amount on the dump at the mine; at least a thousand broken in the breasts, with all the indications favorable for an immense quantity easily accessible beyond. Now that the reduction problem has been successfully solved, the profitable working of the mine is placed beyond all question and we shall look with confidence, in a short time, for a series of bullion shipments which will produce a rapid elevation of the stock in the boards at San Francisco. The road from the mine to the mill is never obstructed with snow except for a short time during the hardest winters, and with an ordinarily favorable season ore transportation can be continued until spring. We know of no property in Eastern or Middle Nevada which promises so favorable results for the next few months as the Geddes & Bertrand. —Eureka Sentinel.

El Paso District.

The San Benito Advance gives some facts about this old district, in Slate range, San Bernardino county.

The El Paso district is situated in the Desert range, on the southern end of the chain of mountains in which the rich mines of Coso, Darwin, Lookout, Panamint and other well-known camps are located.

The district was discovered in 1860, but the attractions of Washoe and the famous lodes of the Comstock drew the crowd of prospectors and adventurers in that direction; consequently most of the claims were abandoned. Malcom and his party have relocated some of these ledges and discovered several more, all of which, so far as they have been worked, look splendidly, and judging from the samples of ores which we were permitted to inspect, the mines are very rich. We have had some experience in quartz mining countries and do not remember of ever seeing finer or richer silver-bearing ore. The ledges vary from four feet to twelve feet in width and are traceable on the surface for miles. Should they hold out as well as they promise, there is no doubt that El Paso will soon become one of the most important mining camps in the State. A shaft 80 feet deep has been sunk on one of the largest leads—on which a tunnel is also being run—and at that depth the ledge continues to grow wider and better, thus giving evidence of the permanency of the mines. The ore is easily extracted and assays from \$50 to \$10,000 per ton. Lumber sells for \$100 per thousand and the scarcity of timber in the immediate vicinity causes some inconvenience.

There is no mill in the district yet, but a company from Los Angeles intend building one in the spring, and as there is a considerable quantity of ore already on the dumps, it will be apt to be kept pounding pretty lively for a time and no doubt will be followed by others. The altitude of the mines is 6,000 feet above the ocean, and the locality is a true desert in all the prominent features. But one lonely willow tree graces the arid waste; greasewood, sage brush and cactus are found everywhere, and they grow large enough to make excellent fuel. Numerous springs throughout the mountain districts supply an abundance of good water.

Within 25 miles of the camp there are (gold) placer diggings which prospect from two cents to a bit to the pan, but cannot be worked with profit owing to the scarcity of water. The famous Borax lake, owned and worked by the Searls Bros., is also in this vicinity. These works employ from 30 to 40 persons, and ship to San Francisco monthly 100 tons of borax, which is said to be of the purest and best quality.

Smelting.

What is Daily Lost.

Have we reached the limit of our inventive faculties in our smelting processes? We have made an immense stride from the first crude operations of our early history, and the present furnaces are a vast improvement, but if one examines the methods he will find that we are very far from perfection, the loss entailed by the present workings being fully 20% of the assay value of the ores extracted. The largest item of loss to the smelter is the volatilization of the ore, resulting in a dust carried off with the fumes, aided by the force of the blast. It is estimated that this will amount to 13% of all the ore smelted. The loss in the slag and iron will reach from seven to eight per cent. more, and it is doubtful if the vein matter is worked even as close as that. The total loss will aggregate at least 20%—a fearful waste and serious in its results. There have been many attempts to solve the dust problem, and it is claimed that at some of the furnaces where it is reworked that the lead and silver are extracted by this final process, but upon examination it will be found that the operation reduces the capacity of the furnaces to such a degree that

there remain no practical results. The Eureka Consolidated recognizes this fact and contents itself with saving the dust from the chambers, and storing it in anticipation of some cheap method of reworking. On the contrary, the Richmond company mixes the dust with clay and feeds it to the furnaces in the shape of a slime, using about ten tons per day. Experienced smelters argue that nothing is gained by this method, even if the lead and silver are extracted by the second working.

The dust has already cost as much in the way of fuel and labor as if smelted by the first process, and its reworking represents 13% additional fuel, power and labor expended in expelling the moisture, and the capacity of the furnaces is reduced 10 tons per day, without any economical gain. The working capacity of the Eureka Consolidated furnaces are at least 10 tons per day in excess of the Richmond, and the company are accumulating a valuable property in the dust saved from their dust chambers. The desideratum is not a process that will extract the precious metal from the waste, but a more perfect smelting method, one that will prevent the original loss, or in other words, a closer working to the dry assay value. Our ores can be worked by no other known process, and nature has done a great deal to further our success in this line. The materials for fluxing are a part of the ores, or abound in the vicinity. We are highly favored in this respect, as there is no deposit of ore in the world that combines in so great a degree the elements necessary for their successful reduction. We have made progress in every direction but the improvement of our furnaces and reduction of the loss in waste; but here we are at a standstill. Every dollar gained in smelting the ore is a net increase in the value of our mines, a step forward in industrial progress, and will add to the further development of the resources of eastern Nevada. An experiment on a small scale was made by one of our mining superintendents, and was a success, but the furnace used in the test was so small that while demonstrating the practicability of the invention it gave no permanent results. We hope the gentleman will be induced to build a furnace of a capacity sufficient to test the merits of his invention, and that we may be able to record its complete success. —Eureka Sentinel.

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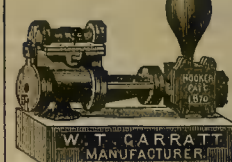
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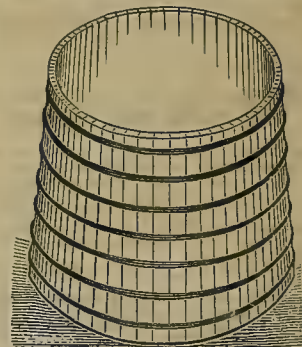
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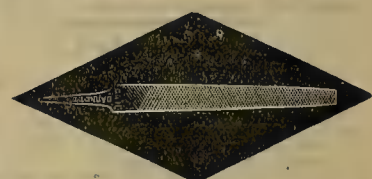
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MINERS, write for your paper.

Continued from page 53.

Casco and the Last Chance, all of which cannot fail to prove splendid property to their owners. The outlook is very favorable for that camp, and it ought to give employment to several hundred men the coming summer. Many of the failures which have attended mining operations in Owyhee for the past season can be attributed to the fact that the business properly. This has resulted in serious loss to many, and miners especially are sufferers. Operations are progressing swimmingly at the Belle Peck. There is a full force of men at work night and day. The main shaft is being sunk and stoping is going on over the tunnel. In every section of the mine the rock is looking first-rate. The Potosi is looking well. There is now a large quantity of rock at the mine awaiting crushing. It will be hauled to some of the mills in the vicinity shortly. Late reports from South mountain disclose the existence of quite a hopeful feeling among the residents of that camp. The mines are being worked by a limited force, and in the spring it is expected that operations will be carried on on a larger scale. Mr. Bowyer, the newly appointed superintendent of the company's operations there, was in town a few days ago. He is in a very hopeful mood concerning the future prospects of that camp. Douglas and others are working a claim about 300 yards west of the Belle Peck. They have a quantity of rock ready for crushing which is said to be unusually rich. There is abundance of gold in it. Rumors continue to prevail of the existence of a rich ore body in the 13th level of the Golden Chariot.

Utah.

NEW MILL.—Salt Lake Tribune, Jan. 18: The new five-story mill, recently erected by the Crimmon Mammoth company, in Tintic, is completed, and will be started up on Monday morning next, running on gold ore. Mr. M. Edwards, one of the lucky owners and proprietors, will go down to see the little beauty make her first run.

LEADS DISTRICT.—The rush to this district has "let up" to some extent, as far as broken men are concerned, and the present influx here is a more permanent lot of men, who come with means sufficient to remain and prospect for mines or work them by contract. This kind of men do not meet with disappointment as those who come here without means, and expect to find work at once or strike horn-silver on the surface. Capitalists are daily arriving, and we hear of a number who will no doubt invest and open out prospects and mines. Silver Reef City is building up rapidly, and contains at present 40 buildings and a number of miners' cabins. About eight buildings are in course of erection. Bonanza City is also improving, and now can boast of 15 buildings, consisting of one store, one saloon, one blacksmith shop, cabins, Barbree's office and a large carol. Several buildings are about to be built. The two towns are close together, and will make a large town after a while.

THE MINES.—The Leeds mining company have struck a good body of ore in their new shaft, at a depth of 85 feet. The ore is of a high grade. The mill is expected to start up about the 20th of next month. The boiler is in place and the battery is now up. When it starts up, everything will be lively here, and large shipments of bullion made. The Barbree & Walker are about completing the first winch in Leeds. They expect to start up in a few days and raise about 20 tons of high-grade ore daily. This mine is on the White road, and is a number of miles from the mine taking out good ore, ready for shipment or reduction here. Among them is the Bonanza, which is shipping to Pioche.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING JANUARY 16TH, 1877.

SOPA BEDSTADS.—Henry Comper, San Francisco. **CHECKS FOR METAL TURNING LATHES.**—Jay H. Harris, Sacramento, Cal.

TUBULAR GANG SAWS.—James A. Balch, East Portland, Oregon.

BELT SHIPPING ATTACHMENT FOR PULLEYS.—Rufus Denmark, Washington Corners, Cal.

MECHANISM FOR LESSENING DRAFT OF VESSELS.—Edward Ellison, San Francisco.

GANG PLOWS.—William Fruhling, San Jose, Cal.

PORTABLE FIRE PLACES.—Theodore C. Nativel, San Francisco.

REFRIGERATORS.—John W. Stewart, San Francisco.

RAILWAY CARS.—In Samuel R. Wallace and Oliver V. Wallace, San Francisco.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

UNITED STATES CON. G. & S. M. CO.—Jan. 19th. Location: Storey county, Nevada. Directors—James F. Brennan, Silas A. Stone, M. P. Madden, W. A. Woodward and John Sroufe. Capital stock, \$10,000,000.

GOLD GRAVEL M. CO.—Jan. 22d. Location: Mendocino county, Cal. Directors—S. C. Bugbee, W. S. Bell, Francis Cronin, H. J. Clarke and Madison Wheeler. Capital stock, \$1,000,000.

SILVER QUEEN M. CO.—Jan. 23d. Location: Pioneer district, Pinal county, Arizona. Trustees—W. R. De Fries, E. W. Bragan, H. A. Barney, G. W. Hopkins, W. H. Boothie. Capital, \$10,000,000, in 100,000 shares.

ASTOR M. CO.—Jan. 23d. Location: Elko county, Nevada. Trustees—George Muck, H. J. Sibley, M. P. Burnham, W. H. Simpson and E. A. Peck. Capital, \$10,000,000, in 100,000 shares.

CALIFORNIA CAR AND TRANSFER CO.—Jan. 23d. Object: To convey passengers, freight, express and mail matter to and from all parts of the city and county of San Francisco, also to and from any and all points and places in the States and Territories known as the Pacific coast. Principal place of business, San Francisco. Trustees—E. J. Baldwin, Joseph Sharon, Russell J. Wilson, Oliver Hinckley, M. G. Kennedy, P. J. Robinson, O. S. Carroll. Capital, \$4,000,000, in 40,000 shares. Capital actually subscribed, \$85,000.

NORTHERN KING M. CO.—Jan. 23d. Location: Arizona. Trustees—J. F. Clark, J. Wilson, M. L. Power, W. H. Lang and J. A. Holmes. Capital, \$10,000,000, in 100,000 shares.

ERSKINE CREEK M. CO.—Location: California. Trustees—E. R. Burke, H. H. Pearson, J. A. Pritchard and Jos. Clark. Capital, \$10,000,000, in 100,000 shares.

BLACK GOLD HILL M. CO.—Jan. 24th. Location: Amador county. Directors—John Beck, C. Remer, John Clements, R. W. Wallace and W. Westhoff. Capital stock, \$80,000.

The boilers at the Eureka Consolidated smelting works not now in use, are being overhauled and put in thorough working condition.

The death rate in this city for the past year was 16.8 in 1,000.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

BELT SHIPPING ATTACHMENT FOR PULLEYS.—R. Denmark, Washington Corners, [Alameda Co. It is often necessary in many kinds of mechanism (as for example the field engines or horse powers which are employed to drive threshing machines), to throw the driving belts entirely off the pulleys, and when those belts are large or tight, or the machine very heavy, it is very difficult to replace the belt on the pulley. The apparatus patented consists of a bar with a thin projection, which lies upon the outside of the pulley, and an arm that projects beneath the rim as far as the line of the spokes. A short pin passes through this bar, so that it crosses the slot formed between the two parts of the bar which clasps the rim of the pulley. A notch is made in the edge of the pulley, and when the bar is slipped upon the pulley the arm will rest behind a spoke of the wheel, and the pin referred to will fit into the notch to form a fulcrum and prevent the bar from being pulled from its place by the drag of the belt. The bar then projects at right angles with the plane of the pulley's motion, from the rim of the wheel, and all that will be necessary to slip the belt upon the pulley will be to bring it over the arm and set the engine in motion. The arm will run the belt into its place at once, and as soon as it arrives at the point where the belt leaves the pulley in its passage to the other pulley, the arm will be free to fall off, which it does, and leaves no dangerous projection, as would be the case if it were a permanent attachment to the wheel.

EGG HATCHER.—Walter Masterton, Stockton. Before incubation begins, and during several days after it has begun, the germ of the future bird lies on the top of the egg; for this reason the inventor applies the heat to the top of the eggs and maintains a lower temperature at the bottom of them. Air is necessary to incubation and passes freely through the pores in the shell of the egg during the process, and therefore a current of air is caused to circulate among them continually. A current of hot air in passing through the eggs and out into the atmosphere continually, will either destroy the vitality by excessive evaporation, or else impair it to such a degree that the birds will be feeble and few of them will live till maturity. To prevent this the inventor moistens the air with vapor of water before it mingles with the eggs. Notwithstanding the moist air constantly about the eggs, evaporation actually takes place and tends to stick the soft parts of the eggs to the shells. To prevent this and for the further purpose of bringing the germ into contact with as large a portion of the egg as possible during the early part of incubation, the eggs are turned over once a day. The patented arrangement of the several parts of the apparatus are intended to accomplish these general purposes.

REFRIGERATOR.—John W. Stewart, S. F. This patent covers certain improvements in the construction and arrangement of such structures as are used for storing and preserving by refrigeration such perishable articles as fruits, vegetables, meats, etc. The improvement consists in the construction of an air chamber with a main refrigerating chamber and one or more surrounding chambers or passages in such a manner that an automatic circulation of cold air will be maintained through the chambers and passages, the temperature of which will vary according to the distance the passage is situated from the main refrigerating chamber. By the peculiarities patented of a concentric arrangement of air passages by which is produced a continuous current of air and a consequent variety of temperature, fruits, etc., can be accommodated to the most natural temperature. In this single structure the inventor combines the elements of a refrigerating process adapted to all varieties and kinds of perishable articles.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

The 1900-foot level, north drift, in the Hale & Norcross, which connects with the Savage mine, is now partly cleaned out. The Savage company are running south in this drift to meet the Hale & Norcross miners. The latter will then connect and get a good supply of air. They can then remove the cave in the incline and lower the water, which is now 21 feet below the 1900-foot level.

The Eureka Consolidated dumps are full of ore, none having been hauled for several days on account of snow.

The Justice mine shows great improvement on several levels and is producing its usual amount of uniform grade ore.

They have gained 241 feet on the water in the Savage mine since they commenced pumping.

In the Leopard mine work in the 400 and 600-foot levels is progressing very favorably. There is every prospect of reaching ore in both levels

before the middle of February. Mill is running all right.

The heavy flow of water in the G. & C. shaft prevented any sinking being done a few days this week.

The lower levels of the Consolidated Virginia are much cooler, owing to the cold weather and the enlargement of the 1550-foot drift, connecting with the C. & C. shaft. It will yet require 10 or 15 days to complete the work of enlarging this drift.

In the Belmont everything about the mine is looking first-rate. The ore bodies are likely to prove extensive.

They are opening a new station 750 feet below the 400-foot level of the Utah.

The new pumping engine of the Overman has been started up and is working well.

The west drift on the 11th level of the Raymond & Ely is showing considerable improvement, and the formation at that point looks well enough to make ore at any moment.

The Knickerbocker Mining Company.

The annual election of the above company held last week, it was supposed it would be hotly contested, as two parties were earnest in their efforts to secure control. While the examination of the proxies was being made, Gen. H. A. Cobb, the President, made a verbal report of how he had been called to the presidency, of the corporation through the request of Mr. J. E. de la Montagne (since deceased) last August. And that during the whole period of his holding his office he had been harassed by vexatious litigation against the company and its Trustees. This litigation not only had an evil influence upon the stock, but by the suspension of work in the mine some damage had been done, and that great injury had been inflicted by this stoppage of prospecting. He was pleased to say that work had been resumed, the vexatious litigation ended, and the mine free from debt. For further particulars he referred the stockholders to the Superintendent's and Secretary's reports.

The successful party cast 57,486 votes and elected Gen. H. A. Cobb, E. C. Evertsen, James H. Crossman, J. M. Miner and Samuel L. Theller trustees for the ensuing year. The opposition having withdrawn, there was no other ticket in the field. Resolutions ratifying all actions of the trustees for the past year, and thanking them for the able management of the company's affairs during its most perilous period, were passed.

After the meeting adjourned, General H. A. Cobb stated to the stockholders that he would attend to their interests to the best of his ability, and he hoped that those who had lately been the opponents of the present officers would forget forever their former hostility and join hands with him and his friends in placing this stock at the rates it really was worth, which is in the neighborhood of five or six dollars per share.

Superintendent's Report.

At the time of the last annual meeting, we were much troubled by the flow of water in the face of the main drift of 400 level, and which which was not got under control until March 4th, when the work of sinking the drift was resumed and continued vigorously until the 27th of May, at which time the shaft had attained a depth of 862 feet, and the drift on the 700 level a length of 500 feet. At this date the Trustees, in consequence of the protracted litigation, ordered the suspension of work. In order to protect the work already done, a substantial bulkhead was erected on the 400-foot level, to hold the water back. The machinery was also protected from any damage. On the 28th of December last, litigation having apparently ceased, preparations to resume work were made. Upon examination, the machinery was found to be in good order, with the exception of the wire cable, but which has since been repaired. At the mine there are two 40-horse power engines, and one 80-horse. The Superintendent is confident that the mine will be cleared of water within two weeks, when sinking will be resumed. The dip and formation of the ledge on the 400 level show that it will be cut by the shaft within the next 100 feet. It costs about \$8,000 per month to extract the water, but when this is accomplished, the monthly expenses can be decreased. The mine has been opened to the inspection of stockholders at all times, and the amount of work done and the cost of the same will compare favorably with any other mine on the Comstock lode.

Secretary's Report.

The report of the secretary for the year was as follows:

RECEIPTS.	
Cash on hand Dec. 31st, 1875.	\$ 7,501 85
Assessment No. 14.	24,000 00
Assessment No. 15.	24,000 00
Assessment No. 16 (part).	25,074 20
Sundry sources.	1,725 00
Total.	\$80,301 05
DISBURSEMENTS.	
Expenses at mine.	\$ 5,661 98
Interest account.	689 65
Insurance.	1,000 00
Mining supplies.	16,939 97
Labor account.	18,642 24
Hoisting works (repairs).	2,608 91
Bank of California (Gold Hill).	8,642 00
Estate of J. E. De La Montagne.	10,724 05
Expense account.	9,550 20
Cash on hand.	2,883 12
Senator Mining Co.	2,760 00
Sundries.	5,738 93
Total.	\$80,301 05

The surplus over the liabilities is estimated at \$114,143.18. The indebtedness of the mine is \$2,573.43.

Raymond & Ely Mine.

The annual meeting of the Raymond & Ely mine was held on Tuesday last, and the following trustees were elected: M. L. McDonald, M. J. McDonald, T. C. Banks, C. G. DeCrao and R. H. Minister.

The following statements taken from the reports of the officers will show the financial doings and condition of the company and the operations at the mine:

Receipts.

From balances last fiscal year (since liquidation).	\$162,549
Bullion yield.	673,991
Property sales.	11,138
Ore sales.	25,355
Sale of mine supplies.	1,471
Sale of mill supplies.	1,224
Nevada Central Railroad.	449
Machine shop and foundry.	3,090
Balance assessment No. 5.	6,630
Account assessment No. 6.	340
Total.	\$788,257

Disbursements.

For balance fiscal report since liquidated.	\$140,023
For mine properties.	22,267
For mining.	858,029
For milling.	154,460
For miscellaneous.	115,736
For railroad.	4,750
Total.	\$795,265

The indebtedness of the company is \$11,302, and the cash on hand amounts to \$2,293.

The following denotes the total expenditures, including dividends, and the receipts of the company since its incorporation:

Receipts.

Total net profit of bullion yield.	\$4,564,414
From Pioche Phoenix Mining Company.	2,560
From assessments 1 to 5, inclusive.	510,000
From current liabilities.	22,780
Total.	\$5,099,654

Disbursements.

Mine properties.	\$1,144,654
Construction mining works.	134,325
Construction reduction works.	170,127
Nevada Central Railroad.	258,989
Mining pumps.	254,659
Dividends.	3,075,000
Current resources.	60,930
Total.	\$5,099,654

During the past year there has been extracted 8,167½ tons of ore, 8,467½ tons shipped to the mills and 8,842 4-5 tons crushed, which yielded \$62 per ton, 67 2-10 per cent. of the assay value. There were 97 tons of ore too base to be reduced by mill process, forwarded to the Sacramento smelting works, and the returns were greatly in excess of all expenses. A great number of feet of drifts and cross-cuts were run, but nothing of any permanent value developed. Several exploring cross-cuts and winzes were run at intervals along the line of the vein on the eighth level, but no ore of practical value was disclosed. The raise being carried up from the eighth level, 1,520 feet west of the main shaft, and which was furnishing some good ore at the last report, gradually died out in barren vein matter. On the ninth level, 700 feet west of the main shaft, a raise carried up 73 feet disclosed a well-defined vein carrying ore, but it proved too low a grade to be profitable for extraction.

From the 10th of February to the latter part of July the pumps were kept running constantly and they just succeeded in holding the water in check. Since August by a series of accidents the pumps have been compelled to suspend operations and have remained so until date on account of the non-completion of the gear wheels. During the year there were 6,702 lineal feet of drifts run and winzes sunk. For the lack of ore the company's 30-stamp mill has been idle the most of the year, and the company's 20-stamp mill was idle the whole of that period.

Black Hills Items.

At an informal session of the Dakota Legislature held at Yankton on the 20th inst., to listen to the address made by parties representing the interests of the people in the Black hills, concerning their resources, interests and wants, Professor Hencke presented an accurate map of the entire mining region, made from actual surveys, and showing the location of all the chief claims, accompanied with statistics as to their richness. Gen. Dawson, a revenue officer located there, and William Myer, publisher of a paper, also made addresses. The latter is on his way to Washington to urge legislation there. The statements were all unqualified as to the richness in mineral wealth, quality of soil and extent of timber. The Legislature awaits the action of Congress in ratifying the agreement of the Sioux commissioners, to provide settlers with courts and local organizations, but can do nothing until the Indian title is thus extinguished.

An express is to be put on between Custer and Last Chance district, in the Black hills. The miners of Harney district have adopted a local rule allowing the wives of miners actually in the hills to hold claims. Some of these feminine claims are very valuable, and the Montanians who hold the ground are determined to fight for the women's rights, while a number of recent comers are bent on "shooting" if a different arrangement is not made before spring.

The diggings of Battle creek are far superior to those of Deadwood. The snow prevents prospecting, but miners are on the ground waiting to work their claims in the spring.

An old resident of the Black hills gives the following advice, through the Omaha Bee, to persons intending to go to the hills:

First—Do not go in the winter season. It is perilous. On the Sidney and also the Cheyenne

routes there are miles of plains where there is no wood. Fuel has to be transported. Then, in snow-storms these plains are terrific. Nothing can withstand the piercing winds which sweep over them. Ranches are 30 miles apart on the Sidney route. Loaded teams do not usually make more than 15 miles per day; will have to camp; and all I can say in this weather is, God help them.

Second.—Do not go in the early spring; then the Indians will be troublesome, and if the agency Indians are removed, some, at least, will shoot away from the main body and join Sitting Bull's forces. I am apprehensive that in the early spring the Indians will be more villainous than at any previous time.

When, however, grass comes, so the army can move, the Indians will recede; so I would advise, don't go until either the middle of May or the first of June; then affairs will be safe. And remember, whoever goes to the hills must expect a hard time, and not much sunshine after he gets there. There is room enough and gold enough for a great many people yet. Nothing is gained by undue haste.

General News Items.

SMALL-POX is raging in New Orleans.

It is now announced that definite arrangements have been made with Moody and Sankey to come to California.

DURING the past year 212 lives, and 27 vessels, valued at \$150,000, have been lost from the Gloucester (Mass.) fishing fleet.

H. C. BENNETT, the defaulting pension agent of this city, has been sentenced to pay a fine of \$5,000 or go to jail for two years.

It is expected the Treasury Department will soon make another call for the surrender of \$10,000,000 of United States bonds.

CHARLES COLLINS, chief engineer of the Lake Shore and Michigan Southern railroad, committed suicide at Cleveland, on Friday. It is supposed that the Ashtabula accident deranged his mind.

THE Times correspondent at Paris reports that the Austrian government has concluded a loan of 70,000,000 florins, gold, with various London, Vienna and Paris banks. This loan is the balance of 110,000,000 florins which the Reichstag authorized the Minister of Finance to raise.

THE lighthouse board gives notice that on and after February 1st, 1877, the second order of fixed white light will again be exhibited at Point Bonita, California, but from a less elevated portion, and about one-fourth of a mile nearer the point. The light should be seen in clear weather, from the deck of a vessel, 18 nautical miles.

THERE is a deep sensation throughout the Basque provinces in consequence of the promulgation of orders appointing the 1st of March as the date for the beginning of military conscription in each of the provinces. General Quesada remains at Vittoria. An army of 30,000 will support the civil authorities.

STRICT regulations have been issued in England concerning the importation of cattle, sheep and goats, from Germany, France and Belgium, consequent on the outbreak of the rinderpest. Denmark and the Netherlands will be added, unless the importation and transit of German beasts is prohibited.

THE Harbor Commissioners have resolved to number the San Francisco wharves, according to the New York system, and hereafter instead of being designated by the street at the foot of which they lie, they will be called "pier" one, two, etc. The system will begin with pier one at Black point, and thence along the water front southerly.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

LEATHER.

(WHOLESALE.)

WEDNESDAY M., January 24, 1877.

Sole Leather, heavy, lb.	26 @ 29
Light	22 @ 24
Jodot, 8 Kil. doz.	48 @ 50 00
11 to 13 Kil.	58 @ 60 00
14 to 19 Kil.	62 @ 64 00
Second Choice, 11 to 15 Kil.	57 @ 59 00
Cornellian, 11 to 15 Kil.	57 @ 59 00
Females, 12 to 13 Kil.	63 @ 65 00
14 to 16 Kil.	71 @ 73 00
Simon Ulmo, Females, 12 to 13 Kil.	58 @ 60 00
14 to 15 Kil.	56 @ 58 00
16 to 17 Kil.	72 @ 74 00
Simon, 15 Kil.	61 @ 63 00
20 Kil.	55 @ 57 00
24 Kil.	72 @ 74 00
Robert Calf, 7 and 9 Kil.	35 @ 40 00
Kips, French, lb.	10 @ 15
Cal. doz.	40 @ 45 00
French Sheep, all colors	8 @ 15 00
Eastern Calf for Backs, lb.	1 @ 1 25
Sheep Roans for Topping, all colors, doz.	9 @ 13 00
For Linings	5 @ 10 50
Cal. Russet Sheep Linings	1 75 @ 4 50
Boat Legs, French Calf, pair.	4 @ 5 00
Good French Calf.	4 @ 4 75
Best Jodot Calf.	5 @ 5 25
Leather Harness, lb.	24 @ 32
Fair Bridle, doz.	48 @ 50 00
Skirting, lb.	33 @ 37 1/2
Welt, doz.	30 @ 35 00
Buff A.	15 @ 18
Wax Side.	17 @ 18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]

LEGAL TENDERS in S. F., 11 A. M., 94 1/2 @ 94 1/2. SILVER, 6 1/2 @ 7. GOLD in New York 106. GOLD BARS, 880 @ 890. SILVER BARS, 7 @ 10 cent. discount. EXCHANGE on New York, 50 @ 55-100 cent. premium for gold; on London bankers, 49 1/2; Commercial, 49 1/2; Paris, five francs @ dollar; Mexican dollars, 38. LONDON Consols, 96 1/2; Bonds, 102 1/2. QUICKSILVER in S. F., by the flask, 1 lb., 50c.

METALS.

(WHOLESALE.)

THURSDAY, M., Jan. 25, 1877.

Iron.—		
American Pig, ton.	30 00 @ 30 00	
Scotch Pig, ton.	29 00 @ 30 00	
White Pig, ton.	30 00 @ 30 00	
Oregon Pig, ton.	29 00 @ 30 00	
Refined Bar.	41 @ 42	
Roller, 16 to 18.	51 @ 52	
Plate, 5 to 8.	51 @ 52	
Sheet, 10 to 14.	51 @ 52	
Sheet, 16 to 20.	51 @ 52	
Sheet, 22 to 24.	51 @ 52	
Sheet, 26 to 28.	51 @ 52	
Horse Shoes, keg.	6 00 @ 6 00	
Nail Rod.	9 @ 9	
Norway.	21 @ 22	
Roller.	71 @ 72	
COPPER.—		
Copper Tinned.	37 @ 40	
Sheathing, lb.	37 @ 40	
Quarting, Yellow.	6 @ 7	
Sheathing, Old Yellow.	5 @ 6	
Composition Nails.	21 @ 22	
Composition Bolts.	21 @ 22	
STEEL.—		
English Cast, lb.	14 @ 25	
Anderson & Woods, ordinary sizes.	16 @ 17	
Drill.	15 @ 16	
Flat Bar.	15 @ 20	
Flow Steel.	84 @ 123	
TIN PLATES.—		
10x14 C Charcoal.	10 50 @ 11 00	
Banca Tin.	24 @ 25	
Australian.	18 @ 18 1/2	
ZINC.—		
By the Cask.	11 @ 11	
Zinc Sheet 7x3 ft, 7 to 10, lb.	11 @ 11	
7x3 ft, 11 to 14.	11 @ 11	
8x4 ft, 8 to 10.	12 @ 12	
8x4 ft, 11 to 10.	12 @ 12	
NAILS.—		
Assorted sizes.	3 50 @ 3 50	
QUICKSILVER.—		
By the lb.	50 @ 50	

GENERAL MERCHANDISE.

(WHOLESALE.)

WEDNESDAY M., January 24, 1877.

BAGS—Jobbing.		
Eng Standard Wheat, 8 1/2 @ 9 1/2		
Neville & Co's		
21x36.	31 @ 31	
21x36.	31 @ 31	
21x36.	31 @ 31	
Machine Swd, 22x36.	9 @ 11	
Flour Sacks, halves.	9 @ 11	
Quarting, Yellow.	6 @ 7	
Eights.	44 @ 45	
Hessian, 60 inch.	11 @ 12	
45 inch.	8 @ 9	
40 inch.	7 @ 8	
Wood Sacks, 34 lb.	50 @ 50	
4 lb.	55 @ 55	
Standard Gunnies.	11 @ 12	
Bean Bags.	7 @ 8	
CANDLES.—		
Grant's.	16 @ 16	
Mitchell's.	18 @ 20	
CANNED GOODS.—		
2 lb cans.	2 75 @ 2 75	
Table do.	3 75 @ 3 75	
Jams and Jellies.	4 25 @ 4 25	
Kickles, 1 lb gal.	1 50 @ 1 50	
Sardines, or box.	1 50 @ 1 50	
Hf Boxes.	3 00 @ 3 00	
COAL—Jobbing.		
Australian, ton.	8 00 @ 8 25	
Coke Bay.	8 00 @ 8 00	
Bellingham Bay.	8 00 @ 8 00	
Seattle.	9 00 @ 9 00	
Cumberland.	14 00 @ 17 00	
Mc Nab.	22 00 @ 7 75	
Lehigh.	22 00 @ 9 00	
Liverpool.	8 50 @ 9 00	
West Hartley.	14 00 @ 9 00	
Scottish.	8 50 @ 9 00	
Cona Bay.	8 00 @ 9 00	
Vancouver Id.	10 50 @ 12 00	
Charcoal, sack.	75 @ 75	
Coke, bbl.	60 @ 60	
Sandwich Id, lb.	2 1/2 @ 2 1/2	
Costa Rica.	21 @ 21	
Guatemala.	20 @ 21 1/2	
Java.	23 @ 23	
Manila.	20 @ 21	
Ground, in cs.	25 @ 25	
Chicoory.	27 @ 27	
FISH.—		
Sac to Dry Cod.	5 @ 7 1/2	
Bonell's.	34 @ 10	
Eastern Cod.	8 @ 8 1/2	
Salmon, bbls.	6 50 @ 7 25	
Hf bbl.	3 75 @ 4 00	
2 lb cans.	1 80 @ 1 80	
1 lb cans.	1 80 @ 1 80	
Col Riv, hf bbl 4 25		
Pld Cod, bbls.	22 00 @ 22 00	
Hf bbl.	11 00 @ 11 00	
Mackerel, No. 1.	11 00 @ 11 00	
Hf Bbls.	11 00 @ 11 00	
Extra.	12 00 @ 12 00	
In Kils.	25 @ 25	
Ex Mess, hf bbl 12 00		
Pld Herring, bx 3 00	3 50 @ 3 50	
Boston Smkd Hg 4 00	4 00 @ 4 00	
LIME, Etc.		
Lima, Sta Cruz.	2 00 @ 2 25	
Cement, Rosen-		
dale.	2 75 @ 3 50	
Portland.	4 75 @ 5 00	
Plaster, Golden.		
Gate Mills.	3 00 @ 3 25	
Land Plaster, in 100 @ 12 50		
Ass'd sizes, keg 3 25 @ 4 00		
OILS.—		
Pacific Glue Co's		
Neatfoot, No 1.	1 00 @ 90	
Custor, No 1.	1 25 @ 25	
Baker's A. A.	1 25 @ 30	
Oliva, Plagniol.	5 25 @ 50	
Possel.	4 75 @ 45	
Palm, lb.	9 @ 9	
Devos's Bril.	75 @ 75	
Bolled.	80 @ 80	
Cocanut.	80 @ 80	
China nut, cs.	70 @ 65	
Sperm.	60 @ 65	
Coast White.	22 @ 22	
Polar, refined.	62 @ 65	
Lard.	10 @ 15	
Olleophine.	44 @ 45	
Devos's Bril.	44 @ 45	
Barrel kerosene.	32 @ 32	
Downer Ker.	45 @ 45	
Elsine.	45 @ 50	
PAINTS.—		
Pure White Lead.	9 @ 10 1/2	
Whiting.	12 @ 12	
Chalk.	14 @ 5	
Paris White.	24 @ 24	
Ochre.	34 @ 34	
Caroline's Ind.	34 @ 34	
Averil Chemical		
Paint, gal.		
White & tints.	2 00 @ 2 40	
Green, Blue & Yellow.	3 00 @ 3 50	
Light Red.	3 00 @ 3 50	
Metallic R.	1 30 @ 1 60	
RICE.—		
China No. 1, lb.	52 @ 6	
Hawailan.	10 @ 10	
Carolina.	10 @ 10	
SALT.—		
Cal Bay, ton.	16 00 @ 18 00	
Common.	5 00 @ 7 00	
Carmen Id.	16 00 @ 18 00	
Liverpool fine.	25 00 @ 25 00	
SOAP.—		
Castle, lb.	10 @ 10 1/2	
Common brands.	4 @ 6	
Fancy brands.	7 @ 8	
SPICES.—		
Cloves, lb.	45 @ 50	
Cayenne.	35 @ 35	
Nutmegs.	85 @ 90	
Pepper Grain.	15 @ 17	
Pimento.	15 @ 16	
Mustard, Cal.		
1 lb bag.	1 50 @ 1 50	
SUGAR, ETC.—		
Cal Cube, lb.	13 @ 13	
Circus A crushed.	13 @ 13	
Powdered.	13 @ 13	
Fine crushed.	13 @ 13	
Granulated.	12 @ 12	
Golden C.	104 @ 11	
Hawailan.	72 @ 72	
Cal Syrup, keg.	25 @ 27	
Hawailan Molasses		
TEA.—		
Young Hyson.		
Moynse, etc.	35 @ 50	
Country pek Gm-		
powder & Im-		
perial.	50 @ 60	
Poo-Chow O.	35 @ 60	
Japan, 1st quality	40 @ 40	
2d quality.	25 @ 35	

A CARD.

Pacific Iron Works, First and Fremont Sts., bet. Mission and Howard, San Francisco, Rankin, Brayton & Co.,

Manufacturers of Engines, Boilers, Marine and Stationary. Pumping, Hoisting and Mining Machinery, including Batteries, Amalgamating Pans and Settlers, Concentrators, Ore Feeders, Crushing Rolls and Rock Breakers. Also, Water Jacket Smelting Furnaces for reducing Lead, Silver and Copper Ores, Quicksilver Furnaces, Retorts and Condensers, Roasting and Chloridizing Furnaces, Sugar Mill Machinery, Water Wheels, etc., all of the latest and most improved construction. Agents for the Allen Engine Governor, Cook's Boiler Feeder and Heater, Buckminster Rock Drills and Air Compressors, Wheeler's Ore Breaker, etc.

GEO. W. FOGG, Supt.

Amusements.

GRAND OPERA HOUSE, Mission Street, near Third. Open every evening with first-class Dramatic Company. Box office open from 9 A. M. to 10 P. M. Doors open at half past seven. Commence at eight o'clock.

CALIFORNIA THEATER, Bush Street, above Kearny. Open every evening with the best Dramatic Company in the United States. Box office open from 9 A. M. to 10 P. M. Seats may be secured six days in advance. Doors open at half past seven.

Mining and Other Companies.

Aetna Tunnel Company.—Location of

principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice is hereby given that at a meeting of the Board of Directors, held on the second day of January, A. D. 1877, an assessment (No. 1.) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 420 California Street, San Francisco, Cal.

Any stock upon which the assessment shall remain unpaid on Monday, the 26th day of February, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 19th day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.

Office, Room 6, No. 420 California Street, San Francisco, California.

Great Blue Gravel Range Mining Com-

pany.—Location of principal place of business, San Francisco, State of California. Location of works, Placer County, State of California.

Notice is hereby given that at a meeting of the Directors, held on the 23rd day of December, 1876, an assessment (No. 7.) of Fifty Cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, Room 33 Merchants' Exchange, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid, on Monday, the 26th day of January, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 14th day of February, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

W. BRYANT, Secretary.

Office, Room 33, Merchants' Exchange, California street, San Francisco, Cal.

Howland Tunnel Company.—Location of

principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice is hereby given, that at a meeting of the Board of Directors, held on the second day of January, A. D. 1877, an assessment (No. 1.) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 420 California Street, San Francisco, Cal.

Any stock upon which the assessment shall remain unpaid on Monday, the 26th day of February, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 19th day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.

Office, Room 6, No. 420 California Street, San Francisco, California.

Mariposa Land and Mining Company of

California.—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the sixteenth day of January, 1877, an assessment (No. 3.) of one dollar per share was levied upon the capital stock of the corporation, payable immediately in United States currency, to the Secretary, at the office of the Company, Room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California, to the Assistant Secretary, at the office, No. 3 Nassau Street, New York, N. Y.

Any stock upon which this assessment shall remain unpaid on the seventeenth day of February, 1877, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the nineteenth day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

LEANDER LEAVITT, Secretary.

Office, Room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California.

Annual Meeting of the Sierra Iron Co.—

The Annual Meeting of the Stockholders of the Sierra Iron Company will be held on Saturday, the 27th day of January, A. D. 1877, at 2 o'clock P. M., at the office of the company, No. 10, Falkland Block, 318 Sansome Street, San Francisco, to elect Trustees.

CALEB T. FAY, Secretary.

San Francisco, January 13th, 1877.

Silver Sprout Mining Company.—Prin-

cipl place of business, San Francisco, State of California. Location of works, Kearsarge Mining District, Inyo County, State of California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the nineteenth day of December, 1876, an assessment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company in San Francisco.

Any stock upon which this assessment shall remain unpaid on the fifteenth day of February, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the fourth day of April, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

T. B. WINGARD, Secretary.

Office, Room 20, No. 328 Montgomery Street, San Francisco, Cal.

Taylor Mill and Mining Company.—Prin-

cipl place of business, City and County of San Francisco, State of California. Location of works, Garden Valley Mining District, El Dorado County, California.

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,

SAN FRANCISCO, CAL.

Established for the Manufacture of
RAILROAD AND OTHER IRON

Every Variety of Shafting,

Embracing ALL SIZES of
Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

HAMMERED IRON OF EVERY DESCRIPTION AND SIZE.

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. Box 2032, San Francisco, Cal., will receive prompt attention.
The highest price paid for Scrap Iron.

THE RISDON Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,
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Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

Directors:

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Wm. Norris, Wm. H. Taylor, J. B. Haggin,
James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

THOS. PENDERGAST.....HENRY S. SMITH.

ÆTNA IRON WORKS.

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, bet. Howard and Folsom

SAN FRANCISCO.

AMERICAN MACHINE

AND



Experimental and fine Special Machinery, Dies, Taps, Punches, Reamers and other tools made to order. Planing, Gear Cutting, Machine Repairing, etc. Models and Patterns for Inventors promptly executed, in wood or metals.

I. A. HEALD, 514 Commercial St.
Between Sansome and Leidesdorff Sts., San Francisco.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NELSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS, CROSS' PATENT BOILER FEEDER AND SEDIMENT COLLECTOR.

Dunbar's Patent Self-Adjusting Steam Piston Packing, for new and old Cylinders,
ALL KINDS OF MINING MACHINERY.

FRONT STREET, BETWEEN N AND O STREETS,
Sacramento City.

OCCIDENTAL FOUNDRY,

137 and 139 First St., San Francisco

STEIGER & KERR,

IRON FOUNDERS,

Quicksilver Condensers and Furnace Castings.

Sole manufacturers of the Hepburn Roller Pan and Callahan Grate Bars, suitable for Burning Screenings.

NOTICE.—Particular attention paid to making Superior Shoes and Dies.

CALIFORNIA BRASS FOUNDRY,

No. 125 First Street, Opposite Minna,
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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch.
J. H. WEED. PRICES MODERATE. V. KINGWELL.

PHELPS MANUFACTURING COMPANY.

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws,
ALL STYLES OF FANCY HEAD BOLTS.
HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,
SAN FRANCISCO, CAL.

FULTON FOUNDRY AND IRON WORKS. HINCKLEY & CO.,

Manufacturers of

STEAM ENGINES,

Quartz, Flour and Saw Mills,
Hayes' Improved Steam Pump, Brodie's Improved Crusher, Mining Pumps, Amalgamators, and all kinds of Machinery.

N. E. corner of Tohama and Fremont streets, above Howard, San Francisco.

SHEET IRON PIPE.

Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.
Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.
All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

THOMPSON BROTHERS, EUREKA FOUNDRY,

Light and Heavy Castings of Every Description Manufactured.

Sole Proprietors and Manufacturers of

Lynch's Ventilating and Illuminating Tile,

The Only Illuminating Tile Manufactured for Lighting Cellars, Basements and Dark Rooms which provides proper ventilation for such places.

129 and 131 Beale Street,
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SACRAMENTO BOILER WORKS,

37 Fremont St., cor. Mission, S. F.

HALL & KELSHAW, PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

California Machine Works,

119 BEALE STREET, SAN FRANCISCO.

BIRCH, ARGALL & CO.,

Builders of QUARTZ, SAW AND FLOUR MILLS,

Keating's Sack Printing Presses,

THE ECONOMY HYDRAULIC HOIST FOR STORES, And General Machinists.

Miners' Foundry and Machine Works,

CO-OPERATIVE,

First Street, bet. Howard and Folsom, San Francisco

Machinery and Castings of all kinds.

McAFEE, SPIERS & CO.,

BOILER MAKERS AND GENERAL MACHINISTS,

Howard between Fremont and Beale Sts., San Francisco.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

San Francisco Pioneer Screen Works,

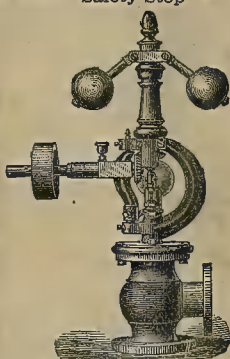
J. W. QUICK, MANUFACTURER,

Several first premiums received for Quartz Mill Screens and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.
32 Fremont Street, San Francisco.

Machinery.

The Gardner Automatic Safety-Stop Governor.

MORE THAN TEN THOUSAND NOW IN USE.
EVERY ONE WARRANTED.



SEND FOR DESCRIPTIVE CIRCULAR AND PRICE LIST.

When all others fail, buy a "Gardner." We have all sizes of these celebrated Steam Governors on hand at all times.

BERRY & PLACE

Selling Agents for the Pacific States,
Cor. Market & Fremont Sts., S. F.

THE O'HARRA

CHLORIDIZING FURNACE

Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing by this Process:

Two cords of wood at \$6.....\$12.00
Two firemen at \$4.....8.00
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Wear of shoes and power.....1.50

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Yours respectfully,
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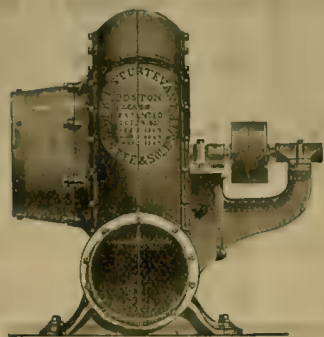
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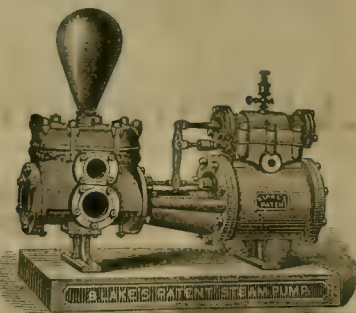
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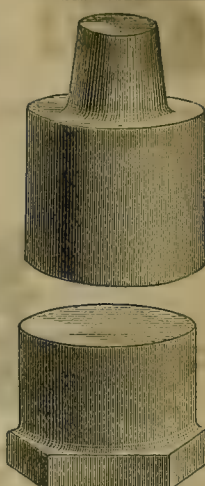
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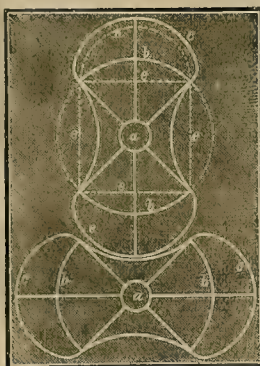
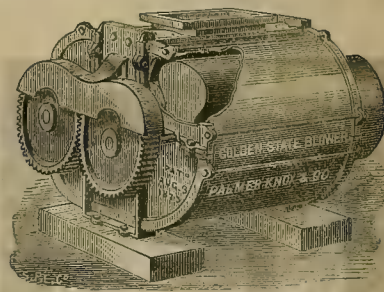
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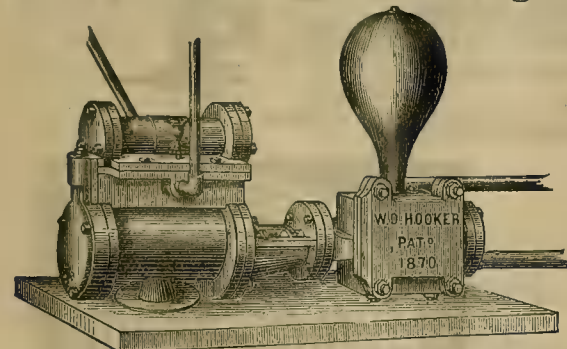
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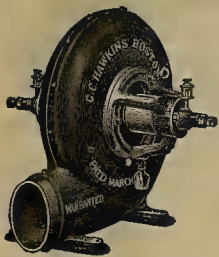
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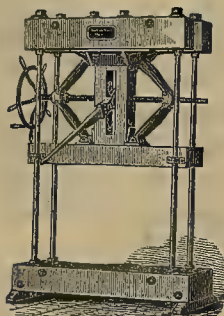
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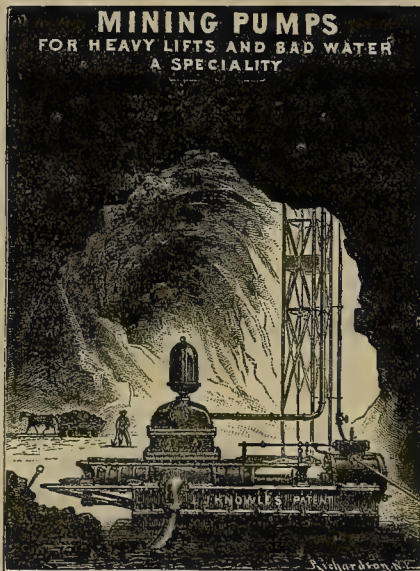
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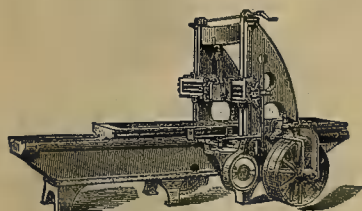
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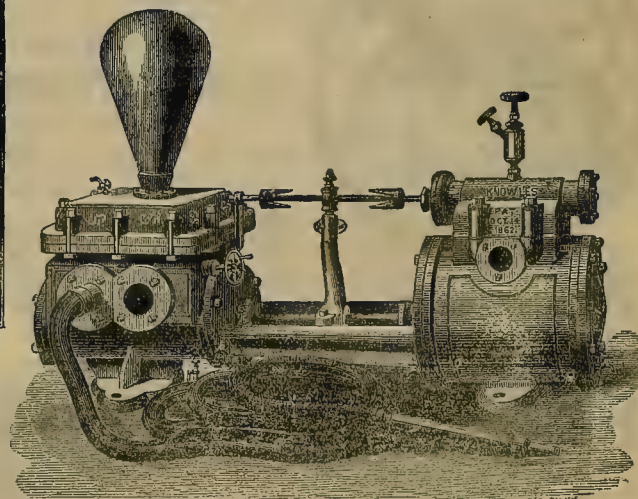
Clapp & Jones' Steam Fire Engine.



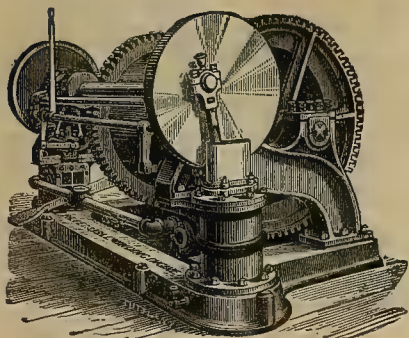
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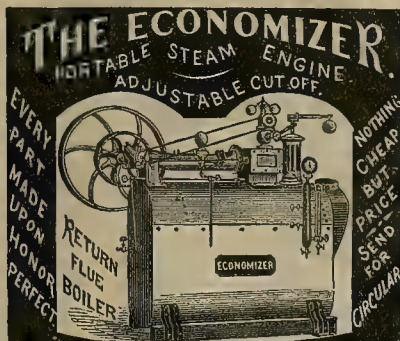


Knowles' Steam Pump; for all purposes where Pumping is required.



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Especially adapted to use in Mines, Hotels, Factories, Quarries, and Steamships, with Bacon's Safety Stop.



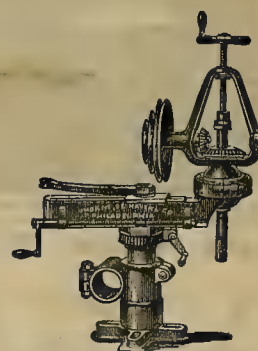
Office of Amazon and Glasgow Mining Co.,

San Francisco, Nov. 25, 1876.

A. L. Fish & Co., Agents for Knowles' Patent Steam Pump,

Gents: After using many devices for pumping mines I must say the DOUBLE ACTING PLUNGER MINING PUMP (Knowles' Patent), bought some time since for the Amazon and Glasgow mines, is seemingly as near perfection as it is possible to be. We carry steam 500 feet to the pump, raising water 400 feet, which it does easily with 40 pounds of steam, without the slightest jar on the pipes, and is perfectly noiseless. Gravel cannot wear the cylinder, and it is by far the simplest, cheapest and most economical way I know of for draining mines. I would cheerfully recommend them. Yours truly,

A. Caldwell, Superintendent.

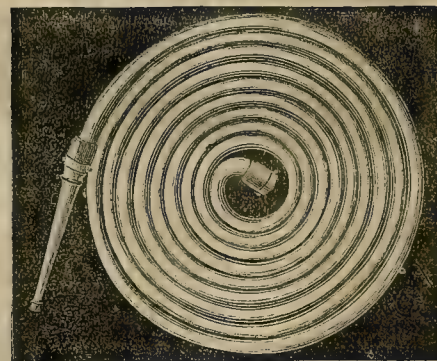


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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 3, 1877.

VOLUME XXXIV.
Number 5.

A Canadian Portable Saw-Mill.

We give on this page some illustrations which will be interesting to readers in our lumbering counties. There was on exhibition at the Centennial a machine commonly known as the Canada saw-mill, which attracted much favorable notice both on account of the simplicity of its construction and the speed and accuracy with which it accomplished its work. It was designed by the Waterous Engine Company, of Brantford, Ontario, Canada, expressly for use in the extensive lumber districts of the Dominion, to saw up the timber in the localities where it is felled, and thus to save the trouble and the expense of the carriage or rafting of the logs to distant points; and being portable, it may readily be removed from an exhausted part of a forest to a new situation. The machine is also excellently adapted for employment in ship-yards, in most of which establishments in Nova Scotia and New Brunswick, we are informed, it has superseded whip sawing by hand.

The annexed engraving represents the mill as it appeared at work while on exhibition at the Santiago (Chile) exposition of 1875. The portable machine has a twenty-horse power engine, which, together with its boiler, is of such weight and of such construction that both boiler and engine may easily be loaded on trucks, when changing the position of the mill, without any disconnection being necessary; so that the labor of a skillful machinist is not required to readjust the mechanism. The saw mandrel, feed and gig work are compactly arranged in an iron frame, and can also be loaded and moved without being taken apart; so that, when resetting the mill, all that is necessary is to frame the foundation timbers previously used in the ground, set the mill on them, coupling the engine shaft and saw mandrel, lay the track, place the carriage on it, and the mill is then ready to start. The whole operation does not take more than from one to two days.

The boiler is supplied with sawdust grates, by means of which it is enabled to keep up a full supply of steam with no other fuel than pine sawdust and refuse edgings. It is also covered with hair felting and lagged with wood or sheet iron. The plates are of the best English material, and the heads are Lowmoor iron. Each boiler is subjected to 120 lbs. cold water pressure before shipment. The 20-horse power engine drives a 56-inch saw, which will, it is claimed, cut from 6,000 to 10,000 feet of lumber per day, or 1,000 feet of one-inch pine lumber in a single hour. The 25-horse power engine, which is usually employed in connection with a tubular stationary boiler, drives any size of saw up to 66 inches, and its capacity is said to be from 8,000 to 12,000 feet of lumber per day.

At the Chile exposition, the 20-horse power mill, we are informed, sawed and edged 1,060 feet of lumber in 40 minutes, vanquishing all competitors and gaining a medal and diploma. It has received the first premiums at 10 Canadian provincial exhibitions, besides a highly favorable report from the judges at the Centennial.

A Villainous Act.

Of all fiendish ways to revenge a fancied injury, or maliciously injure an enemy, setting fire to or blowing up property in which they are interested is the worst. Persons who resort to such measures should have no mercy shown to them whatever. In such cases they not only injure the persons against whom they wish to be revenged, but also innocent persons whose all may be invested in the property destroyed. The latest attempt in this direction was made last week on the Comstock, where some villain tried to destroy the hoisting works and shaft of the Consolidated Virginia mine.

A few days ago the main works of the Con. Virginia were fired in an out-of-the-way and

cocks leads through flumes down the canyon to a point near the pan-mill, so distant that the noise of escaping steam or water cannot be heard in the works. Had he not noticed the open cocks just as he did, the whole place would have been blown up. The effect of opening these blow-off valves is to let the water out of the boilers, and everybody knows what follows when such a thing occurs. By whomever done, this is certainly one of the most damnable of all deeds which have been chronicled for a long time. The C. & C. shaft works above ground, which were endangered by this most dastardly scheme, have cost the joint companies nearly a million of dollars. There are scores of men constantly employed in and about them. The lives of all these men and the destruction of all this valuable property was attempted merely to entail a financial loss upon the companies.

Now the closest watch has to be kept on all

Light in Mines.

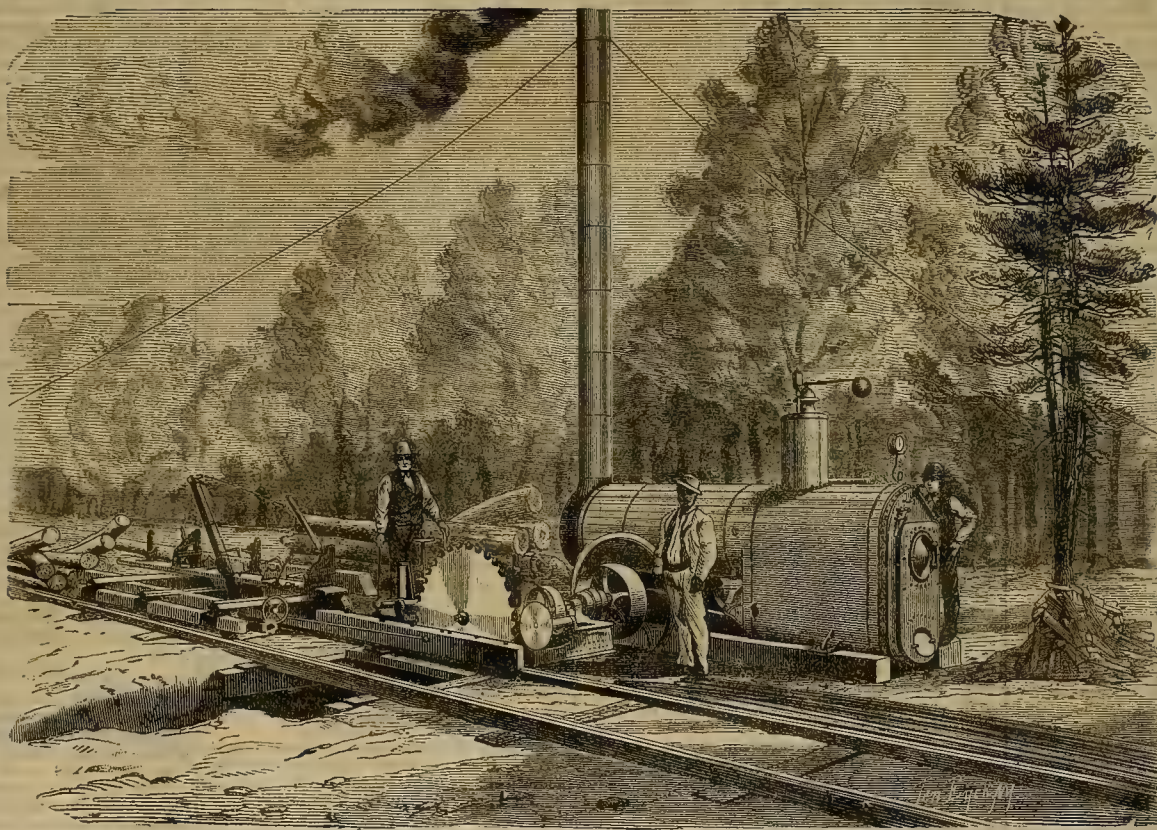
Very few people have any adequate idea what a quantity of candles are annually consumed on this coast, the principal portion of which is used in the mines. Light is one of the most indispensable articles in a mine, and with us it is mainly furnished by candles, although in other countries they use oil or gas. The article commonly used is the stearine candle of an inferior quality. They are called adamantine candles, and have various other names, but in their composition they are nothing more or less than a tallow candle partly freed from some of the olein contained in tallow. Taking into account the price at which they are sold, and the relative light they produce, they are the most expensive illuminating material of anything in common use.

But beside the heavy expense of the mine owners in buying the candles, another and more serious consideration is to be taken into account, and that is the offensive and unhealthy smoke evolved by their consumption in mines which are not well ventilated. It is hard enough where men work ten hours out of 24 to be deprived in the daytime of natural light; but it is still worse that they should be deprived of pure air, by its being poisoned with such unfit material as enters into the combination of most of the candles used. If candles must be used none but the best should be purchased. There is really no economy in buying poor articles of any kind, and in the matter of candles this is particularly true, as those of inferior quality give an indifferent light, are quickly consumed, and at the same time vitiate the air. Mine owners should pay more attention to the health of their workmen in simple matters of this kind, for their men will always do more and better work if they find that the employees are trying to do the right thing by them.

ACCORDING to the figures of Mr. Valentine, of Wells, Fargo & Co.'s express, it is found first, that the aggregate bullion yield has been increased about 56% in five years; second, that the gold yield shows an increase of a little over 20% during the same interval; third, that the silver yield has been increased 104%.

A REVIVAL of the copper mining interests of Calaveras county is apparent, there being several parties who propose re-opening mines. The Calaveras Citizen says that some San Francisco capitalists are about making arrangements to haul 1,000 tons of ore from a mine near Seco to the railroad.

A DISPATCH from Cheyenne says that three men were overwhelmed and carried down the mountain near the Centennial mine by a snow slide. One of them, Thos. Hodgson, of Holland, Michigan, was killed. The avalanche was set in motion by the discharge of a blast in a prospect hole.



CANADIAN PORTABLE SAW MILL.

unfrequented corner of the basement story of the building, under the carpenter shop. The fire was set in a mass of inflammable stuff—old rope, waste, oily refuse and rubbish generally—where it was supposed it would gain uncontrollable headway before its discovery. But owing to the constant watchfulness exercised over every portion of the premises, and the ample and convenient appliances provided for use in case of fire, this apparent work of the incendiary was discovered while yet within control and was quickly extinguished. Less than five minutes' time would have placed the whole property in jeopardy, and probably would have destroyed buildings and machinery valued at hundreds of thousands of dollars.

The Virginia Chronicle says that on Monday morning the attempt at the destruction was renewed in another form. On this occasion villains sought the C. & C. shaft for their operations, and attempted to accomplish by explosion what they had failed to effect by the torch. Just after the whistle had blown, and the morning shift came on, the fireman found it impossible to fill his boilers. On a hurried investigation he found the blow-off valve of two sets of boilers open. The escape from these blow-off

the hoisting works and the mills belonging to the firm who are the largest owners in this property. It does not seem possible this act could have been incited by mere jealousy of some prosperous neighbors; nor does it seem possible that any one could have the temerity to attempt such a deed simply for the purpose of depreciating the stock. If dealing in stocks has brought even a few men to such a pass as that, it is a bad state of affairs. It may have been some villain who has suffered from the fall of stock and wanted to bring others to his level, or some workman who had been refused work. Whoever he was, he would have had short shrift had he been caught. The attempt almost matches that of Thomassen, the dynamite fiend. We have heard of such acts in a lawless country where "strikes" were going on, but in Nevada, where people are generally prosperous and labor is well paid, it is monstrous.

THE war in New Granada still continues, and gross outrages are being committed by the Liberals.

WILLIAM J. LAWRIE will report to this office at once.

CORRESPONDENCE.

Mines and Mills of Butte City, Montana.

[From our Traveling Correspondent.]

The town is named from a prominent butte in sight. It has grown to a population of about 800, chiefly within the past two years. The rapidity of its growth is attributable to the richness and extent of its mines, which cover an area of seven miles in length by about four in width on the western slope of the Rocky mountains, and extend easterly to within five miles of the summit. As the ascent is gradual they are usually accessible. The country rock is granite, the general course of veins east and west, dip south, and strike of ore bodies, so far as explored, to the west. The general character of the ore is quartz, carrying sulphides of silver, frequently rich and from \$5 to \$50 per ton in gold, many veins, however, containing carbonate and sulphide of lead, running from \$30 to upwards of \$100 per ton silver, besides two or three belts of copper, going all the way from 10 to 70%, the average of ore shipped to date being put at 42%, leaving a large body of low grade ore worth from 15 to 30%, that can be made available and valuable with further and more extensive facilities for concentration.

There appear to be two principal belts, each with its parallel veins and spurs, about equally divided by the large butte previously alluded to, the leading lode lying south being known as

The Black Chief,

Probably from the large proportion of manganese it carries. It has been located in claims of 1,500 feet each to the Burlington and other promising claims beyond, the distance of three miles west of the discovery claim, and varies in width from five to 75 feet, carrying in addition to the rich sulphides some bromide and chloride of silver, together with more or less of gray copper ore.

The first location of the Black Chief, as well as

The Travonia,

Lying a little further south (it is understood), was made by Mr. Wm. Farlin, to whom the credit is due for taking the initiatory steps towards the development of the silver mines as well as having given a new impulse to the operations in the district, being the first to erect a mill. Correct results as to the working of ore from the Black Chief (discovery claim) was not ascertained, but shipments from the Travonia to Newark, N. J., were reported at \$350 per ton. The first silver ore worked here was by Prof. Smith, a year ago last November. It was taken from

The Banker Lode,

In northern belt, the property of Messrs. Smith and Coughenour, which has milled ore as high as \$204 in silver, saying nothing of the gold it contained. It has never paid less than \$50 per ton. The fissure is four feet; the pay vein from one to two feet. Fifty tons taken out at the depth of 60 feet, without assorting, yielded \$80 per ton. One hundred tons are now on the dump, all of which will pay handsomely. Ground was first broken on the

La Plata Mine,

Northern belt, in September, 1875, since which time work has gone on uninterruptedly, with the exception of about four months. The first 30 feet of shaft, besides much lower grade ore, yielded 20 tons fit for shipment to Freiberg, giving an assay value there of \$376 per ton silver and \$155 in gold. The next 30 feet of ore, not so closely selected and worked at home, yielded about \$400 in gold and silver. The shaft has since been sunk to the depth of 80 feet and levels have been run each way 135 feet. A contract has been entered into with the Dexter mill to furnish 500 tons of second-class ore, of which 325 tons have been already delivered and worked, yielding \$125 in silver and \$45 in gold. The ore vein varies from two to four feet in width. It is looked upon as one of the leading mines of the district, having paid over and above all expenses for improvements and developments as much as \$5,000 to the share. Inclusive of ore on dump, it has produced \$120,000 in the gross. Messrs. Downs, Jones, Scott and Leary are the fortunate possessors of this valuable property.

The Lexington,

Same belt, owned by Mr. A. J. Davis, of Helena, four shafts of 50 feet each, 200 feet apart. Lode from 5½ to 15 feet wide, all carrying good ore, somewhat similar to that of the La Plata, and sufficiently rich to justify on the part of the proprietor the erection of a fine 10-stamp mill, wet crushing, provided with four of the Purvine pans, for the purpose, principally, of reducing it.

The Mount Moriah,

Just above Butte City, the property of Mr. A. Scott, has a three-foot vein of ore, said to have worked from \$80 to \$100 in silver, besides containing a little gold.

The Gray Eagle,

Porter & Co., has a five-foot vein of ore, that

gives assays in silver from \$60 to \$250 per ton, and probably from 20 to 25% copper.

The Buffalo,

Blaine & Co., shows a vein of from seven to ten feet, nearly all ore, free milling, and running unassorted from \$45 to \$75 in gold and silver.

The Alice (Rainbow Lode),

The property of Walker Brothers, Salt Lake City, is situated one and a half miles north of Butte City. It is opened by two shafts of 75 feet each, the east shaft exposing a vein of ore five feet thick and extending from wall to wall, and the west shaft from one foot to 18 inches of ore. Three different lots worked at the Dexter mill were represented by Mr. Marcus Daly, the Superintendent, to have milled \$50 in silver and \$12 in gold. The statement was afterwards found from the books of the mill to be considerably below the average. The prudent Superintendent has probably seen some of the evil effects arising from glowing descriptions and exaggerated accounts, and preferred to be on the safe side.

The Magna Charta,

On the same lode, has been sufficiently exposed by three shafts to show a large vein of similar ore and of about the same value. The Walker Brothers own an interest in this mine also, in connection with Messrs. Barnard & McCauseland, of Butte City.

The Frank Moulton,

On the same belt, was located two years ago. Ground was broken on it within the last 12 months, and a shaft sunk to the depth of 76 feet. Fifty tons taken from this (five by nine), and worked at the Dexter mill, gave an average for first class, \$150 per ton and for second class, \$95 in silver and gold. Levels are being run each way and the ore coming out is looking splendidly. It is the property of Messrs. Clark & Larabee, First National Bank, Deer Lodge.

The Acquisition Spur,

(Packard & Co.), of Salt Lake, averages from three to four feet, widening in spots to eight feet; has milled on the ground \$200 per ton, the best ore being shipped and sold through Walker Brothers, of Salt Lake. It is represented as having yielded in one year as much as \$75,000, and paying by way of dividend \$5,000 to the share.

The Late Acquisition,

(Leffler, Clark & Co.), shaft 35 feet, four feet from wall to wall and three feet of ore, one-half free milling and the other argentiferous galena, requiring smelting, and sampling \$36 per ton. A second shaft of 60 feet on a branch, carrying no lead, shows a two-foot vein, a portion of which contains some high grade gold and silver ore, milling \$200 per ton.

The Burlington Lode

Is three miles from Butte City, and on the southern belt. A location of 1,500 feet was made June, 1875, since which a segregation has been made. The eastern end, owned by Roubush & Young, has a shaft 20 feet and level 24 feet, this distance being stope out. The ore vein is five feet, free sulphide of silver, and mills \$100 in silver and \$4.50 in gold. The prospect was sufficiently encouraging to lead the proprietors to erect an eight-stamp mill—wet crushing—which was about ready to start up. It has been well put up by a much respected namesake, Mr. R. C. Knox, an experienced mill builder of the Territory.

What appeared to be an improvement was noticed here in the Purvine pan, and of this gentleman's devising and construction, consisting of a wooden cone in the center, to prevent the accumulation of the sand at that point.

The west end of the Burlington, owned by Gassert & Reading, has four shafts, the deepest 45 feet. The whole lode carries ore from two to five feet in width, that has milled from \$60 to \$150 per ton, silver, and from \$5 to \$6 in gold. Further west, Wicks & Crawford, not to mention other locations, are taking out ore, similar in character and value.

The Seymour,

In same vicinity, but on a different vein, is six feet between walls, with 18 inches of free milling ore. Some taken from near surface and shipped to your city, yielded \$150 per ton. At the depth of 50 feet some fine looking ore was being taken out, giving sample assays of \$200 in silver and gold. It is owned by McMinn & Gale.

The Moody, the Sankey and the Kossuth (Orr & Co.) are more or less developed—veins from 18 inches to three and a half feet reported as running from \$60 to \$150.

The Great Republic,

(Butcher, Talbot, and others) shaft 50 feet. From two and a half feet near surface the ore had widened to six feet at foot of shaft. It works, mill process, \$60 and upwards.

The Ringgold (McMinn & Gale) in same part of Independence district, was said to show an 18-inch vein of ore, running as high as \$175.

Returning to the Southern or Black Chief belt, is the Mountain Boy (Noyes and others), greatest depth 54 feet, two levels, each 100 feet, two feet of solid ore, sampling at foot of shaft \$120. Some sold going as high as \$257. It contains considerable manganese, and is said to be somewhat difficult to reduce.

The Gold Hill, near Rockett, Independence district, shaft 80 feet, levels each way 100 feet, has an average vein of two feet of good lively gold quartz. The results of 100 tons, worked in arastra, were very satisfactory to Messrs. Carver, Aldridge & Wolverson, the owners. On

the same belt, half mile east, the California has a 12-inch vein, \$100 silver ore. The Anna and the Franklin, on the same hill (Mineral) are said to run about the same, the former of 10-inch and latter from one to two feet wide.

The Copper Mines of Butte,

If more convenient to market, would not be long in attracting the attention of capital.

The Parrott (discovery claim), situated on the northern belt, has paid well. Messrs. Downs & Leary have sunk to the depth of 170 feet on the vein, which varies from a few inches to four feet, the ore shipped running from 34 to 50½% copper, and about \$30 in silver.

The Parrott, No. 1, (W. J. Parks) has attained a depth of 160 feet, ore vein 1½ feet, average for first class upwards of 40%, second class after concentration running 45%. The ore is sold on the dump at \$55 per ton, leaving a margin for fair profits.

The Mountain has a shaft of 110 feet, and vein 3 to 8 feet of 35 per cent. ore, consisting of red and black oxides, black sulphurets and copper glance, with considerable silver. There are 1,200 tons of second class on dump that can be made equal to the first class by concentration, taking from 1½ to 2 tons of the former to make one of the latter.

The Alex. Scott (Belk, et. al.), shaft 100 feet—6 feet from wall to wall, and from 12 to 18 inches of ore, running 18% copper. As it gives in silver from \$75 to \$236 (assays) it should have been classed among the silver leads of the district.

The Colusa (Clark, Leffler and others) at the depth of 20 feet showed good ore, which was followed down 23 feet. The width of vein not ascertained, as no cross-cut had been made, but thought to be large, as the surface showed a width of 18 feet. Some ore shipped to Baltimore ran 32%.

The Adelaide (Carpenter & Ransom) has a four-foot fissure at the depth of 20 feet, with one foot of 30% ore.

The Hattie Harvey (Ransom, Owsly & Co.) shaft 70 feet, and two levels. The 45-foot level has been extended 100 feet, and the 70-foot level about 70 feet in length, exposing from two to six feet of solid ore, estimated to average 28%; from 200 to 300 tons on dump; 31 sacks assorted (copper glance) and sold to first National Bank, Helena, sampled 59%.

Something more of the mills, etc., of Butte before closing.

The Centennial Mill

Has been leased by Messrs. Manning (Foster and Ray), & Co., and put in good shape for successful running, having been constructed for treating base as well as free milling ores. There are four barrels in place (capacity one ton each), for treating ores somewhat after the old Mexican method, which has proved very successful here, as it is thought that the ores near the surface can be made to yield by this process 80% or upwards.

For the base metals a double reverberatory furnace has been constructed. The manganese ores are the most difficult to treat, and roasting seems to succeed better than any other process tried. After roasting, the ore is amalgamated in one of the Purvine pans, an invention of Mr. Wm. Purvine, a resident of the Territory, a full description of which cannot now be given, as he probably has not yet applied, as intended, through your agency for a patent. This much, however, may be said in its praise on the authority of Mr. S. H. Manning, the Superintendent. He states that this pan, when lined with copper and worked after the Mexican method, gives better results than any other he had ever used. It is the intention of the company hereafter to use iron in the pan for amalgamating the roasted ores.

In addition to the Centennial mill, the Davis and that of Roubush & Young, all of which have been briefly alluded to, there is also

The Dexter,

Dry crushing, of 10 stamps, at present run by Mr. W. A. Clark, of Deer Lodge, and under the immediate charge of his brother, J. K. Clark, to whom I am indebted for much valuable information, particularly in verifying statements in regard to the value of the ores in the district. The mill has a capacity of from 10 to 12 tons, and is supplied with four reverberatory furnaces, two combination pans, two settlers, agitator, retort, laboratory, etc., complete. The Washoe process was first tried, giving only about 60%.

At present the chlorination is used, showing a percentage of chloridized silver, (95%) and a saving in pan from 80 to 85%.

The average yield of 1,000 tons worked the last four months of the year, was \$150 per ton, which was much above some former runs. Of other improvements and facilities for reducing ores in the district, there are from four to five arastras.

Concentrating works chiefly for copper ores, operated by Mr. G. S. Olin, who uses the German automatic jig, in connection with Cornish rolls, screens for sizing and the usual appliances; lixiviation works (experimental) by Captain Turner, from whom you may have some account in future, and a neat little foundry and machine shop, run by Mr. J. F. Allen, who supplies the mills with their castings, and turns out the usual work of similar establishments. From the length of this letter, with many notes necessarily rejected, the reader can take it for granted that Butte City is one of the liveliest if not the liveliest camp in the Territory.

A. C. K.

Tybo Mines and Reduction Works.

[Correspondence MINING AND SCIENTIFIC PRESS.]

Operations of the White Rotary Furnace.

Not since the inauguration of the great industry which has elevated Nevada to the greatness which she now enjoys, has there been exhibited in mining and metallurgical operations, and among the people generally, in every section from which we hear, so many gratifying evidences of progressive prosperity as there is at the present writing. From every quarter where mining constitutes the chief pursuit, are borne to us the glad tidings of improvement and development.

The close of the Centennial year has marked a new epoch in the career of the Silver State. The enormous yield of that memorable cycle has again revived public interest in the wonderful resources of her mines, in her limitless wealth of the precious metals, in her commercial progression, and in the affluence, comfort and social well-being which the spread of her agricultural and grazing interests have brought to her 52,000 inhabitants. This, it must be accorded, is a sparse population for a State like Nevada. It must, however, be remembered that her physical characteristics and climatic changes are not of the sort that are calculated to inspire a person with the desire to make it his future home. But notwithstanding the absence of the sylvan beauties, crystal brooks and diversified scenery, that add such a charm to life in our sister State across the western Sierras, we are every day acquiring fresh accession to our population; for where there is a foundation for prosperity, prosperity and population will surely exist. No doubt there have been many severe disappointments met with in Nevada, by incautious speculators. There has too much suffering resulted from stock gambling, and from the stupendous frauds that have been and still are being remorselessly practiced upon the unwary by unconscionable stock sharps. But however great the misery that has resulted from these things, it is an undeniable fact that there is not in the American Union to-day another section which holds out better and safer inducements to cautious investors and intelligent enterprise than does eastern Nevada. The history of the world is the

History of Metallic Mining.

The ancients, who probably knew nothing of stock boards, "corners," "shorting" and such modern terms, dabbled in it centuries before the Christian era; and the adventurous Romans worked the mines of Hungary long prior to the time of Augustus. The old Spanish mines, too, discovered and opened by the Carthaginians long before they had signalized themselves on the plains of Sicily, are still worked with enormous profits. They yield of the Mexican mines is not inferior to-day to what it was in the days of Montezuma. So, too, with the South American mines, whose productive qualities are as little impaired now as they were when the fierce followers of Pizarro swept down upon the peaceful hamlets and smiling valleys of Peru. History shows that wherever silver mines have been opened they continue, with few exceptions, to be profitably worked. This is not wonderful, for there is no other business from which such enormous profits are obtained, and for permanent and rich returns, silver mining has no parallel in any other branch of industry. These facts are borne out by the magnificent exhibit made by

The Nevada Mines

For the year just passed. The whole of the Spanish American mines did not produce more than \$25,000,000 annually during the first years of the present century, while the Silver State alone has in 16 years increased the world's wealth more than \$300,000,000, or more than \$18,750,000 per annum. Of this stupendous amount the mines of eastern Nevada must have contributed not less than \$50,000,000, \$30,000,000 of which were doubtless produced by the Eureka district, during the seven years of its progressive existence—last year's yield being \$4,003,174.75. Six hundred thousand dollars of this sum were realized from the sale of lead alone, thus showing at a glance the importance of the base metal interests of the great east; and since it is noticeable that argentiferous mining is every day becoming more productive and more extended, it follows as a natural sequence that there will be a much larger revenue derived from this branch of industry in coming years than there has been in the past ones. The operations of the Tybo Consolidated company and the

Developments of the Tybo District

Illustrate the progress and spread of base metal mining. Although this district has scarcely divested itself of its infantile habiliments, its mines have produced nearly, if not quite, \$1,000,000 since active operations were inaugurated two and a half years ago. Were the property of this company located on the great mineral artery which courses beneath the giant shadows of Mount Davidson, the price of its securities would be found away up among the 30's and 40's and were it only situated in the

Continued on page 70.

MECHANICAL PROGRESS.

Heavy Work with Gun Metal.

Our brass-working readers will be interested to hear of something heavy in "gun metal" castings. It seems there are in Glasgow six steel plated corvettes building for the Admiralty, and there are, says the *Glasgow News*, other novelties of construction in addition to that involved in the use of steel rather than iron plates. Not the least interesting is that of the stems, all of which are formed of gun metal, instead of being forged of wrought iron, which has hitherto been the invariable practice in shipbuilding in iron. Although casting in brass or gun metal is an art that is quite unfamiliar to iron-founders, a firm of iron-founders were found quite willing to take the duty in hand. Their air furnace is of such an extraordinary capacity that it is capable of melting probably 35 tons of pig iron. The first of these stems was cast several weeks ago, and at the end of every fortnight that has since elapsed another has been turned out, No. 4 being cast on Tuesday. On each occasion there has been a large party of spectators present, owing to the great interest attaching to the casting of such extraordinary structures in a material with which the workmen had no practical acquaintance.

In outline, each of these stems bears some resemblance to the prow of the war galleys of the ancients. Continuous at one end with the keel of the vessel, of which it is to form a prominent feature, the stem bends forwards and upwards, becoming about 15 inches thick along the anterior border, and attaining to about four feet as its greatest breadth. It then curves backwards and upwards, gradually becoming smaller towards the upper end, where it merges into the bulwarks of the ship; indeed, it may be said to consist of two curved arms meeting in the broadest part at a somewhat obtuse angle, and there becoming a sort of ram. Speaking roughly, each stem may be said to be about 45 feet long, and as it is all cast in one piece, it is not surprising to learn that, in its finished state, the casting weighs about 10 tons, and that its production necessitates the employment of a charge of 14 to 15 tons of metal. The metal may really be regarded as the alloy known as gun metal, the essential ingredients of which are copper and tin. Consisting chiefly of old brass or bronze guns cast at Woolwich, the charging of the furnace commenced at half-past four o'clock on Tuesday morning. The first portion, weighing about seven and a half tons, and consisting of metal left from a former casting operation, and fresh copper and tin, was melted down by eight o'clock, when a fresh charge of about two tons was thrown in. That was melted down shortly before mid-day, and other two tons were charged in. At one o'clock another ton of old metal was thrown in. Next in order 10½ cwt. of tin were admitted—the whole being finished by two o'clock. Immediately before tapping a number of slabs of zinc or spelter, weighing about 1½ cwt., were cautiously slipped into the molten mass, and the whole well "rabblled." It was so arranged that the finished metal in the furnace should have something like the following composition: Copper, 16 ounces; tin, 1½ ounces; zinc, one-half ounce; the resulting alloy being guaranteed to stand a tensile strain of 15 tons per square inch. In all, about four tons weight of old guns were used in the production of the charge of fully 15 tons. At about half-past two o'clock, the metal, being perfectly liquid, was tapped into an oblong basin or reservoir, specially constructed of iron, and faced with loam for the reception of the material. When about eight tons of the charge had been accumulated, a shutter which was situated at the farther end, was raised by means of a lever, and the metal flowed into the mold through the "runner gates," of which there were upwards of 30. Fully half an hour elapsed before the metal in the deeper parts of the "runners" had lost its liquidity, thus differing very considerably from the iron which is so frequently the subject of manipulation in the same workshop. It may be worth while to mention, that in the construction of the mold used in casting these stems, upwards of 40 tons of ironwork are employed, and that the finished casting is valued at £1,000.

LECTURES TO ARTISANS.—An exchange says: Scientific lectures to the working men are a feature in England. They should be in this country. We are happy to learn that some of our intelligent manufacturers have not only subscribed to the wisdom of this idea in theory, but have grappled with its practical demonstration. Messrs. Chess, Smythe & Co., manufacturers of tacks and nails, Pittsburg, have appropriately fitted out a lecture room in their works, and the senior member of the firm has opened a course of lectures on mechanical science to their workmen. The North Chicago Rolling Mill Company, of this city, have encouraged, and aided the establishment of a library and reading-room for the benefit of their workmen, and each year subscribe for several copies of the leading industrial and scientific publications for the reading-room. If other proprietors of extensive manufacturing establishments would adopt the same course we presume they would find their reward in the growing intelligence and efficiency of their workmen. The old idea that the nearer the workman can be brought to an automaton—a human machine—the better, is fast being exploded and done away with. *Hardware Trade.*

Weakness in Iron Bridges.

The Ashtabula disaster is calling out notes from mechanics concerning the elements of weakness which exist in iron bridges. The following, which we find in an *Eastern exchange*, relates to this subject, and to the general subject of the strength and durability of bolts and the metal of which they are made:

During several years of instruction in bridge building and personal inspection of American and Continental viaducts and bridges, I have noticed two elements which affect the Howe truss, and all suspension systems other than those of wire—either of which would tend to an accident similar to the recent crash near Ashtabula. The first grows out of the simple principle that the screw is but the continuous inclined plane. Hence it has been repeatedly found that the strain upon vertical rods has worked the thread down and through the nut overhead; especially if the double nut has not been used and carefully inspected.

In the Polytechnic building of Wabash college, where the apparatus is elaborate, a flying swing once suddenly fell. The cables were attached to inch bolts, passing through heavy hemlock ties, and these were locked by cast iron washers and heavy nuts. An examination showed that other apparatus, gradually and by infinitesimal progress, had worked downward. This discovery has induced frequent inspection, almost always resulting in some slight correction. The fact that a nut seems tight upon application of the monkey wrench does not prove that this slow process has not begun. The oxidation of iron may check, but only suspends, the inevitable tendency of the rod to work down the thread of the screw. The tension is so great upon suspension rods that the test must be made by comparison with the original set of the nut. If it has moved up at all after the weight has been fully felt, it suggests investigation.

The other element is that of crystallization, which affects the fibrous texture of wrought iron as well as the more passive nature of cast iron. The cast iron, which fills the requirements of a column to resist compression, would be absurdly applied to the purposes of suspension; and yet the continual jar (not the strain) of suspension rods, under the passage of trains, destroys or changes the fibrous texture, and leaves a crystallized material of very moderate cohesive restraint. The late Edwin J. Peck, Esq., of Indianapolis, formerly President of the Indianapolis and Terre Haute Railroad Company, and of rare mechanical genius, had occasion to examine into the causes of the sudden fall of one of their bridges, of the Howe truss pattern. In spite of argument and discussion, he very quietly produced the upper ends of several suspension rods, showing that they were crystallized, and these broke under the hammer more easily than ordinary cast iron of the Indianapolis Iron Works.

The question of temperature enters into this inquiry, but with less force than in a matter where cast iron would be a substantial element to be considered. It is a fact that the best wrought iron or steel rails, which break during extreme cold, are more frequently broken by fast trains than by freight, or slow trains. The principle has been adverted to. It is the difference between a distributed and a concentrated force. A prostrate man with an anvil on his breast will receive the blow of a sledge hammer without sensation, and so does the slowly transmitted force spare a rail, a suspension rod, or bridge, which a sudden force would destroy.

FERRO-MANGANESE.—This metal, which has of late attracted considerable attention as a substitute for spiegeleisen in Bessemer steel manufacture, is made at the Terrenoire iron works, France, in the following manner: The manganese liquor produced in the manufacture of bleaching powder is precipitated by means of lime; the precipitated oxides are mixed with a necessary quantity of the purest iron ores (generally powdered magnetic ore from Algeria) and the mixture cemented together, after the addition of 15% of pure coal dust and a little flour spar, with bitumen. The bricks thus formed are heated in a furnace (four-dormant) preparatory to their being transferred still glowing into a Siemens furnace. The goal of the operation is the reduction of the metallic oxides and their fusion. Both operations demand an exceedingly high temperature, inasmuch as manganese is very difficult of reduction, and the carbon powder distributed throughout the bricks forms a notable hindrance to the uniform heating of the ore. In addition to these difficulties, the slag is a most difficultly fusible one, being highly basic; since the presence of silica in the operation is specially to be avoided. The manganese and iron ores employed must be free from sand and clay, and the hearth of the furnace must be formed of an agglomerate of graphite, the successful production of which has but lately been achieved. So soon as the attendant notices that the masses begin to fuse, he adds a certain quantity of spiegeleisen rich in manganese, and brings the charge to complete fusion. The product contains often as much as 65% of manganese. *—Deutsche Industrie.*

BOOK SHELF FITTINGS.—A contrivance for supporting shelves in bookcases, chemical cabinets, or elsewhere, has been patented by Tonks & Sons, of England. A flat strip of iron, three-quarter-inch wide, and stout enough to be firm when fixed, is pierced with openings at regular intervals to receive the neck of a loose stud which forms the support of the shelf. The cheek of the bookcase must of course be mortised to receive the plate, which lies flush with the wood.

The strips are fastened down to the wood by ordinary screws. The contrivance has been varied by having the strips stuck up so as to form a hollow behind, in which the neck of the stud is received. This arrangement permits the strips to be screwed on the uprights without mortising, the ends of the shelves being cut out to accommodate the patent fitting.

PRESERVING IRON.—A scientific discovery of importance to the iron industries in this country, has been made, says the *Sheffield Independent*, by Professor Baril, of the London University. The use of iron as a building material and for shipping purposes is greatly checked by its tendency to corrosion and rapid decay, through exposure to the weather, and all experiments for casting it with protective washes have proved useless. Professor Baril claims to have discovered a process of oxidizing iron, so as to prevent corrosion under any circumstances.

SCIENTIFIC PROGRESS.

Interesting Experiments in Diffusion.

Professor Sir William Thomson, the eminent English scientist, recently lectured in Glasgow on the "Diffusion of Liquids and Gases." After alluding to the diffusion of fluids by endosmosis, the lecturer proceeded to illustrate the diffusion of liquids without any septum intervening. The point which he desired especially to bring out was the marvelous slowness of this process in the case of liquids, and its rapidity in the case of gases. To show this he exhibited the results as far as they had gone, of two secular experiments on the diffusion of liquids. He had filled on the 29th of November, 1870, and the 14th of December of the same year, two long tubes, the lower half with water and the upper half with alcohol, colored red with cadbear, and had then hermetically sealed them. He pointed out to what a comparatively small extent diffusion had taken place during six years, as indicated by the extension of the cloudy stratum of colored liquid downwards into the colorless water. In passing, the lecturer mentioned that a neater and more satisfactory form of the experiment would be to enclose the liquids in a prismatic tube, so that they might be separately identified by their different powers of refracting light. He also drew special attention to the considerable amount of shrinkage which occurred as the process of diffusion went on. In one of the tubes this shrinkage was .70 in. and the other .67 in. during the six years in which the experiment had continued. This matter of shrinkage from diffusion of liquids of different density was one, as far as he was aware, not touched in the text-books. After adverting to the length of time which would elapse before the experiment would be completed, Sir William stated that he had in the university laboratory experiments in process, which, instead of "secular" might be called "millennial," as perhaps 2,000 years would be required for their completion. He had filled two great tubes, 25 feet in length, one with colored water and alcohol, and another with solution of sulphate of copper and water. At the bottom of the latter tube he had placed crystals of the salt, so that the lower portion of the solution would be kept in a state of continual complete saturation. The lecturer next proceeded to point out that, marvellously slow as the process of the diffusion of liquids was, if they were left to the unaided action of the natural law of diffusion, it was very easy so to expedite the process, that the work of centuries might be done in half a minute. This was effected by simply reversing the tube several times, so as to bring the particles of the two liquids into contact. If this were done very slowly it was possible that by the heavier fluid flowing under the lighter, they might change places in the tube without much visible diffusion. But the repetition of the operation brought about complete diffusion, and the total amount of shrinkage could then be measured. Sir William next adverted to the process of diffusion of gases, and showed, by a modification of Graham's experiment of diffusion through a porous septum, how extremely rapid the process is. He pointed out that, according to the Kinetic theory, the difference depended upon the nearness to each other of the ultimate molecules, or atoms of the liquid, as compared with the mutual distance of the molecules of the gas. In the latter case the molecules had the utmost facility of motion, which those of the liquid had not. As illustrative of this point the lecturer took the hypothetical case of a field of sheep, the individual members of the flock being uninfluenced by any consideration but that of going about the field to graze. At the commencement the sheep in one-half the field were branded red, and those in the other black. The diffusion of the red sheep among the black would follow a fixed law, and the extent of it at different intervals of time would be a matter of statistics—an actuary could calculate it. The rate of diffusion would depend very materially on the number of sheep in a given space. If closely packed, like the molecules of water, the diffusion would be slow; if so wide as to have perfect freedom of motion, like the molecules of gases, then it would be proportionately rapid. Sir William concluded by referring to the diffusion of gases through liquids, and, in this connection, adverted to the now well-known experiments of Dr. Fergus, in reference to the passage of sewer gas through drain traps.

The New Pink Coral Reef.

Lieutenant Commander Gorrings, of the United States steamer *Gettysburg*, under date of December 15th, 1876, reports to the Secretary of the Navy concerning the recently-discovered coral bank as follows: We reached the vicinity of the bank on Tuesday morning, December 12th. Soundings taken on and near the bank indicate that it is the summit of an isolated submarine elevation which rises regularly from a general depth of 2,200 to 2,700 fathoms. Within a radius of 20 miles from the position of our anchorage the summit—on which there is less than 100 fathoms—is of irregular shape, about seven in greatest extent north-northeast and south-southwest and five miles in breadth. Outside of this limit the depth increases towards the northeast and southwest to over 300 fathoms in about three miles, and at about the same rate to 1,000 fathoms at a distance of ten miles. Towards the northwest and southeast the increase appears to be much more rapid, a depth of 2,750 fathoms having been found at a distance of 20 miles in the former direction, and 2,200 fathoms at 13 miles to the northward. There appears to have been some violent disturbance at the bottom within a comparatively recent time, as coral obtained from depths of 50 to 250 fathoms is broken into fine pieces of rock, and mixed with small pebbles and pieces of sand and shells. That obtained at less depth is alive, although apparently but a comparatively short time at work. There is manifestly no connection whatever between this bank and that discovered by the *Josephine*. The Secretary of the Navy has decided to give to the coral bank discovered the name of Gorrings bank, in honor of the discoverer.

Laboratory Notes.

T. A. Edison, in an article in the *American Chemist*, has the following laboratory notes, which are of much interest, and may be found valuable:

Hard rubber or vulcanite, placed for several weeks in nitro-benzol, becomes soft and pliable like leather, and easily broken.

The vapor of chloral hydrate is a solvent of cellulose. I have found the corks of bottles containing the crystals eaten away to the depth of a quarter of an inch, the cork being resolved into a black semi-liquid. Certain kinds of tissue paper are partially dissolved in time, if thrown in a bottle containing the crystals.

A very difficult substance to dissolve is gum copal. I have found that aniline oil dissolves it with great facility.

Hypsulphite of soda is apparently soluble to a considerable extent in spirits of turpentine. Large crystals of "hypos" melt down to a liquid after several weeks, and if the bottle be shaken, partially disappear. The turpentine smell nearly disappears.

The vapors of iodine, in the course of several months, will penetrate deeply into lumps of beeswax.

If to a solution of bisulphide of carbon there be added twice its bulk of potassium hydrate in sticks, and the bottle be well sealed, the whole will, in two months, become an intense reddish, syrupy liquid, with scarcely any free bisulphide of carbon.

THE MICROSCOPE IN GOOD HANDS.—A competent judge declares that Professor Pasteur has saved enough to France by his discoveries to pay the entire indemnity to Germany. He is a great chemist, and one of the most skillful experimenters in the world. For many years he has been subjecting the theory of spontaneous generation to the most severe scientific tests, and is positive in his conviction that all life, so far as we know it, springs from living seed or germs. The experience of the best dealers in wine has been baffled in seeking a remedy for a difficulty. Professor Pasteur put some of the spoiled wine under the microscope and soon discovered the cause of the trouble. Minute organisms were found in the wine in every instance, and the change of quality was due to their presence and growth. Of course they grew from germs, and if the germs could be destroyed the mischief would be averted. Judging from experiments in other liquids that heat would be fatal to the germs, he subjected the wines to a degree of heat which they could bear without injury, and found that all the germs were destroyed. The wine makers profit by the science of the chemist, and save millions of dollars formerly lost by the spoiling of the wines. Having been successful in making wines unalterable, he turned his attention to vinegar. This was subject to changes, which made it putrid and worthless. He detected another kind of organism in vinegar, and taught the dealers how to destroy it in germ and keep the vinegar unharmed.

NATURAL GAS.—There are now three gas-producing wells at Beaver Falls, Pa., one of which has been in operation over 17 years. Two of the wells are nearly 1,100 feet in depth, one having been reamed out, and is said to produce about 100,000 feet per day, which is utilized in the cutlery works, except what is used in the gas-lighting works, where it supplies about 60% of what is used. The other well is to be bored out to eight inches. The third well is recently bored and struck a good vein of gas at 500 feet. This well is to be cased 12 inches, with a small tube inside to continue the boring to a greater depth, while the present product of gas, which is much greater than the other wells, can be utilized. *—Coal Trade Journal.*

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

MONTICHRIST.—*Amador Ledger*, Jan. 27: We regret to learn that the entire force of men was discharged from this mine on Sunday last, with the exception of one man retained for the hoisting of water. It is difficult to ascertain the precise reasons which led to this move. According to the Superintendent's report, the last crushing of rock averaged between \$10 and \$15 per ton, which, with economical management, ought certainly to leave a handsome profit after paying expenses. The managers of the mine assert that the closing down of the mine is for the purpose of straightening the books of the company, so as to ascertain definitely how matters stand. The stoppage is only temporary.

MACE'S MILL.—Mace's mill, beyond Volcano, which has been running steadily through the fall until the late spell of weather, has suspended operations until spring.

QUARTZ MINING BEYOND VOLCANO.—The owners of the small quartz claims a few miles above Volcano continue to work the same with gratifying results. Stoken is putting his mine in order for a good run in the spring. Griesback is taking out rock, ready for shipment as soon as the roads will allow. In fact, all the mines are looking well, with every prospect of making their owners wealthy in the future.

EAST KEYSTONE.—This mine is located at Amador City, being the eastern extension of the Keystone ledge. It has lately been incorporated into 70,000 shares. A shaft is down 30 feet, with a two-foot ledge of fine ribbon rock at the bottom. The ore is expected to mill from \$20 to \$30 per ton.

TALISMAN.—In running the tunnel to connect the air shaft with the main shaft, the miners struck a splendid body of ore on Saturday last. We have not seen specimens of this rock, but those who have informed us that it is literally covered with gold, estimated to yield \$1 to the pound. We have not heard the size of the ledge. The mill is still a long way from completion, the delay being occasioned by the difficulty in getting the iron work ready.

ONIDA.—Everything around the Onida mine looks thrifty and prosperous. Sufficient rock is taken from the lower levels to keep the 60-stamp mill constantly running, and within the past few weeks a marked improvement has been noticeable in the quality of the rock. Mr. Robinson, the Superintendent, has put things in excellent shape. The water supply used to be conducted through ditches to the mill, resulting in considerable surface water draining into the mine. These ditches have been discontinued, and an immense stock of firewood is on hand, enough to supply the furnaces for months to come.

FIDDLERTOWN GRAVEL CLAIMS.—The supply of water is at present inadequate to start all the large gravel mines around Fiddletown. The big company have commenced work upon one of their claims. A number of San Francisco men have visited Fiddletown of late and invested in the mines.

BUTTE BASIN.—James Morgan, of San Francisco, has been in Jackson the last few days. The object of his coming is to start mining operations at Butte Basin. A very rich streak of gravel was worked at this place years ago, and it is thought by some that the pay dirt goes deep into the earth, in the shape of a basin. To test that theory is the object of the present undertaking.

BUTTE.

BIG BAR MINING CLAIM.—Oroville *Mercury*, Jan. 26: On the second day of January a company consisting of Chas. Waldeyer, G. W. Dyer, J. C. Logan, D. K. Perkins, J. M. Brock, J. J. Smith, J. M. Burt, E. W. Fogg, Mr. Fitts, B. P. Hutchinson and three others whose names have been escaped us, bought what is known as the Grange boys claim, on the North fork, paying therefor the sum of \$10,000, half down and the balance some time in the fall. The company have incorporated and are known as the Big Bar hydraulic gravel company. Several of them are among the best miners on the coast. Mr. Waldeyer owns the richest mines in the county, and is probably the wealthiest man in the county in this line. Mr. Dyer is the foreman of the Spring Valley company. Others of the company are also skilled in mining, and all seem to feel that they have purchased a good piece of property. They have opened up a good road to the mine at a cost of \$1,200. They are now building 1,200 feet of flume, and will soon have it completed and ready for use. As the North fork is a very rapid stream, wire cable will be strung from bank to bank, and everything taken across the river on a car suspended from the rope or cable. It will cost some \$3,500 to put the claim in working order, but it is fast being done under the direction of skilled men, and by the first of March we shall be able to give our readers a more correct idea of the richness of the claim than at present.

CALAVERAS.

MILL STARTED.—*Calaveras Chronicle*, Jan. 27: The new mill at the Tiger mine, Rich Gulch flat, was started Thursday morning last. The battery contains 10 stamps and is run by steam. We understand that the machinery performed satisfactorily upon its initiatory trial, everything running smoothly. As there is a considerable quantity of quartz in the dumps, we presume the stamps have been set to work at crushing it. The Tiger is one of the most promising mines in this vicinity.

UPPER COUNTRY NOTES.—Very rich rock has lately been discovered in the Carey mine near West Point. The mill being put upon the Carey is nearly completed. At the Champion mine a new sinking shaft is just finished and running smoothly. As there is a looking as well as ever, which is the most complimentary remark that could be made respecting it. Fields & Co. are taking out good rock. Reports from the Mina Rica continue favorable, work progressing steadily and with good results.

WASHINGTON.—Mr. William Devan, who during the fall made extensive preparations for mining out his premises on East Center street, formerly occupied as a Chinese garden, has commenced washing. Mr. Devan has every thing in first-rate shape for washing, and having the advantage of an abundance of water, will run off gravel rapidly. At present ground sluicing is the method of washing employed. Work is being energetically urged forward day and night, and as we hear very favorable reports concerning the richness of the gravel, there is no question but that Mr. Devan will make the enterprise pay handsomely.

MOUNT TOLU.—Everything is progressing favorably at the Mount Tolu mine, Jesus Maria district. The dumps are so full of rock that the mining of ore has been suspended until the stamps "catch up." Something like 200 tons of quartz is now in readiness to be crushed, the battery of five stamps being unable to work the rock as fast as a small force takes it from the mine. At the depth of 80 feet the chute of pay rock is over 100 feet wide, averaging about three feet wide. The prospects that the Mount Tolu will develop into a permanent, paying mine are flattering.

MINING JOBS.—At the Duryea claim, Chile gulch, labor is progressing effectively. The mining of gravel is completed and unintercepted, and the battery is kept in motion day and night. A large amount of gravel is put under the stamps daily. The tunnel being run in the Brown claim, Tunnel ridge, is lengthening rapidly. Still in bedrock, Veith, the great hydraulicist, is running powder drills. Preparations are also being made for putting up a water-power derrick. The foundation is being laid and it is expected to have the machinery in operation in a week or two. For some time past Mr. S. Moser has been engaged in opening his hydraulic on Tunnel ridge. Preparations are now nearly completed. The flume is laid and everything will be in readiness to commence piping soon. Emerson, proprietor of the Happy Valley claim, has resumed washing. All the improvements contemplated are

completed, and the mine is the best appointed one in the county. Piping is being vigorously prosecuted—a large head of water being used—and operations systematically and perseveringly urged forward. Piping is steadily going on in Cook's new hydraulic in the vicinity of the French hospital. We have not yet found time to visit the claim and consequently cannot give details. Work is also progressing steadily in Cook & Co.'s claim on the Calaveras, with uniformly good results. There is now an abundance of water all around, and mining operations generally are being energetically pressed.

INYO.

DEFIANCE.—*Cons Mining News*, Jan. 27: P. Reddy, Esq., Superintendent, and John S. Gorman, Foreman of the Defiance furnace, went below last Sunday on business connected with the company. On returning it is thought matters will be so arranged that the Defiance mine and furnaces will be started on a solid basis and for an extended run.

MODOC CON. M. Co.—This company's mines in Lookout district are turning out their usual quantity of rich bullion and are looking as well as ever at all points. Ten men are employed taking out ore for the two furnaces. The ore is being taken from Confidence Nos. 3 and 4, and Lookout. On the Lookout they are sinking on the ore body of the same strike, about 30 feet south from the old winze. If this ore continues to show, as is now indicated, it will be of immense value. The two mines, Confidence No. 4 are very fine, but of a drier nature, rather more of a milling character. By mixing the ores of No. 4 with those of No. 3, very high grade bullion is produced, going from \$450 to \$600, some shipments being made as high as \$600 per ton in silver. Three prospect tunnels are being driven in different directions, deeper into the hill.

FURNACE NO. 1 has been running uninterruptedly for the past 45 days, under the able management of Mr. J. J. Williams, who is entitled to much credit for the very successful manner in which both furnaces have been run, particularly since so many experts came up here to examine the ores and gave it as their opinion that they could not be melted. Mr. Williams, however, finds it so long filled with satisfaction to the company and credit to himself, to accept another offer elsewhere. T. H. Selby, a nephew of the late Thos. Selby, has arrived and taken the place of Mr. Williams. He has had the reputation of being an excellent smelter, and the interests of the company will probably not suffer by the change, though all are not so successful as Mr. Williams as could be desired. Mr. Polkenhorn, the mine Foreman, is also entitled to the warmest consideration of the Modoc company for the very able manner in which he has prosecuted work in all the mines for development of splendid ore bodies now in sight.

TUS WOOD and coal road to Wild Rose canyon, from whence those supplies will hereafter be obtained, is now completed and in excellent condition. A tramway from the furnaces to connect with the Wild Rose road has been commenced, and machinery will be ordered immediately. It will be an iron double track T-rail tramway, with a heavy stationary engine to propel the cars.

ACUM AND AROENTUM.—This is a company lately incorporated, and we are assured the men composing the same are wealthy and mean business. Mr. T. A. Brawley has been appointed Superintendent. He arrived here last Tuesday, and at once commenced work on the company's mines, which are situated in Minute-Gun canyon, through which the road hence to Lookout runs.

LOS ANGELES.

COAL IN THE ARROYO SECO.—*Los Angeles Herald*, Jan. 29: We were shown yesterday a very fine specimen of coal from a mine which is now being opened on Mr. Prudent's land, in the Arroyo Seco. It is a large block, and the quality is excellent. The prospect was covered by a Mr. Carson, a son of the celebrated geologist, philosopher and friend of Gen. John C. Fremont. He has run a tunnel into the hillside to a depth of 40 feet, and he thinks he will strike a fine vein of coal when he gets in a distance of 80 feet. He is now showing his faith by his works, because he is doing all the labor at his own expense. He is confident, on being assured that Mr. Carson believed in the existence of a reliable coal mine, agreed to give him one-half of the coal product if his expectations should be realized. Mr. C. has been at the entire outlay for the work himself, and is confident that the results will be satisfactory.

NEVADA.

ALLISON RANCH PHENIX MINE.—*Grass Valley Union*, Jan. 26: A company has recently been incorporated for the purpose of working the above named mine. The location is near and to the west of the old Allison Ranch mine, and the veins are almost parallel. The "Phenix" as the ledge has always been called up to the time of the recent incorporation, has never failed to give large results whenever a crushing from it has been made, and number of times the ore has been taken from the mine, and sold at points, have been made. The ledge has not been constantly worked because the owner, Mr. Patrick Hennessey, did not have the required capital for that purpose. Steam machinery for pumping is absolutely necessary there in order to get down more than 30 or 40 feet. That difficulty has now been arranged for, and the Allison Ranch Phenix shaft will soon be worth money. We regard this as about the best of the returning good results to owners as any untried venture in the district. We are familiar with the history of the Phenix and its record is most excellent. The most of the stock of the new company is owned in Sacramento. Mr. Hennessey will superintend the mine.

SPARROWHAWK MINE.—This is a prospecting operation now going forward in Woodpecker ravine near this town. It is being conducted by workmen and the results have so far been satisfactory. A tunnel has been opened, and the ledge has been cut so as to give about 60 feet of backs. Only about eight tons of ore have been taken out, and of this a trial working of four tons has been made by mill process. The four tons yielded six ounces of retorted gold. The ledge is from eight to 14 inches in thickness. The showing is so good that systematic work, in the regular Grass Valley style, will be continued in time.

AMERICAN.—*Transvaal*, Jan. 26: The American mine, Juan, has been a good producer, and has gold enough in it yet to make the owners regular "mildons." From 1863 to 1872 the company's books show that \$1,241,240 was taken out. It is one of the best and most economically worked mines in the county. A tunnel was commenced about eight years ago and was completed last year. It is 400 feet in length, and will permit the ground to be washed through it. There is ground enough to last for 15 or 20 years. The mine has the most complete system of undercurrents to be found in the State, and but little gold is allowed to escape. We believe there are over 40 of these gold savers between the mine and creek. The owners are John McCoy, J. S. McBride, George C. Spooner, S. M. Hall, A. P. Swan, M. Dickinson, Furth Bros., and others. They are all first-class men, and deserve the prosperity they are enjoying.

THE Cold Spring company are now running three drifts in their claims. Two are run for the purpose of taking out gravel, and one is being pushed ahead through hard rock for the purpose of striking the main channel. In the gravel there is a large quantity of quartz rock, which the company have been mining and contains gold in paying quantities, and which has been hitherto thrown away. It is estimated that the whole of it will pay, on an average, \$20 to the ton. It comes out with the gravel and is easily saved. It will add greatly to the proceeds of the mine when in full operation. The company think at least five tons per day of it can be taken out with the gravel. Since the gravel is being taken out, it has been learned, was once crushed at Kitz's mill, and yielded \$35 to the ton.

SAN BENITO.

CON. RAUSTON.—*San Benito Enterprise*, Jan. 27: The above mine, or combination of mines, is located about one mile south of the Clayton furnace. The owners are J. A. Owens, C. W. Wentworth, T. H. Swain, W. Eppeimer and Thos. Conlan. Four hands, old miners, have been driving two tunnels on it since last fall, and have just completed their first contract. In the main tunnel, which is about 60 feet, they struck a heavy body of metal, and

the indications are that the Ralston will turn out one of the best mines in the Coast range. The men who done this work on the mine have had sufficient confidence in the prospect as to take their pay altogether in the stock of the company, and consider that they have made a good bargain. A new contract will be let to the same parties at once. A quantity of specimens, taken from the mine in the principal tunnel, is on exhibition at Justice Owen's Court room, and according to the judgment of some experienced "quartz sharps" they contain silver and gold, as well as quicksilver and other metals. There is hardly room to doubt that the mine will turn out to be valuable.

TRINITY.

NORTH FORK.—*Trinity Journal*, Jan. 27: Chris. Meekel, who was in town this week, informed us that the old town of "Bagdad" was just as dull as any other place in the county and nothing short of plenty of water could be expected to enliven it. From him we learned further that the McAllister company are working some very rich ground near the site of the old mill on the other side of the river. The new ground is extensive and under Mr. Burns's energetic management the company will probably realize a profit this season.

RUSH CREEK.—This is rather an agricultural than a mining country—only one company of white men working on this side of the river. That is the Chamberlain Bros.; when they are making money or not, I cannot say, but they certainly deserve to, as they are hard working, industrious men. Paulsen & Christiansen turned the water into their pipe across, or rather under the river, on New Years day, and it works splendidly. Two Chinese companies are working with the water, and a third will soon start. Mr. Muncey to-day presented me with a piece of rock from his claim on Deadwood, a little the richest I ever saw in any part of the State. Mr. Muncey informs me that it works about the same as the Deadwood. I had almost forgotten to say something about the Buckley ditch, as neat and well dug ditch as the State affords. It is now completed from Bol's hill to Van Matre creek, a distance of 23 miles and I understand will be completed to Stuart fork the coming summer.

TUOLUMNE.

BRINO REOPENED.—*Tuolumne Independent*: The old Monteruma tunnel, after a lapse of about 17 years is about to be reopened by a company of San Francisco gentlemen, under the management of John H. Neale, an experienced miner both in gravel and quartz. The tunnel is situated about two miles below Rawhide, and was owned in 1859-60 by Stranahan & Dann. A difficulty arose about this time between the owners of this claim and a man named McAllister, on account of the former parties tapping a spring and draining the water from the latter's ranch, and culminated in the death of McAllister by the hands of Dann. The claim has ever since lain idle, and up to the time of the difficulty paid well.

FEELS.—In our last we stated that the ditch to the Cave diggings was taken from the Tuolumne river. We were wrong; it is not, but is taken from one of its tributaries. The two new and Buckley drills at the Solsby mine are now on the ground, and they will be in operation as soon as possible. They will be worked by steam power, and a 60-horse power engine will be used for that purpose. They will be used in running a new drift from the south to the north shaft, and with the ample motive power provided, will greatly facilitate the work. The West Wall vein claim, owned by Glasson & Co., parallel with the Solsby lead, big and fair to be a really good deposit of precious ores. The vein in the present bottom of this mine looks like a rich and permanent deposit of galena, iron sulphates and gold, and a *fac-simile* of the Solsby upper tunnels; and there is not a doubt but that, as it is further opened, it will spread a large amount of money in circulation in this county.

Nevada.

WASHOE DISTRICT.

SINIERA NEVADA.—*Gold Hill News*, Jan. 31: The flow of water at the bottom of the shaft is still very strong, but is easily handled by the pumps. The face of the north drift on the 1700-ft level is developing some fine quartz and low grade ore.

CROWN POINT.—Sinking the main incline is making the best of headway, the rock in the bottom blasting out well. It is now down to within about ten feet of the 2000-ft level. As soon as a sufficient depth is attained the 2000 level station will be opened, and a drift started to prospect the ore vein at that point.

HOMESTEAD.—Sinking the new shaft has progressed at a very satisfactory rate. Considerable clay and occasional bunches of quartz are met with. The old prospecting operations of the company demonstrated the existence of good ore deposits at no great depth, and this new shaft is intended to open the mine properly and give an outlet to its riches.

SAVOGE.—A breakage of a pump rod during the first part of the week caused a stoppage which permitted the water in the shaft to rise to a distance so great as to stop all work in the main south drifts on the 1900-ft level. The broken rod has been replaced, however, so that everything is again in the best of working order.

TRINITY.—The main incline has reached the 1830-ft level, at which point a station is being opened. In the meantime a winze is being sunk below the 1700-ft level to prospect the vein in the downward direction.

SILVER HILL.—The main incline has been sunk during the past week 123 feet. The rock in the bottom is very firm and the flow of water is gradually lessening.

CALEDONIA.—The shaft has reached the 1440-ft level, at which point a large working station is being opened, and large tanks erected preparatory to letting in another of the heavy lift pumps. At the same time preparations are being made to cross-cut and determine the value of the ledge on the 1200-ft level.

MEXICAN.—The ore prospects in the drifts on both the 1600 and 1700-ft levels are gradually on the increase.

SUCCESS.—Sinking the main shaft is making the best of headway. The new pumping machinery is working finely.

NEW YORK.—The excavation of the third or pump compartment to the shaft is pushing ahead as usual, in hard rock.

COSMOPOLITAN.—The usual yield of ore comes from the upper stopes, and also from the north drift from the incline below the main adit level.

SILVER TUNNEL.—Total length of tunnel, 14,780 feet. Somewhat softer material has been met with in the face of the header during the week, allowing of better progress.

LADY BRYAN.—The new and powerful engine is in place, together with its accompanying machinery, and will be ready to start in about two weeks, draining the water from the mine. The newly encountered last week, and will be forwarded from San Francisco at once, together with the balance of the hoisting machinery. The mine has now passed into the possession of men of known probity and ability, with plenty of capital and energy, and they show a disposition to develop and run the mine upon its own real and acknowledged merit. At the earliest period practicable the new machinery will be completed and set in motion. A new battery put into the mill of the company, and the extraction of milling ore from the mine begun.

CON. VIRGINIA.—Daily yield, 285 tons of ore, keeping the Consolidated mill steadily running. On the 1500-ft level the spur of ore recently struck is 28 feet in width, and will mill about \$100 per ton. On the 1500-ft level the hanging and foot veins are now connecting with each other, and the Gould & Curry is nearly completed. On the 1200-ft level the main south drift connecting with the Gould & Curry is being enlarged and repaired as rapidly as the nature of the work will permit. This is being done to get at and extract the ores now known to exist in that portion of the mine. The west drift from the C. & C. shaft has passed through the foot vein, and is now connecting with the Gould & Curry in first-class ore. This streak of porphyry was something very similar to that found on the east side of the ledge on the 1500-ft level.

JULIA.—The main cross-cut on the 1800-ft level from the

south drift is making the best of progress. This drift after penetrating the quartz and ore recently struck a distance of 90 feet, passed into a horse of porphyry 30 feet or more in thickness. This porphyry has been passed through and the face of the drift is again in quartz and ore of a better character than any that has yet been struck. The vein at that point is undoubtedly wide, and the quartz shows a decided improvement with every step of progress made. The south drift which was recently started on the east body of ore, is making good progress, the face in solid quartz of the finest character.

WELLS-PAROE.—The work of development in this mine will be pushed forward hereafter with renewed energy, and under more favorable auspices, the company being reorganized with more effective plans for the future.

IMPERIAL CON.—The north drift from the bottom of the south winze on the 2135-ft level is making steady progress, the face still in a very favorable vein formation. Both the north and south drifts from the bottom of the north winze on the same level are being pushed rapidly forward, the face of each in ledge material.

OVERMAN.—Sinking the winze below the 1200-ft level is making good progress, with increasing prospects. The prospecting drifts on the 1300-ft level are making the best of progress, the water having been pretty well drained at that point. The pumps continue to work admirably, and water is being taken with perfect ease. The connection of the south drift on the 1200-ft level with the north drift from the Caledonia mine is fast cooling off.

BECKER.—Daily yield, 130 tons of ore, keeping the Santiago mill crushing to its full capacity. Sinking the main incline is making the best of progress. Sinking the drain shaft is also making good headway, notwithstanding a strike, strong flow of water at the bottom. The 1800-ft station is completed and drifts have been started to open and prospect the ore vein at that point.

CHOLLAR-POTOSI.—Sinking the Combination shaft is making good headway, the bottom in good working order. The new pumping machinery is all in the best of working order, whenever there is need of it.

HALE & NORCROSS.—Owing to a breakage of a pump rod in the shaft during the first part of the week, the water rose rapidly to a considerable distance above the 1900-ft station, the pumps unable being unable to keep it down. The Savage break, however, has been fully repaired, and both pumps running in conjunction with one another, are again rapidly gaining on the flow. The water is now down to its old status, below the 1900-ft station.

TRUMAN.—The ore dump has been filled with ore, and a new dump has been provided until the weather will permit of the ore being hauled to the mills. The stopes on the 350-ft level are looking splendidly. A winze has been started downward on the ore body, which is also looking finely.

CALIFORNIA.—Daily yield, 500 tons of ore, keeping the mills crushing to their full capacities. The ore breasts and stopes are showing well at every point. The north drift on the 1400-ft level, is being enlarged. The south drift from the winze, on the 1850-ft level, is steadily though slowly advancing, the face in excellent ore. Sinking the C. & U. shaft has made but very slow progress during the week, owing to the steady and fearfully strong flow of water at the bottom.

LEVATHAN.—The foot-wall of the new ore vein in the north drift is showing around more to the northward and is being followed. The vein continues to the east end of the drift, and the main body of ore is being left to the east end of the drift. At some favorable point farther north another cross-cut will be made into or through the ore vein.

GOULD & CURRY.—The south drift on the 1700-ft level is being pushed rapidly ahead. The east cross-drift on the same level has been stopped, and diamond drills substituted. While these drills are being used, work in the winze below the 1700-ft level is suspended, on account of not having sufficient air with which to drive the machinery of both places.

JUSTICE.—Daily yield, 360 tons of ore, keeping the mills all steadily running. Another mill, the Atlas, has been added to the reduction force. The ore stopes on the 400, 600 and 700-ft levels show but little change. The developments on the 800-ft level continue of the most favorable description.

YELLOW JACKET.—Both of the two east cross-cuts on the 2040-ft level are being driven forward, the face of each drift showing a decided improvement for the past two days. These two cross-cuts are located between the north and south drift.

BULLION.—The north and south drifts on the 1500-ft level of the Bullion are both making excellent headway, with steadily increasing prospects of ore. The main east drift, on the 1600-ft level, appears to be just entering the vein, and is also looking very promising.

DAYTON.—The east drift on the 700-ft level is showing better with every foot the drift advances. The north drift on the 220-ft level is also showing some very fine ore. The company have over 800 feet of entirely unprospected ground north of the old works, which gives room for some good ledge developments.

KOSUTSI.—The west cross-cut on the 600-ft level is in 30 feet, the face in broken quartz and porphyry. This drift is gradually draining the flow of water, and it is confidently believed that when the white portion of the vein is developed a paying mine will be opened.

NORTH CON. VIRGINIA.—Preparations for draining a heavy flow of water, should any be encountered on the 1100-ft level, by means of diamond drills, has nearly been completed. The new pump station at the 1150-ft level is about finished.

LADY WASHINGTON.—The north drift is in 138 feet, and during the past two or three days has run into a heavy body of hard, compact quartz, the whole of which is the drift being in it. It gives good assays, and is a very encouraging prospect.

BALTIMORE AND AMERICAN FLAT.—Sinking the north winze below the 1050-ft level is making the usual fair rate of progress. The north drift on that level is showing some fine streaks of ore.

DIAMOND CON.—Sinking the winze on the ore vein below the 1300-ft level is making excellent progress.

PHIL. SHERIDAN.—Sinking the shaft is being pushed ahead with the usual vigor, the bottom in splendid blasting ground.

SOUTH COMSTOCK.—Drift north from the main east drift at the 300-ft level is to-day in 34 feet and still in low grade ore. Some streaks of this, however, give high assays.

BUEY.—The ore stopes north of the winze on the 350-ft level are looking well, and are yielding the usual quantity of milling ore. The Hope mill is kept steadily running on ore from the mine.

FLORIDA.—Sinking the main shaft is being pushed ahead vigorously, the bottom in porphyry.

MINT.—Sinking the main shaft is making the best of headway, the bottom in good blasting ground. The flow of water gives no trouble.

SUPERIOR.—The shaft is now draining out rapidly.

ALTA.—The pump station is completed and sinking the main shaft has been resumed.

Utah.

NOVELTY MILL.—*Salt Lake Tribune*, Jan. 23: Messrs. Harris and Tischer have moved the Novelty mill from Orr, and it is now on the way to Leeds, where the owners expect to have it in operation within four or five weeks. It is a five stamp mill. They pretend to be able to work ore to within 5% of the fire assay value by the leaching process. An exceedingly rich strike has been made in the Kearsarge mine on Shoo Fly hill in Dry canyon. Two young men who had been employed at the Mono, leased the Kearsarge for four months from the first of January, contracting to do certain work on the mine for four-fifths of the ore extracted. On last Thursday evening a vein of horn silver ore between three and four feet thick ran the bottom of the mine, the whole of which were sent to this city to be assayed. A piece given to Mr. McVicker went \$18,000 in silver and \$24,000 in gold, or \$42,000 to the ton. Another specimen, assayed by Mr. Frank Foote, went \$195.95 in gold, and \$14,800.08 in silver to the ton.

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midst of the Eureka bonanzas \$1,000,000 would be a small price for its 50,000 shares. The corporation is a close one, consequently its members hold their stock pretty tightly and care not to sell it, well knowing that they could not very readily find a better, safer or more permanent investment than they possess in both the mines and reduction works of Tybo. The latter comprise two furnaces and a 20-stamp mill, which are kept continuously employed in the make of bullion—one of the former has been taken down to make room for one of larger capacity. This will be completed by the end of this month. The united reduction capacity of mill and furnaces then will be from 85 to 90 tons each 24 hours. The company's mines are in a flourishing condition, every quarter of the underground workings of the lode exhibiting an abundance of finely graded smelting and milling ores.

The Mill

Is now running on ore from the company's mines very successfully, thus attesting both the value and importance of the White rotary oxidizing furnace and rotary drier as auxiliary reduction agents. These have been in constant use since the 4th ult., and it is enough to say that they have thus far performed their work in a manner to win the approbation of all who have witnessed their operations and that they will subserve the purposes for which they were constructed is now no longer a question of doubt, but an assured fact, as the annexed data will abundantly prove. The chlorinization of the ores is very thoroughly effected in their passage through the superheated cylinder. They are chloridized up to 90 and 92% of their assay value, and the contractor, Mr. G. O. Kilbourne, hopes ultimately to obtain 95%, which perhaps would be the highest percentage that has ever been obtained by millmen on the coast. The

White Rotary Oxidizing Furnace

And rotary ore drier, were erected here last November in connection with the company's mill. They were constructed under the immediate supervision of Geo. O. Kilbourne, Superintendent of the Jefferson mine, in this county. He claims that the plan on which the fire-places are constructed and arranged, and the manner in which the fires are controlled, together with the chloridizing chambers into which the pulp is discharged after passing through the flames of the cylinder, are original, and entirely different from anything that has heretofore been introduced for the purpose of chloridizing base ores. The

Rotary Drier

Is a unique apparatus, and its completeness and fuel-saving qualities should bring it into general use for drying ores for the battery, and since it is conceded to be far ahead of the old metal-plated drying kilns, there is little doubt but it soon will supersede the latter.

The ore when fed to the rock-breaker is discharged directly into the head of the drying cylinders, whose dimensions are as follows: Length, 17 feet 6 inches, outside diameter, 36 inches, inside, lined with strong corrugated iron, cast in sections to fit the sections of the cylinder. This, bolted together, is placed on a substantial foundation composed of stone and hewn timbers, having an inclination of one-half inch to the foot, or eight and three-quarter inches altogether. The ore, as already stated, being fed at the upper end, is met by the heat and flames from the fire maintained at the opposite end. After passing through the cylinder, which makes about nine revolutions a minute, the ore is discharged into an iron spout, placed at a proper angle in the brick, between the bridge or fire-wall and the end of the cylinder, thence falling directly in front of the battery caement to the feeder. One man on each shift will dry 30 tons per day, and use not more than a half a cord of wood, of the value of three dollars, thus making the cost of running rockbreaker and drying furnaces \$11 each 24 hours, or less than 40 cents per ton. The dimensions of the

Oxidizing Furnace

And method of handling or working it are as given below: Length of cylinder, 24 feet; outside diameter, 40 inches, inside lined with best of Scotch beveled firebrick. It is cast in four-foot sections, which are firmly bolted together and placed on a substantial foundation, having an angle of inclination of 9-16 of an inch to the foot, bevel geared and driven (not the foundation) by a six-inch belt, and rotates at the rate of nine revolutions per minute. It is both fed and fired at the same end, but by a peculiar arrangement of the fire space the man in charge is enabled to temper the heat and the draft to any required degree. This is a very important arrangement, for by its means there is promoted that sharp concentration of heat that is usually obtained in firing with the feed.

The pulp, after passing through the cylinder, and while discharging into the first chloridizing chamber, is caught by a sharp concentrated auxiliary fire, which thoroughly chloridizes every portion of the pulp not chloridized in the cylinder. There are four

Chloridizing Chambers.

The first is about nine feet high by four feet wide and nine feet long; the other three decrease each six inches in size from one to the other. Each chamber has a division or hanging wall, varying from three to two feet in height from the chamber floors, forming thereby short diving furs, so arranged that all the heat from both fires (head and end) passes along with the pulp while moving and close down on it when at rest, during the time it remains in the chambers,

which is from three to four hours.

The discharge or hauling doors of the chambers are nearly three feet above the cooling hearth, and so arranged that the red-hot pulp, as it is drawn out, is allowed (with occasional stirring) to remain on the hearth till cool enough to pass to the amalgamating pans.

The furnace, although now handling fully 30 tons of ore each 24 hours, consumes not quite two cords of wood, and the bullion demonstrates the equally agreeable fact that 90% of the assay value of the ores is obtained by this process. The pulp is conveyed from the battery to a large sized hopper, placed on a level with and a few feet from the furnace, by the usual method of revolving screens and hoisting buckets, placed on an endless belt. These buckets discharge their contents into said hopper, which is connected with the feeding and firing end of the cylinder by a revolving screen, which propels the pulp from the hopper to the feeding aperture of the furnace. Two men, one on each shift, are capable of attending to all the wants of the furnace, which, as is shown, is by no means an expensive concern to operate, everything being simplified and the whole constructed with a view to facilitate and cheapen the operations attending the roasting and handling of base ores.

Unverified Predictions.

When the company and its agent, Mr. Kilbourne, first determined to adopt the "White" process, and the improvements suggested by the latter, mentioned elsewhere, they were confidently told on the threshold of their undertaking, by chronic croakers, who themselves were never guilty of having achieved even an ephemeral success in any department of either mining or metallurgy, that the White furnace would not meet the requirements, that failure was inevitable, and that the pulp, instead of being chloridized, would cinder and mat before reaching the cooling hearth, or would roll up into huge balls in the furnace, etc., *ad nauseam*. These oracular utterances, however, have not been borne out, for the results are entirely different and are satisfactory to all concerned, thus proving that these leaden ores can be chloridized up to the necessary percentage to pay for working them, as shown by recent returns.

Cost of Construction, etc.

The remarkable success that has attended the operations so far cannot be otherwise than highly gratifying to both the company and the builder; for the enterprise and expenditure of the one and the skill and inventive genius of the other have been suitably rewarded by the fact of having demonstrated to the people of eastern Nevada that sulphureted ores are susceptible of profitable treatment by the White oxidizing furnace.

The cost of the whole apparatus, embracing ore drier, pulp furnace, belts, machinery, construction, etc., approximates \$25,000, and the cost of running, including the two essentials of labor and feed, does not exceed \$33 for each 24 hours employed. This latter feature is an all important consideration in a place like Tybo, where there is such an abundance of ores that do not carry sufficient lead to facilitate smelting, nor yet too much to prevent their being thoroughly and profitably worked by the White oxidizing furnace. GOTHAM.

Tybo, Nev., Jan. 18th, 1877.

"Vulcan Coal Mine," Santa Cruz County.

EDITORS PRESS:—Having promised to keep your readers informed in regard to all developments of the Vulcan coal mine, I will here state to you all that I have been able to learn of the work since performed and of the character of the coal as the new shaft has been sunk lower and the new vein has been opened on the line of its lateral extension.

The new shaft run down on the vein has reached the distance of 18 feet from the surface. The dip of the vein, which was first at an angle of 50 degrees, soon began to assume more of a perpendicular direction, leaving the vein with but a slight inclination to the south in its continued descent. After reaching this depth in the shaft a tunnel from the outside, 18 feet in length, was run from the road, at the foot of the hill, at an elevation of about 20 feet above the bed of the creek. Having connected the shaft and tunnel, drifts were then run in either direction on the vein. The coal has improved in quality in the shaft as the depth increased, until now it is uniform in character, and free from extraneous substances. At this depth also the vein is well defined. The lower wall is now composed of solid sandstone, lined within with about 3½ feet of slate, then the vein of four feet eight inches of solid coal, afterwards the upper wall of sand rock, black and discolored, for one and a half feet outside the coal. The drift extension to the east of the shaft is about eight feet in length, seven feet in height and in width of the thickness of the vein. The drift running westwardly is the same in its dimensions as the other, except in the thickness of the vein, which has diminished to about three feet.

About 12 tons of good coal had been taken from all these excavations at the time of our visit. The coal is what the miners call "blind" coal, and is similar to anthracite in character.

The company having become satisfied as to the genuineness of this vein, determined to continue the workings in the old tunnel, running northward from their 160-foot shaft. They have secured its perfect ventilation and they can now work in it without hindrance or danger.

Mr. Wm. Muller, who, after graduating from both French and German scientific mining schools, and a large experience in the mines of the Old World, came to Mexico, and for four years superintended in some of the best copper and silver mines of the New World, has now the superintendence of this coal mine. Mr. M. informed me that by continuing the present tunnel for about 50 feet further, and 300 feet from the shaft, he expected to strike a coal vein well defined in its croppings at the surface, and dipping at an angle which would intersect the tunnel at this depth and distance. Having succeeded in striking the vein and opening it well, he then proposes to return to the shaft and there extend the tunnel southward to about 50 feet, where he expects to strike at a right angle the new vein already opened and described as above. Then, again, he proposes to run a drift eastward 160 feet, with a slight ascent on the vein, towards the excavations already made on the vein. Then from the end of this drift, he will run an incline upwards, at an angle of 45°, a distance of 230 feet, to the present opening tunnel near the road. On this incline he proposes to work both ways: upwards and downwards. The coal taken from the tunnel and lower drift will be hoisted, of course, up the 160-foot shaft until the incline is completed; when all the coal from every part of the mine will be drawn up this incline, and the shaft only used to drain the mine of water. Mr. Muller also expects to intersect and pass through this coal vein (in the southward extension of the tunnel as described), on whose croppings the deep shaft was first sunk. He informed me that this vein at the surface was inclined northward, at an angle of 35°. At the depth of 85 feet from the surface a tunnel was run from the shaft northward until the vein was intersected. At this point it was found to be broken and of about nine feet in thickness.

Leaving this tunnel and going back to the shaft again, it was continued down until the depth of 125 feet was reached, when another tunnel was run to the north, to again find the vein. But this time it was found with a dip to the south, and still broken in character. The work on the shaft being again resumed, it was continued down 25 feet further, when the 150-foot level was reached and the main tunnel commenced and run, as already described. But in sinking the shaft this last 25 feet the vein was intersected and cut entirely through, and found to be still broken, although not so much so as at the tunnel 25 feet above. Mr. M. is confident that when they strike it again, in the proposed extension south, that it will be beyond the break and in solid coal. Thus it will be seen that this company expects now to reach and work three veins of coal with but small labor comparatively.

These deep workings at the present time are being prosecuted with vigor, and the company hope to have all completed so as to commence shipping coal in the spring.

This company, besides securing by long lease the lands which their coal discoveries have invested with so much interest, have recently bought a tract of 300 acres lying on the east side and up the Corralitas creek, opposite the present town, and known as the "Rich" farm. After reserving suitable sites for their own buildings and coal yards, they propose to lay out a large town. It is a beautiful location, with an unsurpassed climate. If the company should succeed in their plans this proposed town no doubt will become one of the finest in the county. There is also a coal vein indicated on this "Rich" tract, about a mile above Corralitas. I visited the spot a short time since, and found that a tunnel commencing in the bluff on the east side of the Corralitas creek has been run 150 feet directly into the hill. The vein as now worked is a black lustrous substance, looking at the dump like black clay, but in the vein, viewed by the miners' torches, it looks like solid coal. Wherever there is a breakage in the black mass, as well as where the pick has cleaved it, it has a polished surface. It has a sandstone wall on either side much harder than the substance of the vein. The miners informed me that they found occasional pieces of pure coal in the vein, but I did not see any of them. They are now running an incline to obtain the depth at which they think the solid coal exists.

Mr. Strader, the gentleman whom I have before mentioned as the discoverer and resident director of the coal mines, showed me coal which he recently discovered in a vein a half a mile or more below the present mines. This vein is shown running into the hill in a northerly direction, seven feet in thickness, and exposed by a land slide, which had broken from the side of the hill. About 100 lbs. had been mined and found to be good blacksmith coal; so good that the blacksmith in Corralitas is using it. What I saw seemed to be of good quality.

Your correspondent is not a coal expert, and does not assume any responsibility in regard to this whole coal matter, beyond giving the facts as he observed them; and yet from these observations he is constrained to believe that there is an abundance of coal here, and although much more may be required to be done to make it pay, yet pay it must ultimately. All honor to these men, who, notwithstanding every discouragement and continued opposition, have persevered for over two years in their purpose, until now success has not only promised to themselves large pecuniary reward, and justifies their superior capacity and fitness for their work, but has also opened up to the entire county such a source of wealth and prosperity as to entitle these men to be regarded as public benefactors.

Watsonville, Jan. 19th, 1877. C. N. W.

Cost of Smelting.

The Coso Mining News says: On the afternoon of the 1st inst., the Defiance furnace, after a suspension of several months, started up, and for 17 days has been running without any interruption. It had to close down, however, on Thursday evening last, on account of a non-supply of coal, the snow having blockaded the roads to the coal pits. It is not thought that this state of affairs will last long, and, in fact, Mr. Reddy assures us that he will start again within two weeks. As the Defiance has heretofore been a non-paying concern, for reasons not necessary now to state, we have taken the trouble to interview Mr. J. S. Gorman, Superintendent of the furnace, to ascertain the actual cost of smelting the Defiance ores. We found him very communicative, and he has given us a statement in detail of the expenses incurred for running the furnace for 17 days, and as the New Coso company is thought to be running very successfully, we give the figures for the cost of each. We presume, taking all things into consideration, it is nothing discreditable to the New Coso, and we give the figures for its benefit, hoping they may prove beneficial to the company. Although we did not obtain the figures from the Superintendent, we can assure our readers they are quite correct. Following is a tabulated statement of the expenses of running the New Coso furnace for one day.

New Coso Expenses for One Day.

One Foreman.....	\$ 10 00
Two Assistant Foremen.....	10 00
Two Engineers.....	10 00
One Machinist.....	6 00
One Blacksmith.....	5 50
One Helper.....	4 50
One Carpenter.....	5 50
Three Changers.....	15 00
Three Smelters.....	15 00
Three Helpers.....	12 00
Two Coal Passers.....	9 00
Five Laborers (ore men).....	20 00
One Cartman, Horse and Cart.....	6 50
One Night Watchman.....	5 00
Iron Ore, six tons per day, used at \$10.50 per ton.....	99 00
Lime Rock, 14 tons per day used.....	50 00
Charcoal, per day.....	396 00
Wood, six cords per day.....	66 00
Water, per day, 3,000 gallons.....	30 00
Sundries, Oil, etc., etc.....	5 00
Total expense per day.....	\$ 780 00
Total expense for 17 days.....	13,260 00

The furnace is of 50 tons capacity, and, when running well, smelts an average of 20 tons of ore per day.

Defiance Expenses for Seventeen Days' Run.

Coal, 14,800 bushels, at 32 cents.....	\$4,736 00
Labor.....	1,564 00
Wood, 34 cords at \$11.....	374 00
Iron ore, 30 tons, at \$16.50.....	495 00
Water, at \$22 per day.....	374 00
Sundries, at \$8 per day.....	85 00
Total.....	\$7,628 00

The furnace is of 30 tons capacity, and has smelted in the 17 days' run, 550 tons of ore, at an average cost per ton of \$12.05.

By these figures, which are very nearly correct, it will be seen that the Defiance has smelted its ores at an expense of \$12.05 per ton, whereas the New Coso company has smelted its ores at a cost of \$99 per ton. It is no disparagement to the New Coso, for it labors under difficulties of inexperience of boss smelters and managers not known to the Defiance company. It is to be regretted that the Defiance is compelled to shut down just at this time on account of weather elements, but the above statement is so satisfactory that creditors and all concerned will unite in lending their aid for the further prosecution of work. The company has now as much ore on the dumps as when it started, and the mine is placed in such shape that, when again started, both furnaces will be kept fully employed.

Dry Gold Separating Machine.

The Wheatland Free Press says: We visited the old Camp Far West mining ground last Tuesday, to witness the working of Carter & Irving's new method of separating gold. Mr. Irving, the inventor, is a practical millwright, and has spent eighteen years in bringing the machine to its present condition. The two great difficulties that present themselves are first, to run through enough dirt to make it pay, and second, to save the fine gold. Both, we believe, are accomplished in this machine. The dirt is carried by elevating rings to a drier, which consists essentially of three perforated cylinders, with the flanges on the inside, and revolving over a fire. When the material leaves the drier, it goes in three different grades into a pipe divided into three apartments. The lower apartment is for the finer dust, the middle for the next finest, and the coarsest at the top. A current of air is caused to pass through the pipe, which by means of valves can be regulated in any of the apartments at pleasure. Riffles are provided in the pipes, and the lower apartment, where the finer material passes, is provided with quicksilver. These pipes may extend to any desired length, and it would hardly be possible in a long distance, for the gold to escape the various traps set to catch it. When it is remembered how much ground there is in California where gold in paying quantities is known to exist, but where it cannot be practically mined for want of water, the importance of a machine that will separate gold without water will be appreciated. We think this new machine of Carter & Irving will do it in such a way as to make it pay, and will convert many of the old waste places of California into rich gold fields.

Rights of Stockholders.

The following is the full text of the bill before the Nevada Legislature, entitled "an act to protect the rights of owners of stock shares and other interests in the mineral and metal yielding mines of Nevada:"

SEC. 1. Any person who shall be the bona fide owner of stock shares representing the value of two per cent. of the capital stock of any company incorporated for the purpose of working upon and mining in any lode, ledge, deposit or bed of the precious metals, or useful minerals in this State; and any number of persons who shall be the bona fide owners of an aggregate number of mining shares amounting to two per cent. of said capital stock shall, by a duly accredited agent, upon a written order from the clerk of the county in which such lode, ledge, deposit or bed is located, be entitled to the privilege of fully examining all of the shafts, adits, borings, drifts, stopes, hoisting apparatus, and every and all properties and appurtenances belonging to such mining company; provided, such privilege for examination shall not be permitted except during one day during each calendar month.

SEC. 2. The county clerk in each of the counties of this State shall keep in his office a suitable book of registration, in which he shall enter the names of all persons who shall be entitled to the privileges granted by this act; and the county clerks of the several counties in this State are hereby authorized to administer an oath, or affirmation, to each and every applicant for said privilege; and for administering such oath, or affirmation, and for registering the name of the applicant, the clerk shall receive a fee of one dollar, to be paid by the applicant at the time of registration.

SEC. 3. Upon making application for the privilege of entering and examining any of the mines or mining properties mentioned in section one of this act, the applicant shall present to the county clerk certificates of stock-shares representing in value two per cent. of the capital stock of the company whose mine he desires to examine. Thereupon the applicant shall make oath, or affirmation, that he is a party in interest in the stock-shares of the mine and mining property which he or she desires to examine; that the stock certificates presented by him or her are actually his or her own property, or that such certificates of stock really belong to the parties which he or she is authorized to represent; that such stock certificates have not before been presented during the existing calendar month, and that they will not again be presented at any time during said calendar month.

SEC. 4. Immediately upon complying with the provisions of section three of this act, it shall be the duty of the county clerk to furnish the applicant with a written order for admission to the mine and mining properties which he or she may desire to examine.

SEC. 5. Any person who is a party in interest in any incorporated mining company in this State, and any mining superintendent, or mining foreman, or mining secretary, in this State, acting under and for such mining company, who shall fail or refuse to comply with any of the conditions mentioned in section one of this act, shall, for each and every such failure or refusal, be deemed guilty of a misdemeanor, and upon conviction in any court of competent jurisdiction, shall be fined in any sum not less than \$100, and not exceeding \$500, or by imprisonment in the county jail for a term not less than 30 days, and not exceeding six months, or by both such fine and imprisonment.

SEC. 6. This act shall take effect immediately after its approval by the Governor.

Mining in Russia.

The *Economiste Francaise* states that the mean average of production of iron in Russia is 320,000 tons. In 1874, the metallurgical establishments belonging to the State in the Ural mountains, in the district of Olonetz, in the east and the west of Poland, and in Southern Russia, produced 202,501 tons of cast-iron, 8,994 tons of unwrought iron, 1,151 tons of steel, 8,203 tons of war projectiles, 146 tons of steel for cannon, 241 tons of iron for cannon, 169 tons of armor plate, 46,695 sabers and bayonets, 5,735 muskets and locomotives weighing 177 tons. In the single district of Gorbolodatt, in the Ural mountains, from 35,000 to 40,000 tons of iron ore are extracted every year, and, since 1813, these mines have yielded 1,290,322 tons. The extraction is very easy, for many of the beds of ore are close to the surface, and the quality is very good. The manufacture of steel is also making rapid progress, and several of the State establishments employ the Bessemer system, among others the cannon foundry at Obouchoff, near St. Petersburg. The great central market for iron in Russia is Nijni-Novogorod, to which the Ural mines alone send down the rivers Bulaya, Kama, Volga, and Tchoussora, in barges, and, as the navigation is very dangerous, many of them are lost, especially on the Tchoussora. The iron sent to Nijni-Novogorod has to pass through three hands before it reaches the consumer, so that the price of it is very much enhanced. A great deal of the iron sold there is sent into the neighboring districts and to St. Petersburg, while at Riga and Odessa it has against it the competition of foreign iron and of that sent from the State establishments of Tombof, Riazan, Vladimir, and Kalouga.

USEFUL INFORMATION.

Glycerine and Its Uses.

This substance, says the *Polytechnic Review*, which has of late years attained a position of considerable technical importance, exists in the form of glycerides—in combination with the solid and liquid fatty acids, in most of the fats, to the extent of eight or nine per cent. From these combinations the glycerine may be separated by treating them with certain bases (such as potassa, soda, lime, or oxide of lead); or with acids (sulphuric acid), and certain metallic chlorides (chloride of zinc); or finally, by the action of superheated water. Glycerine is likewise one of the products of the alcoholic fermentation of the several fermentable varieties of sugar, forming, according to the researches of Pasteur, about three per cent. of the weight of the sugar.

We append in what follows a list of the more important uses of this substance. It is employed to keep modeling clay in properly moist condition. It is excellently adapted for the preservation of articles of food, and especially of fruits which require to be kept in a moist condition. It is used in the manufacture of liquors, essences, and the like, as a sweetener; and its sweetening and preservative properties have caused it to be largely employed as an addition to wines and beer. As a lubricant, especially for fine machine work, such as the working parts of clocks, watches, chronometers, sewing machines, glycerine has been found well adapted, in virtue of its non-habit to decompose or freeze, and its indifference to metals. It has been found to make an excellent copying ink, when added in small quantity to such writing fluids; letters written with ink to which glycerine has been added do not require the wetting of the copying paper, but may be copied dry even for some time after writing. In virtue of its property of keeping the skin soft and moist, glycerine is employed pure, and in a number of preparations (glycerine soap, pomatum, etc.), and medicinal mixtures, as a cosmetic, in cases of burns, catarrhal affections, etc.; and from the same property of this substance—its avidity for moisture—it has found application in several industries, such as paper making, weaving, dressing of leather, etc., where it is found desirable to give to fabrics great softness and flexibility, and do away with the subsequent tendency of such articles (as leather belts and the like) to dry and crack. It is extensively used as an ingredient of printer's rollers.

As a solvent, glycerine occupies an important place in medicine and the arts; it is particularly valuable as a solvent for gum arabic, as also in paste. Glue, by continued digestion, is soluble in glycerine, gelatinizing on cooling. Glycerine dissolves aniline violet, alizarin, and alcoholic madder. A solution of aniline colors in glycerine is often used for stamping with rubber hand stamps. Glycerine is employed to extract the perfume from flowers, and the aromatic principle of red peppers. Sulphate of quinine dissolves in ten parts of glycerine when hot, but when cold, separates in clots, which, when triturated with the supernatant liquid, gives it the consistency of a cerate, very useful for frictions and embrocations. Fifty parts of warm glycerine will hold in solution, when cold, one part of salicylic acid. Three hundred parts of water may be added without causing precipitation. A mixture of carboic acid and glycerine has been suggested as a preservative agent for green skins, as a substitute for the salting generally practiced. The carboic acid increases the preservative effect of the glycerine, while the action of the latter keeps the skins perfectly soft and fresh, just as they were directly after slaughtering.

One of the most important applications of glycerine is its use in wet gas-meters. Water possesses the disadvantages of freezing in winter and of evaporating in the warm seasons, while a mixture of equal parts of glycerine and water is free from both of these evils.

A few drops of glycerine in mercurial gauges, etc., have been found to prevent the formation of the objectionable slimy film that shortly makes its appearance on the surface of the quicksilver column. It has been recommended for keeping guns and pistols clean and free from rust. It is found well adapted for the preservation of anatomical preparations, and for the saturation of barrels intended to contain petroleum, etc.

Lastly, it is employed in great quantities for the production of that most powerful and valuable of all known explosives, nitro-glycerine, made by a treatment of glycerine with a mixture of sulphuric and nitric acids. We have no figures at hand from which to estimate the total magnitude of the glycerine industry of the world, but its extent may be imagined from the statement that in the United States alone there is annually produced not less than 2,000,000 lbs.

To Obtain the True Meridian.

In all of recent works on surveying, it will be found that Alioth, the first star in the handle of the Dipper, is designated as being directly opposite the pole from Polaris, the north star. There was a time when such was the case, but now it is far from being correct.

The first published account of this method which we have been able to find is in a revised edition of Abel Flint's work on surveying, published in 1833, which states that this method was communicated to the compiler, with per-

mission to publish, by Moses Warren, of Lyme, Conn. It appears that this mode of reckoning had been in use among surveyors for some time previously; but we have not been able to find by whom or when it originated.

In 1800 Alioth was opposite Polaris; but a retrograde movement of the latter, of about 20 seconds a year, has caused Alioth to be, at the present time, 25 minutes ahead, and brings Mizar, the second star in the handle, within five minutes of being opposite; so that, in 15 years more, Mizar will be exactly opposite. Polaris is on the meridian 25 minutes after Alioth has passed the perpendicular, and five minutes before Mizar reaches it.—C., in *Sci. Am.*

BRASS COATING FOR IRON WARES.—The coating of iron goods with brass, according to Herr Hess, has not attracted the attention it deserves. It is admirably adapted, according to this author, for a great variety of articles of iron, partly to preserve them from rusting and partly to beautify them and enhance their value, and among the objects for which it will be found suitable may be enumerated: ordinary keys, door-bells, furniture springs, cast door-plates and signs, statuettes, certain kinds of hollow ware (if tinned inside and brassed outside they present a fine appearance), smooth turned door knobs, nails, wire, etc., used by cabinet makers, etc. The process is as follows: The first step is to thoroughly cleanse the articles, either by means of emery, or by laying them over night in a weak bath of sulphuric acid. They are then to be washed off with water, a weak soda solution, and then immersed as the cathode of a bath consisting of 2½ parts of sulphate of copper, 20 parts of sulphate of zinc, and 45 parts cyanide of potassium, in 300 parts of water. The anode should be two plates of zinc and copper of equal size. The color of the resulting brass coating may be modified by varying the depth of immersion of one or other of the plates. The galvanic current should be a strong one, and the liberation of hydrogen bubbles on the object to be brassed should be plentiful. It is important, however, to note that the objects should be first coppered to insure a strong attachment of the brass coating.—*Metallarbeiter.*

TESTING POISONOUS WAFERS.—Poisonous red wafers, which, more than 50 years ago, were detected as very injurious, seem still (according to *Stunner's Ingenieur*) to be in extensive use. A simple method of recognizing the poisonous character of such wafers has been suggested by M. Feldman, of Detmold. You stick a needle into a wafer, saturate the latter in a few drops of petroleum and light it. When the burning wafer has become a glowing mass, blow weakly on it. While you do so, the metallic constituent drops down, and may be caught on a porcelain plate or a piece of white paper. Even with the naked eye one may recognize the lead granules, and the better if one presses them first with some hard and smooth substance—e. g., a knife handle.—*English Mechanic.*

ANILINE POISONING.—We find the following in an Eastern exchange: "A man wore a new felt hat for one day, and though it did not press on his head he had severe headache. An eruption appeared, attended with swelling of his forehead, proceeding in some parts to suppuration. The eyes also became inflamed and almost closed, and the swelling extended more or less over the whole face. A chemist found, on examination, that the brown leather lining was colored with an aniline dye containing poison." [The foregoing is similar in effect to the poison which one of our correspondents lately reported with blue shirting. Many colors are made with the same group of substances known as aniline dyes.—EDS. PRESS.]

GOOD HEALTH.

Medical Progress.

It is true, says the *Manufacturer*, that medical practice is still, in many respects, defective, empirical, tentative and even sometimes mere guess-work; hence the carefulness of those who know the deficiencies of the healing arts, while boldness in prescribing belongs especially to quacks, who act after the maxim, "kill or cure," and mostly 'kill; but, luckily for the quacks, the surviving relations of a diseased patient usually think that he would have died, notwithstanding the medicines he took, while, in fact, the patient who did not die, recovered, notwithstanding the drugs he swallowed.

In the meantime, with all the deficiencies of the medical art, and the little benefit enjoyed often by single individuals, the good done by the clearer insight of the causes of diseases, the study of preventatives and of the correct principles of hygiene has been an immense blessing to mankind in general.

In order to realize this fully, we have only to look at the death lists of large European cities two centuries ago, and we find that a large portion of the then mortal diseases have been deprived of their dangerous tendency, and several other diseases have become extinct. Many people then died of fever and ague. Cromwell died of it. At present it is no longer mortal in the temperate zone, and the reason is that improved drainage and cleanliness on the part of the people in general have caused the disappearance of the moist, foggy and unhealthy atmos-

phere which surrounded then the dwellings in every densely populated district. Dysentery, or bloody flux, formerly caused many deaths; now it is seldom fatal. Small-pox was the most terrible of all diseases, carrying off victims by the hundreds, and scarring or blinding others by the thousand. Spotted fever, scurvy and the plague prevailed every year somewhere, but now they all are diseases of the past, and this by reason of the more correct knowledge of their nature and the means applied, resulting either in a total prevention, or at least in giving the disease a more mild form and favorable result. Even cholera, which first appeared in Europe 45 years ago, has, by a better knowledge of its nature, lost some of its former infallible malignity. It is the same with scarlatina; and we enter upon the threshold of so much knowledge respecting the nature of phthisis, that we may justly hope to see this scourge of families become more and more rare, and this by preventative measures, to be applied when there is a tendency in that direction.

Preventative medicine is slowly attaining such a degree of perfection, that the time is not very distant when the occurrence of an epidemic will be a reproach to city governments, while the chief functions of the foremost physicians will be the preservation of the public health. This assuredly will be a most noble calling, and the present boards of health, established in our large cities, is a move in the right direction, and has already been a benefit to the inhabitants which they cannot value at too high a price.

Eucalyptus Tea.

The editor of the *San Diego World* gives the following personal experience: Some months ago the writer read in an English paper of a discovery by some physicians in Europe of the value of the eucalyptus in early stages of cold and fever. Some weeks ago, being taken with a severe cold, we made a decoction of eucalyptus leaves and drank it on retiring to bed. The result was that it brought on a gentle perspiration and sleep, and in the morning all symptoms of the cold had disappeared. A fortnight ago a friend of ours was seized with cold and fever. He had aching pains all over his body and to every appearance bade fair to be confined to his room. We thought of the eucalyptus and told him of our experience. He went home and had a strong decoction made and drank freely on going to bed. It worked like a charm, for he was in perfect health the next morning, only a little weak from profuse perspiration. His wife was suffering from cold at the time and tried the remedy and found it a perfect and immediate cure. One instance more in our own case. Last night, just before retiring to bed, we were seized with a violent chill, accompanied with pains in the back and legs. This was followed by a little fever. These symptoms had presaged a very serious illness a year or two ago, and we thought ominously on the subject. We sent out to the street, had some leaves plucked and our favorite tea was made at once. We drank about a pint and soon fell asleep and to the credit of eucalyptus we say we are as well to-day as ever we were in our life. Our opinion is that the tea is perfectly harmless to drink even a large quantity of. For a medicine tree we can recommend everybody to grow eucalyptus.

THE POISONOUS PRINCIPLE OF SPOILED CORN.—Professor C. Lombroso describes two poisonous principles derived from spoiled maize: an oil soluble in alcohol, and an alkaloid. From these may be derived a body closely resembling strychnia, possessing all of the chemical and most of the physiological reactions of the latter alkaloid. In frogs, not only tetanic symptoms, but also those of paresis and narcosis, were induced by administration of the oil. In chickens, after prolonged administration of the oil, only paresis and convulsive movements of the head, with inclination to retrograde movements, were induced. The administration to chickens of the alkaloid, on the other hand, induces death in a few minutes, with previous paralysis of the limbs and chronic convulsions. Administered to locusts, fish, mice, etc., the alkaloid gives rise to symptoms similar to those of strychnia poisoning. Professor L. concludes, therefore, that two distinct poisons are present in spoiled maize.

TOO MANY SWALLOWS.—Eating, like all other things, can be carried to excess. The requisite amount swallowed goes to build up the person; all other food eaten is superabundant, and goes to swell out the stomach. It is fallacious reasoning to say that a fine physique can be produced by gormandizing. The physique of the Scotch Highlanders is immeasurably better than that of the Germans, and yet the Highlanders are exceedingly abstemious. Heavy eaters are apt to be exceedingly dull people. They clog the brain in catering to the wants of the stomach. They are like a boa constructor; they eat until they can hardly see or move, and are compelled to loll about after a dinner, closely resembling a pig. It is impossible for such people to be possessed of acute reasoning powers.

TARTARIC ACID IN COOKERY.—This acid is put up under the false name of fruitina, and is largely used to make tarts, pies, etc. It is not a rank poison, but cannot be used very extensively without harm, and is no substitute for fruit.



W. B. EWER..... SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, Feb. 3, 1876.

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A BONANZA CASE.—Hugh J. O'Reilly and wife have filed a complaint in the Nineteenth District Court against Flood & O'Brien, which avers that plaintiff was the owner of 484 feet of the White & Murphy claim on the Comstock lode; that on the 25th of January, 1875, he sold this interest to the defendants for 100 shares of Consolidated Virginia stock, which has since been subdivided into 500 shares; that plaintiff made a conveyance of his interest to the Consolidated Virginia company and received a bill of sale for 100 shares of that stock; that by agreement the stock was left in the hands of the defendants subject to call, the dividends to be paid plaintiff; that on the 29th of January, 1875, plaintiff assigned the 100 shares to his wife; that defendants collected dividends on the stock and paid over to plaintiff only four of them; that in March, 1875, the defendants repudiated the contract and refused to pay. Therefore, judgment is demanded for a delivery of the stock or \$60,000, value thereof, and \$17,000 dividends. As a further and separate cause of action, O'Reilly alleges that at the time of the sale, on the 25th of January, 1875, the defendant agreed with him that he should have the option of taking \$150,000 in gold coin in lieu of his 100 shares of stock if he should desire to do so six months after January 25th, 1875. He then goes on to allege in the other complaint the acceptance of the contract on plaintiff's part, the leaving of the stock in defendants' hands, and their repudiation of the contract. He therefore asks judgment for the \$150,000, and \$2,000 dividends improperly retained under the second agreement.

JUDGE WILLIAMS, of the 19th District Court, has vacated the order appointing a receiver in the case of the Lady Bryan mining company, and has decided that the court has no right to order a new election. This disposes of the entire matter in favor of the present management.

The "Tailings" Case.

The judgment rendered by the Sacramento District Court, on the 26th ult, in the suit of Atkinson against the Sacramento and Amador Canal Company, for damages done to the plaintiff's farming ground by the deposition upon it of sand and gravel washed from the defendant's hydraulic mine, is one of importance to the mining interests. We give in another column the decision in the case, as well as the Judge's instruction to the jury, which it is important for all interested in this matter to read carefully. This was the first case of a series of the same kind, and has been considered a test case. The decision is apparently more favorable to the farmers than the miners, but, on examination, it will be seen that if the Judge's charge be held as correct by the Supreme Court, the burden of proof will rest on the farmers, and in the case of distant mines this gives a great advantage to the miners.

We gave in a late issue the substance of the whole controversy between the miners and the farmers, in a general way. This particular case is somewhat exceptional in its nature, and that in a very important point. The land injured was not situated like that along the banks of the Feather, Sacramento and other rivers, 40 or 50 miles below the mines, but was close to the mines. The debris was deposited almost directly on the farming land. It was shown in evidence that the flume boxes of the Pet mining company actually extended across the line of Atkinson's land and emptied the rock, sand and dirt on his land, while the water from the sluices carried the lighter parts and spread them over the bottom of his ground on Arkansas creek. The plaintiff was able, of course, to trace directly the tailings to this claim, and it is a significant fact that, although evidence was offered to prove that other companies contributed to the damage, this evidence was ruled out. It devolved on the plaintiff to prove that the company had done the damage.

With the question of title the jury was instructed that it had nothing to do. It was simply to decide whether the land was damaged or not, by whom, and how much it was damaged. Of course it was damaged by tailings being dumped directly on it, the same as if any miner dumped his waste dirt in the garden of some resident near by. But we are sure that in such a case, even among miners damages would usually be paid without recourse to the courts. The jury visited the ground, saw the state of the case and decided accordingly. The plaintiff proved that the "slickens" were deposited directly on his land from the defendant's mine, and were caused to be so deposited by the direct action of the defendant. This direct testimony was what decided the suit as it was decided.

Judge Sexton, however, in the case, charged the jury among other things as follows: "If the defendant discharged, in the usual and ordinary working of mines, water, tailings, earth and other matter upon the banks of Arkansas creek at places remote from plaintiff's land, and such matter, in the course of nature and from the effect of natural floods flowed in and down said creek and was deposited, portions of it, upon plaintiff's land, the defendant would not be liable to damages; but if the deposit of sand and gravel and sediment was deposited in such close proximity to the land that it must of necessity pass upon the land of plaintiff, the defendant would be liable for all damage done by defendants."

Under this ruling, if it is confirmed by the Supreme Court, the miners of Dutch Flat, Moore's Flat, Bloomfield, San Juan ridge, and in fact almost everywhere else where the districts are high up the mountains, will be safe from the farmers. All the great hydraulic districts in Nevada, Placer, Sierra, Butte, El Dorado and Yolo counties, where hundreds of mines discharge their tailings into the Bear, Feather, Yuba, or American rivers, are not affected by the decision.

The companies may float their tailings into a canyon or gulch, where they will lie until winter's floods sweep them over the valley, in which case no recourse can be had under this ruling.

During the progress of the trial the defendants wished to offer in evidence the following allegations. They foreshadow in part the issues upon which the case rests, and will be fought on appeal.

First.—That the defendant is a ditch company engaged in mining, and that it has a grant from the Government of the United States to construct its ditches—which grant antedates any title or right that the plaintiff has to this land, and that under that grant the defendant has the right to run the water upon this land.

Second.—That in accordance with the customs, rules and decisions of the courts, defendant as a ditch owner had the right to discharge this water charged with sediment and tailings into Arkansas creek, which right antedated any right plaintiff had to the land, and that the plaintiff's land was public land of the United States at the time the grant was made, and that he had no right, at law or equity, to any part of it.

Third.—That there are over 500,000 acres of mineral land in California, gravel deposits, that can only be worked by hydraulic mining, nineteen-twentieths of which have not yet been

mined, and that the one-twentieth has produced over \$900,000,000 since they have been worked, and that these mines have always been worked in the same manner in which defendant worked its mine, and cannot be worked in any other way.

Fourth.—That the value of the agricultural land in California which can be affected by mining does not exceed \$200,000.

Fifth.—That unless the mines in California can be worked in the manner as defendant worked its mine, they cannot be worked at all, and will be of no value whatever.

Sixth.—That the defendant had mined in the same manner as that in which mining has been conducted on like land since the first settlement of the country.

Seventh.—That defendant has not conducted its business negligently, carelessly or in an improper manner.

Eighth.—Before and since the admission of the State it has been and is the custom of miners to throw the tailings from the mines into the natural outlets and water courses leading from such mines.

The propositions given above all relate to very material facts, and, doubtless, the superior court, in the new trial which will come off, will admit them, or some of them. Even if the tailings on some of the ranches in Sutter and Yuba counties can be traced directly to some particular mine, it appears probable that to recover damages the owner of the farm must prove that his title was obtained before the passage of the federal statute of 1866, recognizing the titles of mining claims and ditch claims, and giving their owners priority of right, so far as there might be any conflict, over titles to agricultural lands subsequently purchased from the United States.

The expenses of this suit were probably not less than \$4,000, and if the decision is confirmed by the Supreme Court, immense sums must be spent in costs and attorney's fees during the next few years, for as long as there is any gold the miners will continue to work their claims and count the "damages" as so much additional expense. There are other suits now pending, one of which is that of Keyes, of Sutter county, against the miners in Nevada and Placer counties, but that will be in favor of the miners if Judge Sexton's rulings hold good. In any instance the cases will be taken to the higher courts, and it is probable that the associations of the farmers and miners will pay the expenses of the respective contestants in these test suits. The question has thus far been only opened, but enough has been developed to show the points on which the fight is to be made. As far as it goes it seems more favorable to the mining interests than the farming, as the burden of proof rests on the agriculturists, and the ruling referred to above practically puts it out of the reach of the farmer to show exactly who damaged his land when the mines are at a distance from it.

BULLION SHIPMENTS.—Since our last issue shipments from the prominent mines have been as follows: Leopard, Jan. 18th, \$5,103.76; Chollar, 24th, \$7,061.74; Northern Belle, 21st, \$16,381.66; California, 25th, 21 bars, valued at \$86,736.24—total to date, \$574,601.39; Con. Virginia, 25th, 11 bars, valued at \$39,475.13—total to date, \$314,603.67; Comanche, 23d, \$4,691.94; Northern Belle, 23d, \$10,466.87; California, 27th, \$146,822.85—total to date, \$721,423.93; Con. Virginia, 27th, \$41,607.49—total to date, \$356,211.26; Tybo Con., 25th, \$11,959.80; Modoc, 25th, \$5,180—total to date, \$98,177; Chollar, 27th, \$7,220; Modoc, 27th, shipped 230 bars, value \$5,680; Tybo Con., 25th, \$5,870.71—total to date, \$39,961.27; Modoc, 27th, \$5,680—total to date, \$103,860; Leopard, 28th, \$5,900; Northern Belle, 25th, \$9,898.93; Modoc, 29th, \$10,680—total for January, \$114,540; California, 30th, \$173,417.45—total to date, \$894,841.38; Con. Virginia, 30th, \$55,146.29—total to date, \$411,357.41; Northern Belle, 28th, \$16,000.66.

PATENTS IN 1876.—The following is a summary of the forthcoming report of the Commissioner of the Patent Office for 1876:

	1875.	1876.
No. of applications for patents.....	21,638	21,425
No. of patents issued.....	14,837	15,695
No. of patents allowed but not issued for want of final fee.....	3,518	3,353
No. of caveats.....	8,094	2,697
No. of trade marks registered.....	1,188	1,081
No. of labels registered.....	313	3,902
Amount of cash receipts.....	\$871,000	\$874,000

THE Post's London special says: Colonel Gordon, the explorer, who returned from his expedition into the interior of Africa, under the auspices of the Khedive, and arrived in England a few days ago, has already received an urgent summons from the Khedive to return to Egypt. He has presented the Royal Geographical Society with valuable original maps, which he brought back from equatorial Africa, and has promised to contribute a paper of great interest.

THE aggregate deposits in the local savings banks on January 1st, 1876, were \$56,260,964, and on January 1st, 1877, \$59,627,191. The large line of deposits, as above shown, strongly attests the interest of the people of San Francisco in the stability and solvency of these banks.

A bill appropriating \$10,000 for a road from Phoenix to Globe mining district has been passed by the Arizona legislature over the Governor's veto.

Artificial Ice Manufacture.

Machinery for the production of artificial ice has been greatly improved of late, and numerous inventors have turned their attention in that direction. The subject of artificial ice manufacture, however, is one little understood by the general public, and the following description of an improved method just patented through the MINING AND SCIENTIFIC PRESS Agency, by Robert H. Lucas, of this city, will be found of interest.

This invention does not relate to any particularly novel step or new discovery in the chemical process of refrigeration by which artificial ice is made, but rather to the mechanical construction and arrangement of the apparatus employed. The object which the inventor attains is the production of ice in the ice molds or forms of an ice machine and the automatic removal of the blocks, cakes, bars or sheets of ice from said forms or molds, without manual labor, thus reducing the cost of its production to a minimum point. To accomplish this he necessarily remodels the ice machine and provides certain novel mechanical improvements.

An ordinary tank is taken, inside of which the molds or forms are placed at proper distances apart in the usual way. The tank is supported on legs so as to raise it a short distance above the floor for the purpose hereinafter explained. The tank is provided with two bottoms, placed a short distance apart, so as to provide a space between them, and the forms or molds, which are simply tubes of any desired shape, pass down through both of these bottoms, so that their lower ends terminate below the lowest bottom. To one side of the lower end of each tube or form is hinged a door, which may be kept closed against the lower end of the tube by a spring or weight, as most convenient.

Each of the tubes is surrounded with an outer case, which extends from near the upper end of the tube down to the lower end, thus forming a jacket around each tube. A hole just above the upper bottom connects the interior of the jacket space with the interior of the tanks. A pipe conveys the refrigerant gas through the tank and it is coiled around between the molds so as to subject every part of the interior of the tank to the refrigerating action.

Over each row or series of molds is led a water pipe, from which a branch pipe leads down into and terminates in the upper open end of each mold. This main pipe is connected with a pump or other water supply, and a rose or sprinkler is attached to the lower end of each pendent tube or branch pipe inside of the molds, so that when the water is turned on it will be sprayed through the rose, inside of and against the sides of the molds.

The tank is filled, or partially filled, with a saline solution or other non-congealable liquid, so that it will cover the refrigerant pipes and rise in the jackets around the tubes as high as the solution stands in the tank. Now, when this refrigerant gas is allowed to circulate through the pipes, and the spray of water is turned into the molds, the water will be frozen on the sides of the molds until each mold has been filled by gradual accretions.

An air pipe is coiled back and forth in the upper part of the tank so as to pass between each two series of molds. A short branch pipe connects this pipe with the jacket which surrounds each mold. The air pipe is connected with an air pump so that when the molds have been filled with ice, as above specified, air can be forced through the pipes into the surrounding jackets, and which will drive out the saline solution which is contained in them through the openings in the tank, thus interposing an air jacket between the saline solution and the ice.

Another pipe passes along under the tank and conveys hot water against the lower ends of the jackets or tubes below the hole in which a portion of the saline solution constantly remains, so that by heating this portion of liquid the heat is conveyed to the inner sides of the molds and doors and thus dislodges the blocks or cakes of ice, which will by their own gravity drop out of the tubes, falling upon the floor beneath.

Their weight will be sufficient to force the spring doors open and inclines or deflectors can be applied underneath the tank to direct and convey the blocks or cakes of ice to a point away from under the tanks. To facilitate the automatic removal of the blocks of ice the inventor prefers making the molds or tubes tapering or gradually wider towards their lower end, so that they will, when loosened by the heat, drop freely from the forms. Short exhaust pipes are used, through which the air in the jackets can be exhausted and thus allow the water to resume its level in the jackets.

It will be seen from the foregoing that this inventor produces the ice and removes it from the molds in which it is manufactured without manual labor in handling the blocks. One person can attend to the entire machine, and his attention will only be required as engineer, to start and stop the pumps and the cocks, which admit and exhaust the gas, air and water as each is respectively required.

WILLIAM J. LAWRIE is no longer agent for the publishers of this paper in this State.

Comstock Papers.—No. 15.

Pioneer Mills and Millmen.

Postponing, for the present, further reminiscences of the first claim locators on the Comstock lode, and their immediate successors, who together gave their names to most of the mines along it, we proceed to remark briefly upon the first efforts made in the way of developing these mines and providing reduction works for the proper treatment of their ores. As already stated, the earliest attempts at working the Comstock ores were made in the spring of '59 at Gold Hill, the means employed consisting of the common Mexican arastra, some half-dozen of which were in use there before the rich ore deposit at Virginia City was discovered. During the following summer and autumn the number of arastras here employed was largely increased, several having been started near the site of the new discovery, and also down on Carson river, these last being driven by water. In the spring of 1860 the Meldonado brothers, owners of the Mexican, or, as it was it was then called, the Spanish ground, erected extensive yards for working their ores by the patio process, there having, as yet, been no mills or other reduction works put up here for the treatment of the ores. Almarin B. Paul and the introduction of the Washoe Pans.

In the month of March, 1860, Almarin B. Paul, an experienced quartz miner, and skillful metallurgist, of Nevada county, California, made a visit to the newly found silver mines of Washoe, and after carefully examining the character of the ores, became satisfied that amalgamation could be thoroughly and economically effected through the use of the iron pans already employed in the gold mines of California. This idea was rejected as absurd by the old school of metallurgists, all of whom contended for the use of the German barrel or the Mexican patio process, some even insisting that the ores here could be satisfactorily treated only by smelting.

So thoroughly, however, was Paul impressed with the adaptability of the pan process for this purpose, that he instituted a series of careful trials directed to test the matter, the results of which fully confirmed his previous opinion. Satisfied that he was right, he determined that the mill which he had already concluded to put up in Washoe should be furnished with this and no other amalgamating apparatus. Having completed an organization styled the Washoe gold and silver mining company, No. 1, of which he was himself the moving spirit and almost sole director, Paul commenced on the 24th day of May, 1860, work on his new mill, which was located at a rugged pass on Gold canyon, known as the Devil's Gate, this site having been chosen because of its convenience to water.

The First Two Mills and a Close Race for Precedence.

On the 7th day of June, Paul gave his order to Howland, Angell & King, of the Miners' Foundry, San Francisco, for the iron work of this mill, which was driven by steam and carried 24 stamps. This machinery, with all needed supplies, was shipped over the mountains during the summer at an average expense of about \$400 per ton, this being before any wagon roads had yet been constructed over the Sierra. As there was but a single saw mill then running in the country, the lumber required for this mill cost at the rate of about \$300 per M, labor and material of every kind being proportionately high. Notwithstanding these and other obstacles, the projector and manager of this new enterprise pushed it ahead with such activity and vigor that he had the pioneer mill of Utah Territory advanced so near to completion that steam was let on and machinery started up on the 11th day of August, 1860.

It was by a single point, however, that Paul gained this distinction for his mill, that of Coover & Harris, situated at Gold Hill, two miles above, having gotten up steam and set its stamps in motion only an hour or two later on the same day, as appears by the certificate of W. H. Howland to that effect, he having acted as engineer for both of these establishments on that occasion. As this was only an eight-stamp mill, the labor and cost of its erection were proportionately less, though the iron work, turned out at the same foundry, was not ordered until two weeks later than in the case of Paul's mill, which latter cost about \$50,000.

Their Successful Career.

The two mills, though rude and unpretentious structures, compared with some of those soon after put up, had, nevertheless, a long and successful career, having made large earnings for the owners, while they served the mining public acceptably and well. Paul's first run was on Gold Hill ores, Alpheus Staples having given him a contract to work 4,000 tons, at \$30 per ton, an arrangement that resulted to the mutual satisfaction and advantage of both parties. He had at the first endeavored to get a contract from the Ophir and the Gould & Curry companies, but they declined to furnish him with ore, being timid about his proposed method of amalgamation. Before his mill had been running a week, however, he had engaged to work ore to the amount of nearly half a million dol-

lars, and so numerous were the applications thereafter, that he commenced, within three months, building near the town of Gold Hill another mill, which was to carry 64 stamps and cost \$150,000.

The First Clean-Up

Made by him, amounting to several thousand dollars, was carried in iron kettles to Rhulung's assay office in Virginia City, where its appearance after being retorted created quite a stir, this being the first bullion produced in the country. It had, moreover, been demonstrated that pan amalgamation, since known as the Washoe process, would answer in the treatment of these Comstock ores, a fact that gave a new impetus to mining and imparted additional value to "feet." It is worthy of note that the first at-

many of them to serve the purpose at that.

The Coover Mill

Also ran at first for the most part on Gold Hill ores, the proprietors, Charles S. Coover and Dr. E. B. Harris, having contracted with Pluto and Bowers to work their ore at \$25 per ton. The building occupied by this mill was a mere shed, composed of rough lumber, and no one in passing by would have supposed it of much account. But the machinery was good, and it was run by a man who thoroughly understood and carefully attended to his business. Pass it at what hour you might and this mill was in motion, and so it continued for several years, giving the best of satisfaction to all who patronized it, while it enriched the owners. It afterwards passed into the hands of C. C. Stephen-

FIG. 1.



FIG. 2.

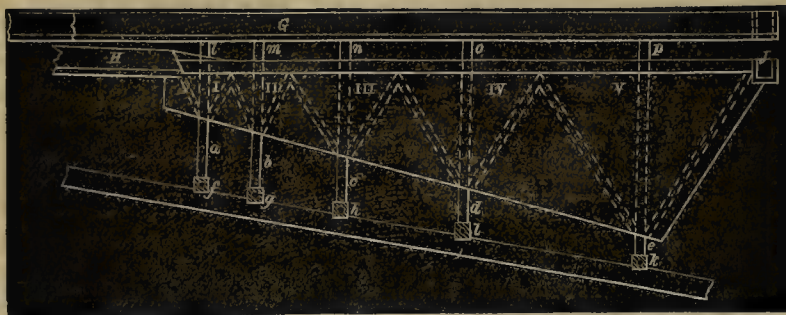


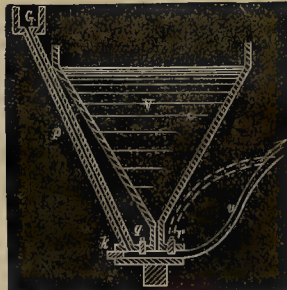
FIG. 3.



FIG. 4.



FIG. 5.



THE WENGLER ORE CLASSIFIER.

tempt at working the ores of the first silver mine ever found and opened in the country should have been attended with the inauguration of a process so distinguished for its efficiency and so essentially its own.

A Retort of Preposterous Dimensions.

Paul, entertaining a pretty high notion as to the richness of these Washoe ores, had taken over for use in his mill a retort of about 300 pounds capacity. This implement having been thrown out and for some days exposed to the public gaze, excited the jeers of passers-by, who tauntingly inquired of the over-sanguine mill builder if he expected to ever fill the thing with amalgam. The first clean-up having more than filled this retort, put an end to these jocular remarks upon its extravagant dimensions. The retorts now in use at the larger Washoe mills hold several tons each, and it takes a good

son, who also made money with it, but standing close to the wagon track, and proving to be quite in the main street of Gold Hill when it came to be widened and straightened, this venerable and useful structure was torn down and the machinery removed to eastern Nevada, where it was again set up and has since been pounding away as industriously as ever on the silver bearing ores of that region.

The ship *Orient*, now loading for New York, will carry a consignment of 4,000 bundles shingles and 50,000 feet redwood boards. This is a new outlet for our surplus lumber and its products.

J. B. Ford & Co., the well-known publishers, have gone into bankruptcy for the second time, having failed to carry out the terms of their first compromise with their creditors.

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Mechanical Ore Concentration and Separation—No. 20.

[Written for the Press by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.]

Classification by screens will in practice act with success whenever the capacity of the screen is equal to the volume of ore fed into such screen. The capacity is not determined by the size of the screen alone, but by its rate of motion also, and therefore it is wise to provide screens and their driving shafts with cone pulleys, permitting the acceleration of their motion under greater requirement. Although screens made out of proper material, such as sheet copper and sheet steel, last longer than commonly supposed—the water acting as a lubricator and protector from rigorous friction with the ore—they are costly in make and maintenance. For coarser sizes they can not be successfully replaced by any known apparatus, but for the sizes from stamp batteries (one and one-half millimeters and less), classifiers of another system and based on other principles may be employed with good success. As an instance of this class of classifiers, we quote an apparatus known as

The Wengler Classifier.

This apparatus, although lately patented in the United States, has hardly any feature which would be maintained as new and as not applied in practice and described in print a long time previous to the patentee's application, it being the old Spitzlutt with an arrangement of water supply and discharge more or less modified in unessential parts from what was customary.

The Wengler classifier consists of five reversed pyramidal-shaped vessels, increasing in size, which vessels, when full, are in communication with each other; they are shown in the engravings from I to V. From the bottom of each vessel there extends a tube, as shown at a, b, c, d and e, and each tube is connected with a tubular foot piece, as shown at f, g, h, i and k. From a trough, G, situated some distance above the apparatus, a series of five tubes, l, m, n, o and p, extend down and connect each with one of the foot pieces. The trough, G, serves as a clear water conduit to supply water to the tubes, f, g, h, i and k. Attached to each of the tubes last mentioned are small sluices or gates, q and r, intermediate between which is the lower end, a, b, c, d or e, of the vessel which opens into the tube. The sluices serve to regulate the influx of water, and the efflux of the corn or kernels of ore.

The trough, H, serves as a conduit for the stamped material as it comes from the stampers. At the other end of the apparatus is another trough, J, which carries off the slimes.

The water in the trough G, is, as before stated above, the level of that in the main portion of the apparatus, and it therefore has a more powerful head; consequently, if the sluices be so adjusted that the efflux opening at r be smaller than the influx opening at p, then a part of the pure water which would otherwise flow out at r, will reach up and against the downward current on, for instance, the tube a. It will therefore be seen that it is possible for such grains, only, whose weight is greater than the resistance of the upward reacting stream, to flow out at r, the other and finer ores, together with the slime, flowing over into section II, where the same operation is repeated, only on a finer scale, and so on to the last section or vessel, which receives all the slimes and the ore of ultimate fineness. Here the operation is again gone through with, and, by a simple adjustment of the sluices of this last section, all the slime is made to pass over into the trough, J.

The assorting of the different sizes can be accurately regulated, inasmuch as the slightest movement of the sluices has a remarkable influence upon the classification, and according as the reacting stream is stronger or weaker, the grain classified thereby from the mass of stamped ore will be correspondingly coarser or finer.

But in this influence exercised on the action by the movable sluices or slides consists the weak point of the system in practice. The apparatus is not self-acting automatic as screens are, but requires skilled regulation, not only when put up, but constantly, and the least change or interference with the sluices, slides or valves destroys the correct action totally. Where skilled labor is scarce and therefore costly, the more reliable system of classifying by screens is preferable.

Out of 1,357 cases of small-pox reported in this city since May 19th, 1875, there were 395 deaths. The number of deaths from diphtheria since July 1st, 1875, was 454, of which 110 occurred in December. In the four weeks ending January 26th there were 116 deaths from this disease.

The importation of horned cattle and sheep from Germany, England, Russia, Austria, and Turkey into Belgium, is prohibited by royal decree. The British authorities have issued further stringent orders against the importation into Great Britain, from Germany and Belgium, of cattle, hay, hides, horns, fat, hoofs and fresh meat.

The first engine built in San Luis Obispo county has just been turned out at Philbrick & Barneberg's shop. It is of 20 horse-power,

California State Geological Society.

Opening Address of the President, Henry G. Hanks.

The society which we meet this evening to organize has two distinct objects in view:

First—The collection of material for a State museum of Pacific coast rocks, fossils, ores and all inorganic substances having a bearing on practical geology. We hope by our individual exertions and the assistance of those interested in mining and manufacturing industries, to form a collection which will be both valuable and instructive. We shall, as soon as possible, throw it open to the inspection of all those who may wish to study, or who may desire information as to the mineral products of the Pacific coast. When the collection becomes worthy of acceptance, it will be donated to the State of California upon the conditions that it shall not be removed from the city of San Francisco, that it be properly taken care of, and that it shall be placed on exhibition free to all.

The second purpose of the society will be to study geology and encourage others to do so. It has long been a reproach, that while the people of the Pacific coast have displayed such remarkable energy in the development of the mineral deposits which nature has provided so bounteously, little or nothing has been done to aid the prospectors, to whom the credit of their discovery justly belongs. Strangers, and especially foreigners, naturally ask, "Where can we see a State collection of your minerals?" to which there can be returned no answer. The prospector who wishes to study the types of the minerals and ores he is in search of, has no resource but to seek information from private collections to which he can gain access.

There is no class of men who so eagerly seek information or so seldom obtain it, as the miners and prospectors of the Pacific coast. They are naturally intelligent and often well educated. Love of adventure and the natural desire of mankind to seek new countries brought them early to the Pacific coast. To them we owe everything. Until they had paved the way we could not have lived on the sites of our most populous cities. Few can realize the difficulties and dangers they meet and overcome in opening up the wild, inhospitable regions over which they swarm. In conversing with them, their first expressed wish will be a desire to acquire a knowledge of geology and mineralogy. The eagerness with which they buy or borrow books, and the interest with which they read them, is an evidence of this fact. These men who have done so much for our State, and are doing so much, are certainly worthy of some consideration, and should be provided with the means of gaining the information they so much desire. A private collection thrown open to the public a few years ago attracted a large number of visitors, as the register will show.

Strangers who seek the new fields for manufactures offered by our State, naturally look to the country for the material upon which the proposed manufacture is based. For this reason the inquiry for iron, graphite, gypsum, cement, limestone, marble, clay, building stones, salt, emery, alum, baryta, manganese, slate, asbestos, mica, borax, nitrate of soda, sulphur, etc., is of almost daily occurrence. In the absence of anything like a State collection, they naturally—like the miners and prospectors—apply to the owners of private collections for localities of the much desired minerals.

Much has been done by private individuals toward the study of mineral products of the State. As some information concerning these collections may be interesting, I will give a brief history of them as far as I know:

The well-known Piche collection is one of the largest ever made on the Pacific. It was commenced by Mr. A. Remond, a young French gentleman of high attainments, who was devoted to the science of geology. When he died, Mr. Piche expended large sums of money in adding to it and in its arrangement. At his death, it became the property of the State University by his bequest.

A collection made by Mr. C. D. Voy has also passed into the possession of the University. This is really a remarkable one, and has more local value than any of the others. It consists of rocks, fossils, minerals, ores and ethnographic specimens of great interest, mostly from the Pacific coast.

My own collection, the work of many years, is also embodied in that of the University.

This aggregate, including the collections made by the State geological survey, and much museum matter acquired by purchase, is by far the best collection on the Pacific coast, and will compare favorably with those of similar institutions elsewhere. It is admirably suited to the requirements of the University. Among other collections I may mention the following:

One owned by Mr. Charles Schneider, of San Francisco, which is large and well selected. It consists of minerals only, but is very complete and valuable. It is especially rich in rare mineral species.

One at the Mercantile Library has many fine and beautiful specimens, almost wholly minerals.

Mr. Melville Attwood, a member of this so-

ciety, has a large collection, mostly geological, consisting mainly of rocks and ores. Mr. Attwood has given much attention to the microscopic study of the rocks, and has prepared sections of nearly all his specimens.

The Society of Pioneers have a collection of considerable value. The specimens are principally rich ores of gold and silver.

The California Academy of Sciences have large quantities of minerals, fossils, rocks and ores.

The collection of ores at the Occidental hotel is justly celebrated, but it has but little scientific value, although the ores are selected mostly for their richness in precious metals.

The St. Ignatius college, on Market street, has a small but well selected collection, nicely arranged, and of much scientific value.

At the Alta office there is a collection containing many beautiful and rare specimens.

A collection at the Bella Union theater is quite extensive, but it is not arranged upon any scientific plan.

Dr. Maxwell, of this city, has a fine geological collection, consisting of minerals, rocks, fossils and ores from Europe and the Pacific coast.

Dr. A. B. Stout is also in possession of a fine collection.

There are, no doubt, other collections in the city which are well worthy of mention, but I do not now recall them. Scattered through the States of California and Nevada, there are many local collections, showing the ores of the various districts, which are widely celebrated. They are generally the work of men who have no knowledge of mineralogy or the other branches of geology. The specimens are generally rich ores from noted mines. In making these collections the most interesting objects are generally overlooked.

It was a great mistake that the State Government did not give this subject more attention in the early days of California. During the last 25 years, the loss to science has been beyond calculation, from the failure to collect and preserve the mineral discoveries made by the miners and prospectors, during that period of wonderful activity. Had the proper collections been made, the State would have now possessed a collection identified with its history; of daily use to its citizens, and a contribution to science in a world-wide sense.

Modern geology has become a science to which all others are tributary. The history of the earth is the history of the universe. The same chemical and physical laws which govern matter here, govern matter beyond the fixed stars. This science is the slow growth of ages. The earliest historians noticed fossils and expressed wonder as to their origin. The ancients were surprised to find shells, perfect in form, imbedded in the solid rocks. Knowing nothing of geology, they could only account for them in two ways: either that the seas once covered the tops of the mountains, or that the supposed shells were not such in reality, but were only an accidental resemblance to shells. The traditions of Noah's flood, and the deluge of Deucalion, found strong confirmation in these discoveries. Ammonites were mistaken for petrified serpents, and the teeth of elephants for those of giants. Strabo uses remarkable language in writing on this subject, which would indicate that the ancients were not wholly ignorant of geology, as we understand it. The following quotation from the writer would not be out of place in a modern lecture on geology: "The real cause, I repeat, of all the changes is that the bed of the sea is sometimes accidentally elevated and sometimes depressed." In the year 1517, at Verona, the discovery of petrified shells and crabs caused much speculation among the thinking men of the period. One learned man, Fracastoro, boldly stated that these shells could not have been deposited by the deluge, for the reason that the rushing waters would have broken them or scattered them on the surface of the earth. He rejected, as absurd, the theory that they were not real shells, but the result of "plastic force." Without being able to explain how, he maintained that the shells died where they lived, and that the sea must have been at some time above the tops of the mountains.

The theory of "plastic force" took many forms, some stating that the shells were the sport of nature, or "stones in disguise," while others, leaning toward the belief in their organic origin, offered as a compromise the theory that they might have been ejected from submarine volcanoes and thrown upon the land. Palissy, a celebrated French potter and scientific man, revived the theory that fossils were the remains of marine animals, and being found perfect, with unbroken spines and edges, could not have been conveyed by water, but must have died where they lived. This was the birth of the science of paleontology.

The next important step in the growth of the science was made in 1740, when Marsili discovered that shells were associated in genera, which differed with the locality and with the formation in which they were found. In 1759 Arduino classified rocks into primary, secondary and tertiary.

Soldani, in 1789, began to use the microscope in the study of minute forms and in the classification of rocks. During the sixteenth and seventeenth centuries much was written on the progressive science of geology. The science slowly grew into importance, advancing step by step, each observer adding something. It was long considered a heresy to doubt the universal spread of the deluge over the whole face of the earth. Linnaeus boldly affirmed that such an event as the covering of the whole surface of the earth by water was impossible. He

showed that calcareous deposits had an organic origin, and proved that animal and vegetable matter combined with mineral matter in forming the earth's surface. In 1775, Werner promulgated his celebrated theory of the universal agency of water in forming the earth's superficial crust. Those who accepted his theory were known as "Neptunists," while those led by Dr. Hutton, who believed that the same phenomena was produced by fire, were called "Vulcanists."

Dr. Toulmin published a work, in 1775, "On the Antiquity of the World," in which he claims "that no single substance in nature is either permanent or primary; that animals, vegetables and minerals alike have their origin in the gradual progress of time, and that all matter is subject to innumerable transmutations and changes. The globe itself is subject to slow but important revolutions; that it undergoes incredible changes from heat and cold, volcanoes and earthquakes; that vast alterations are gradually made by the decay, generation and petrification of vegetables and animals. That the sea is continually altering the surface of the earth; that in the lapse of time it encroaches upon the land, and takes it from its inhabitants and restores it to them again."

In 1807 the Geological Society of London was organized. It originated at a meeting of a few scientific gentlemen who met for the transaction of other business. The birth of this society did much to advance the science of geology. Similar societies were organized in Europe, each of which did its share toward new discoveries in geological science. About this time William Smith, a surveyor and student of geology, developed remarkable talent as a geologist—so much so that he became identified with British geology, and for a time maintained the highest position. He not only made the first important collection of British fossils, but published the first geological map in 1815. From the date of his first map, Mr. Smith published no less than 20 geological maps of different parts of the British islands within the following 10 years. Before his death his extensive collection of organic remains became the property of the British museum, forming the nucleus for the paleontological collection of the present day.

The Geological Society now numbers nearly one thousand fellows, who reside in every part of the world. The museum of minerals, fossils, rocks, etc., not only British, but from all quarters of the globe, is very extensive. The society has published its transactions, and now issues a quarterly journal; their rooms are in the Somerset house, in the Strand.

The Museum of Practical Geology, in Jermyn street, London, was established in 1835. Sir Henry de la Bache, of the Geological Survey, called the attention of the government to the importance of making such a collection, the Geological Survey offering great facilities. The collections were at first placed in an obscure locality, but they grew so rapidly, principally by donations, that the present commodious and beautiful building was erected for their reception, at a cost of £30,000.

The following description of the museum is from a late Hand-Book of Modern London: "The collections illustrate the mineral products of every part of the United Kingdom and colonies, including the marbles, porphyries, building stones, etc., with complete series of fossils, ores and minerals. There are beautiful specimens of polished vases, statues, inlaid floors of mosaics, of native substances and manufacture. They comprise illustrations of the application of geology to the useful purposes of life; numerous models of mining machinery, metallurgical processes and other operations, with needful maps, sections and drawings, and a proper and comprehensive view of the general subject. Pottery and porcelain, a very good collection historically arranged. The lecture theater holds 450 persons, and evening lessons to workmen, illustrative of the collections in the museum, are delivered in every season. The collections are open to public inspection every week day except Friday."

Nearly every country of any importance is now or has been employed in geological surveys. Among the most notable are India, Australia, New Zealand, England, and, of late years, the United States. Most of the States of the Union have individually published reports of their geology, in which California is not behind. When the magnitude of the territory undertaken is considered, it is wonderful how much has been accomplished. One volume of general geology, two on paleontology, one on ornithology, and lately, one on botany, besides numerous excellent maps, have been published, which are a credit to the State.

The present state of geological science may be briefly summed up as follows: It is assumed, rather than proven, that the earth, in common with the other bodies of the planetary system, owes its origin to the condensation of nebulous matter. The heat which caused its attenuation became concentrated in the center of our system, and produced the sun. This theory is substantiated by the revelations of the spectroscopic, which proves that the sun and the nebulae are composed of identically the same elements which we find existing in the earth. The planets are supposed to have been rings of nebulous matter, somewhat concentrated by the same causes which produced the sun. These rings were broken up and further concentrated, forming the planets, of which the earth is one. As this matter became further condensed, the elements began to react upon each other, producing a red hot earth, surrounded by an

atmosphere of air mixed with aqueous vapors at a high temperature. As the earth commenced cooling, hot waters, highly charged with carbonic acid, fell, and chemical changes of a complicated nature took place on the earth's surface. As more and more heat was radiated into space, the water became cooler, and when the warm rains fell, a portion remained, forming seas and lakes, while the irregularities of surface became land. Countless ages must have passed before the lowest forms of plants could live. As the cooling of the earth progressed, the following events succeeded each other: Plants of higher orders grew luxuriously, covering the earth with dense vegetation. During this period the state of the atmosphere generated violent storms of wind and rain. The falling rains washed down parts of the more elevated lands and deposited the sedimentary matter in the beds of the oceans and lakes, giving rise to the stratified rocks. The vegetable growth, under the influence of the sunlight, began locking up the carbon of the carbonic gas largely in excess, and setting the oxygen free, thus purifying the atmosphere and rendering it fit for the use of animal life, which began to appear in its lowest forms.

The lowest stratified rocks enclosed the lower animal and vegetable forms then existing. We cannot conceive of the time that must have elapsed before the higher order of animals, including man, could exist on the earth's surface. Each successive age left its record in the stratified rocks which geologists now regard as an open book. Certain causes, which can be only generally stated, have broken up the horizontal strata so formed, and strangely distorted them.

It is generally conceded that the enormous weight of sedimentary matter deposited on one portion of the earth's surface caused other portions to rise. This, the cooling of the earth's crust, the attraction of the sun and moon and earthquakes, are favorite theories by which this phenomenon is accounted for. The falling rains, acting on the disturbed strata, produced a new class of sedimentary rocks, until finally the whole earth became enveloped in a coating of its own ruins. Sedimentary rocks, in many cases, have undergone change and have become metamorphic. The stratified rocks, no matter how much they may be disturbed, always retain the same relation to each other. Geologists have classified them and are studying them in every portion of the earth. It is assumed that their ages may be determined by the fossils contained in them.

This is only true in a general sense, for it is, I believe, admitted that in different parts of the earth at the present day, different species of animals and vegetables exist, as, for example, animals are now living in Australia and the South Sea islands, which are not found elsewhere; still the principles are correct, for geologists do not attempt to indicate the number of years or centuries which have elapsed during each geological epoch, but all dates and eras are relative. It is considered a mistake to suppose that geological changes have been necessarily a series of catastrophes, violent or sudden, but they have been gradual, the influences controlling the changes being as active now as they were countless ages ago.

The study of geology naturally assumes two forms—scientific geology and practical or economic geology. Scientific geology aims to complete the earth's history; to account for the varied phenomena which present themselves; to ascertain the chemical composition of the rocks and minerals; to classify and describe the fossils; to study their bearing on the history of the successive ages in which they lived, and to speculate on the future. Economic geology, on the other hand, has for its object the utilization of the various mineral products.

It seeks to develop new mines and invent new uses for the ores they produce; to analyze the soils; to bring to notice the various members of the mineral kingdom. Man cannot dispense with the supplies which he draws from the earth's surface. Take from him iron alone, and he becomes comparatively helpless. Deprive him of all the minerals of the earth, and he is only in intellect above the beasts of the field.

The bias of this society will be in the direction of economic geology. It will be its purpose to encourage the development of all and every mineral product discovered in the future, or already known. It will foster and aid in every way in its power legitimate mining and manufactures dependent on the minerals of our State. In this it will accept the Museum of Practical Geology of London as its model.

PURIFICATION AND DEODORIZATION OF PETROLEUM PRODUCTS.—Mr. S. E. Johnson, of Ashby-de-la-Zouch, England, has discovered a method of treating petroleum and other mineral oils, by which these liquids are not only purified, but also deodorized; and that in a simple and inexpensive manner. Chloride of lime is first introduced into the cask or other receptacle containing mineral oil or spirit, in the proportion of about three ounces of chloride, more or less, to each gallon of the liquid, according to the degree of its impurity, and thus chloride gas is evolved in the oil or spirit. If necessary, the evolution of the gas may be assisted by pouring in hydrochloric acid, agitating the content of the receptacle so as to bring the whole of the liquid into intimate contact with the chlorine gas. The oil or spirit is then passed into another enclosed vessel containing slaked lime, which, having an affinity for the chlorine, absorbs the same, leaving the liquid sufficiently deodorized and purified.

Mines of Great Britain.

A precise knowledge of the extent of the products of the metalliferous mines of the United Kingdom, and of the great industries dependent upon these products, may be gathered from the following statistics: The pig iron produced from British ores during the year 1875 amounted in weight to 6,365,420 tons, and its value at the places of production equaled £15,645,774. Of copper, 4,322 tons were raised, valued at £388,983. Copper and silver precipitate amounted in quantity to 54 tons, and in value to £3,207. Tin was gained from "the bowels of the harmless earth" to the extent of 9,604 tons, of which the market price was £666,266. Of lead, 57,435 tons were extracted from the mines of that metal, and these represented a money value of £1,290,373. Zinc came up to the tune of 6,713 tons, and produced the sum of £162,790. Silver extracted from lead gave 487,358 ounces, at an estimated value of £115,747, while the gold obtained from the auriferous rocks of Merionethshire and from the mines of Hlogon and Cape Coch amounted in the aggregate to 584 ounces, and these were valued at £2,105.

A general summary brings the grand total value of minerals (including coal) and metals obtained from the mines of the United Kingdom during the past year to £67,487,688. When the returns for the current year shall be made up it is quite possible that, despite the depression in the metal trades which has distinguished 1876, the total yield of minerals and metals will not fall far short of its predecessor. It will probably surprise some persons to learn that in 1875 no less than 5,061 tons of arsenic, worth in the market £31,174, were thus yielded. Much of this rather suggestive and not very reputable mineral, it may be explained, is used in processes connected with the arts and manufactures of the country, and not for sinister purposes. Of manganese, 3,205 tons, equal in value to £15,906, were raised. Ocher and umber combined gave a total weight of 5,315 tons, and, in all, produced the sum of £7,185. Of wolfram and tungstate of soda, 48 tons were obtained, equaling in value £362. In the matter of plumbago—the whole of which is the net product of the Borrowdale mine in Cumberland—20 tons were extracted. It is impossible to give an estimate of the value of this substance, either in its natural or manufactured state, for the whole of it is retained by the Plumbago mining company itself for the manufacture of the "Real Cumberland" black lead pencils. In the way of fluor spar 359 tons, of the value of £188, were brought to the surface and disposed of. Clays (porcelain and fire clays) exhibit an aggregate total of 3,008,444 tons, fetching £753,957; oil shales amounted to 442,336 tons of the value of £200,000; while salt is responsible for a weight of 2,316,644 tons and a sum of money equal to £1,158,322. Barytes came up to 15,549 tons, valued at £14,089; coprolites rose to 250,122 tons, rated at £528,000; while sundries added £3,500 to the sum of the miscellaneous items just enumerated.

At the Furnaces.

The enormous slag piles that grace the neighborhood of our furnaces stand in the same relation to our mines as the tailings of the stamp mills do to the free milling ores, with this one unfortunate difference, that, while the tailings can be reworked cheaply and the precious metals extracted, no process can do the same for the slag at a rate that will give any profit. The slag pile represents a waste of from eight to 10% on all the ore smelted, and carries quite a percentage of lead and silver. It is roughly estimated, that the dump at the Eureka Consolidated contains at least \$1,000,000 of the precious metals, and the Richmond as much more. As great quantities of this material has been used to fill up our streets we can boast that they are literally paved with silver, and we doubt not but that a sample of dirt from Main street would yield a good assay. Our citizens are familiar with the picturesque sight at the furnaces where the molten stream is constantly pouring into the iron pots from the hearth. The specific gravity of the lead and its affinity for silver carries those metals to the bottom of the furnaces. On the top of these float the lighter impurities of the ore, consisting of silica, etc., and technically termed slag. The hearth is provided with two spouts, one some three inches higher than the other. The top spout is continually running and carries off the slag, which is wheeled away and forms the principal component of the dump pile. At intervals the lower spout is tapped, the melted iron run off, and the cubical castings that ornament the surface of the slag piles are the result of this operation. The smelters exercise great care in handling the iron, as in cold or damp weather the least moisture coming in contact with it will produce a violent explosion, scattering the molten mass in all directions. At the side of each furnace there is a receptacle, called a lead well, communicating with the bottom of the furnace by a pipe running into it. The melted lead runs into the well through this pipe, and is ladled out into molds, forming bars, averaging 115 pounds in weight. This is the base bullion in a form ready for refining. The time may possibly come when the refuse of the furnace can be utilized and reworked, but at the present cost of smelting there is no probability of such a process. In the meantime it can be used to grade and repair the streets, and its merits in that direction are too important to be overlooked.—Eureka Sentinel.

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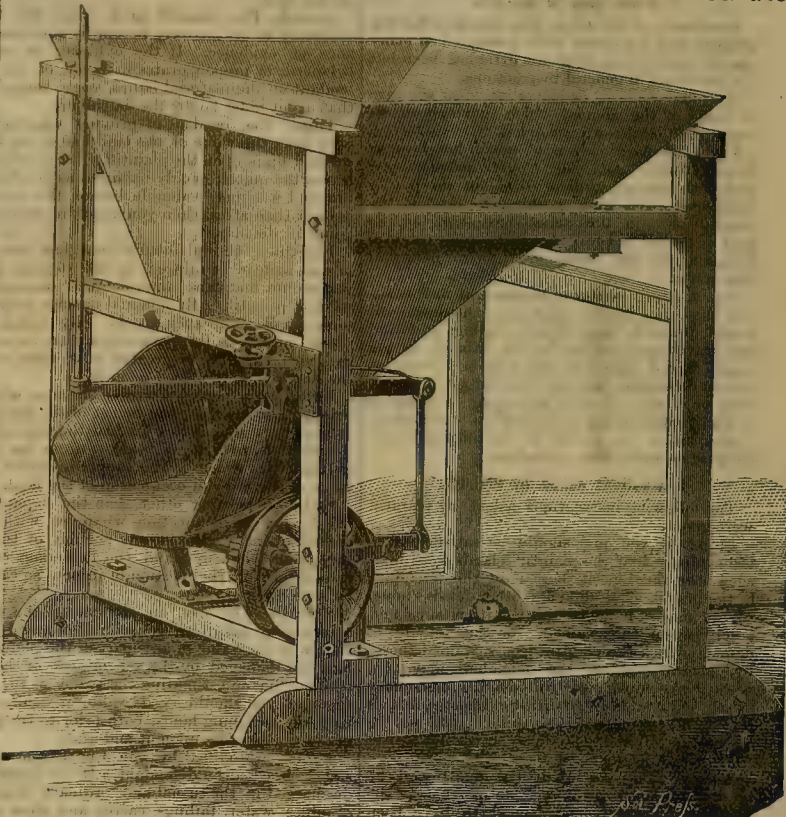
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REFERENCES.

A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them." A letter from Mr. C. C. Belding, of Amador County, speaks in the highest terms of them. Two of the machines were shipped to the Bunker Hill Mill, also Dover Mill, Amador County. Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen. Soulsby Mill, Tuolumne County. California Company, Nevada City. Omaha Gold Mining Company, Grass Valley. St. Patrick Mill, Placer County.

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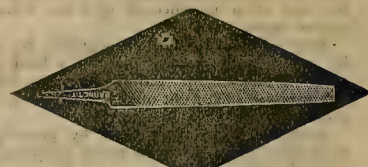


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The Mining Debris Decision.

We print in full below the decision of the jury in the mining debris case (Atkinson vs. Sacramento and Amador Canal Co.,) and Judge Sexton's

Instructions to the Jury.

Gentlemen of the Jury: The attorneys for the plaintiff and defendant have presented so many special instructions, that but little has been left for the Court in general instructions.

And first we will endeavor to clear the case of some of the clouds which have been attempted to be thrown around it.

Upon the question of title, which has been so largely dwelt upon, the Court instructs you that with the question of title, in its purely legal sense, you have nothing to do. If the plaintiff was in the actual possession of the land described in the complaint under claim of title, then he has sufficient right to maintain this action.

Again, it is a matter of no moment in this action that some person other than the defendant would probably have flowed tailings and sand and gravel upon the land of the plaintiff, for the reason that it cannot in any wise be a justification to defendant, nor can it be urged as an excuse, or in mitigation of damages. A prospect of what others might have done in committing a trespass is no excuse or justification of a trespass committed by defendant.

Instructions Asked by Plaintiff.

The following instructions asked by plaintiff were given:

First.—If the jury should be satisfied from the evidence that the plaintiff's lands were damaged from the deposit thereon by the defendant of the gravel, sand, mud and other debris known by the general name of tailings, they must find a verdict for the plaintiff for the amount of damage which the plaintiff has sustained thereby, notwithstanding the defendant may have worked its mine after the manner customary among miners; and notwithstanding the fact, if it should be so, that the mine could not be worked at all without doing much damage to the lands of plaintiff.

Second.—The defendant has questioned the legal title of plaintiff to certain portions of the land in his possession claimed to have been damaged by the deposit from defendant's mine, but has not connected itself with the title to any such portions; as it is not disputed that defendant has ever since 1870 been in the actual possession, by inclosures, of all the land claimed to have been damaged (except a small fraction thereof) under claims of title thereto, it is not necessary to inquire into such disputed title; and the amount of damage to which plaintiff may be entitled will not be affected thereby.

Third.—If you find for the plaintiff, then in estimating his damages you will calculate the difference between the value of the land in issue on the 30th day of March, 1875, in its then condition, and its value as it would have been on that day if uninjured as alleged in the complaint. In this connection the value of the land includes the value of fences, ditches, dams and the improvements upon the land; and in estimating the injury done to the land, you can include the injury done to such improvements.

Fourth.—To acquire a right by prescription to overflow the lands of another with water, sand, mud or tailings, there must have been an actual occupation by such overflowing under a claim of right for five years, and such occupation must have caused damage to the knowledge of the injured party, and there must have been during a period of five years such an occupation and damage as will raise a presumption that the injured party would not have submitted to it unless the other party had acquired a right to use it.

Fifth.—Preponderance of evidence is the result which is produced upon the mind, not merely by the number of witnesses testifying upon one side or other a disputed state of facts, but by the weight of conviction produced by such testimony, having regard to the intelligence, impartiality and acquaintance of the witnesses with the subject matter testified about; so that preponderance of evidence may be, and often is, effected by a few witnesses against many witnesses.

Sixth.—Defendant has not acquired the right by prescription to use plaintiff's land as a place of deposit for tailings, nor has defendant acquired such right under any act of Congress.

Seventh.—To acquire a right by prescription to do acts injurious to another's property, the injured party must have assented to a commission of such acts by the party committing them, continuously for five years. By assent, you may understand an implied or actual assent, an avowed or a tacit one—a knowledge of the acts done, without objection to their being done.

Eighth.—In weighing the evidence you should consider the manner of the witnesses upon the stand, their probable motives in giving their testimony, and their opportunities for obtaining accurate information as to the matters concerning which they testify; and if the testimony of two unimpeachable witnesses as to any particular is in conflict, then the testimony of the witnesses who appear to you as the most intelligent, and whose means of observation have been the most favorable, and who have made the most careful examination of the subject of the testimony, is entitled to credit, when it ac-

cords with the other facts and circumstances of the case.

Instructions for the Defendant.

The defendant asked, and the Court gave the following instructions:

First.—The plaintiff is not entitled in this action in any event to recover the rents and profits of the land.

Second.—The plaintiff must prove the facts necessary to his recovery herein by a preponderance of evidence. If the evidence is evenly balanced, or preponderates in favor of the defendant on the material issues, your verdict in that event must be for the defendant.

Third.—The burden of proving what would have been the value of the land had it not been covered up is upon the plaintiff. If the evidence leaves the matter evenly balanced as to whether the land was more valuable before the deposit upon it than after, then you must find upon that point for defendant.

Fourth.—If the plaintiff's land has been improved instead of injured by the deposit, then you cannot find more than nominal damages in favor of plaintiff. By nominal damage is meant some small sum, such as \$1. By being improved means, in this connection, that its actual cash market value is greater now than before the deposits were placed upon it.

Fifth.—If a person destroys an acre of land belonging to another, the owner of the land can recover the value of the land at the time of the destruction, with legal interest from the time of the destruction. He cannot recover the value of the use and occupation of the land.

Sixth.—If persons other than the defendant, and having no connection whatever with the defendant, have caused any portion of the injury to the plaintiff's land, the defendant is not responsible for the portion of injury so caused by such other persons.

Seventh.—The jury, in estimating the damages, cannot take into consideration any depreciation in the value of any part of the plaintiff's land not damaged by the act or acts of the defendant, but in estimating the value of the valley land, you should fix its value in connection with the adjoining lands, both prior to the placing of the deposits upon it and after.

Eighth.—(Modified by the Court from an instruction asked by defendant.) If the defendant discharged in the usual and ordinary working of mines, water, tailings, earthy and other matter upon the banks of Arkansas creek, at places remote from plaintiff's land, and such matter, in the course of nature and from the effect of natural floods, flowing in and down said creek, found its way down the creek and was deposited, portions of it, upon plaintiff's land, the defendant would not be liable to damages—but if the deposit of sand and gravel and sediment was carried directly upon the lands by the water used in the mine; or, if the deposit of sand, gravel and sediment was deposited in such close proximity to the land that it must of necessity pass upon the land of plaintiff, the defendant would be liable for all damage done by defendant.

After an absence of three hours, the jury returned into court with a verdict for plaintiff and damages assessed at \$4,000.

A stay of proceedings for 60 days was granted.

The Belcher Mine.

The annual meeting of the Belcher mining company was held on Tuesday last, and the reports of officers for the year received. The Secretary's report does not show a very flattering condition of affairs. The mine produced last year \$2,920,460 in bullion, and one would suppose that that amount of production would warrant payment of dividends, but only \$416,000 was paid; in fact, a \$1 assessment is expected. These figures are rather discouraging to others who expect dividends from mines on the Comstock which produce less than this.

The bill for crushing ore alone was \$1,534,924, which will indicate what a good thing it is to own a mill in that vicinity. This was for crushing 131,328 tons of ore, which yielded an average of \$22.23 per ton. In any other part of the world this would be considered first class ore, and the bullion yield of the year—nearly \$3,000,000—a first class product, but it seems not to have been very profitable in this instance.

From the Superintendent's report we extract the following: For the year ending December 31st, 1876, there was extracted and shipped to the mills for reduction 131,228 tons of ore. This ore was extracted from the various levels above the 1600-foot level, and principally from the east and west streaks outside the main ledge. An attempt was made to work the fillings, but the result proving barren, it was abandoned. On the 1500-foot level the ore is not of the quality which will pay for extracting, although the ledge upon this level retains its regular course and width. Cross-cuts run at different intervals on this level developed no ore which would pay for extraction. A drift run to the south line and a cross-cut run east shows a fine body of quartz. The 1600-foot level drift cuts the vein 618 feet south of the north line. This drift shows a fine quality of quartz. A drift has been run south to the Seg. Belcher line. Cross-cuts made at different points resulted without the finding of ore. The main incline is down 100 feet below the 1600-foot level, and as soon as it reaches the 1800-foot level a new station

will be opened. The air shaft has attained a depth of 1,850 feet. When the pumps are lowered, a station at the 1800-foot level will be opened, and drifting and cross-cutting on the vein will be commenced. During the past year 3,270 feet of drifts were run; 1,012 feet of winzes and inclines sunk. Large improvements and additions were made to the surface buildings and machinery. The 131,328 tons of ore worked produced \$2,920,461, being an average yield of \$22.23 per ton.

The Secretary's report we publish in full:

RECEIPTS.	
Bullion.....	\$2,920,460 62
Interest.....	5,903 43
Crown Point Mining Co., joint air shaft account.....	83,580 02
Dividends unpaid.....	440 60
Cash on hand, Jan. 1st, 1876.....	421,753 77
Cash due Bank of California, Jan. 1st, 1877.....	88,265 67
Total.....	\$3,520,504 11
DISBURSEMENTS.	
Crushing ore.....	\$1,534,924 00
Labor.....	660,508 75
Mine expenses.....	172,728 65
Discount on bullion.....	158 371 80
Assaying bullion.....	16,956 00
Lumber.....	132,788 03
Wood.....	106,281 61
Joint pump account.....	149,666 67
Dividends.....	416,000 00
General expenses, Gold Hill.....	5,308 54
Legal suit expenses.....	22,983 00
Medical expenses.....	176 00
Salaries mine.....	11,600 00
Transportation.....	26,906 18
Taxes on net proceeds.....	20,338 74
Office expenses.....	9,550 00
General expenses, city.....	1,130 04
Insurance.....	2,247 92
Air shaft, mine account.....	21,987 40
W. H. Smith, Superintendent.....	9,324 89
Bank of California.....	195 00
Segregated Belcher.....	7,962 93
Total.....	\$3,520,504 11

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

The last official letter of the Ophir company is not very encouraging. It says: Since stopping the mills have reduced the force of men in mine very much, also all expenditures. The remaining ore on 1465, 1600, 1600 and 1650 levels is so poor it would not pay for mining; have, therefore, quit all work in the ore breasts on those levels; on the 1650-foot level have a limited quantity of fair ore, average assay about \$30; raising about 15 tons per day; when sufficient quantity has accumulated in ore dump, will ship to one of the mills.

In the ninth level of the Eureka Consolidated the ore body is looking very favorable. The upraise and winze when attaining the height of 40 feet opened into a large natural cave extending up to the eighth level. Have found a fine quality of ore in cave, the top and sides of which seems to carry more or less ore. This natural opening will save the labor of raising winze in making connection with the eighth level.

In the Raymond & Ely mine the prospect work being prosecuted above seventh level is showing some promising vein matter, but assays run low. The mills are still idle; as soon as the weather moderates will start up the 30-stamp mill and run through the tailings, which will yield a good profit.

The superintendent of the Gould & Curry in his last letter says: On the 1,700 level the ground in the east drift was so difficult to keep up and the heat was so great that but little progress could be made, so I concluded that it would be economy to prospect ahead with a diamond drill. We have bored 52 feet from the face through blocky porphyry; samples have been taken from every ten feet but so far without any result.

The Belcher air shaft has now attained a depth of 1,873 feet.

The Justice ore-producing stopes throughout the 400, 500 and 600-foot levels continue to produce their uniform grade milling ore. Ore developments in Nos. 1 and 2 crosscuts, as well as north drift on the latter level, are developing a regular and well-defined body of ore. The 700-foot level north drift has met with a marked improvement in discovering important body of ore, the like of which and the general character of the ore produced is different from anything hitherto found on this level. Further explorations are necessary before its extent can be known.

The superintendent of the Golden Chariot (Idaho) writes rather encouragingly. He says the 1300-foot level is now in a distance of 108 feet. The vein continues wide and is producing better ore than at any time heretofore. Its great width and the increased value of its ore as it approaches the ore chimney affords proof of the value of the result.

On the 1500-foot level of the Consolidated Virginia the various ore breasts are looking well and yielding the desired quantity of ore. East of the main ore body we find a spur of ore 27 feet in width. Its course is not east. The quantity of ore is good, all of which assays over \$100 per ton. The separation between this and the main ore vein is from 11 to 20 feet of hard blasting rock. On the 1400-foot level the ore breasts are looking very favorable. Lower levels are much cooler, owing to the enlargement of the 1500-foot level drift. This work is not yet completed.

Home Manufacture of Agricultural Implements.

The manufacturing industry of our young State is strong and promising. The great shops of our city build some of the most ponderous and intricate machinery which the mechanic has contrived. Scattered here and there throughout the State are the local manufactories, which furnish many valuable implements and tools. Here and there, too, are flour mills and woolen mills, either now in active operation or projected by enterprising men. All these things are marks of the State's progress, and we would have them multiplied until our State shall furnish altogether its own manufactured goods, and support a thriving manufacturing population, giving active home markets for our large agricultural production. There are indications that this advancement is being made, and we refer with pleasure to one outcropping of the progress which is announced from Sacramento. We learn that a few days since there were filed in the County Clerk's office articles of incorporation of the "Sacramento Manufacturing Company," with C. T. Wheeler, of Booth & Co.; R. S. Carey, ex-President of the State Agricultural Society; Robert Hamilton, of Baker & Hamilton; Christopher Green, of Green & Trainor; Albert Gallatin, of Huntington, Hopkins & Co.; E. B. Mott, Jr., formerly of Gillig, Mott & Co.; J. M. Keller, of Keller & Co., incorporators. The object of the company is to manufacture all kinds of agricultural implements used in this State and on the Pacific coast generally.

It is interesting to note some advantages which these enterprising men foresee in the competition which they will have to enter with Eastern manufacturers. A reporter who questioned Mr. Hamilton gained these among other points from him:

The dry climate of the interior region is the most favorable known for the manufacture of goods made in whole or in part of wood. The timber becomes so well seasoned by the atmosphere that if it is dry at all when it is made up, and it soon dries, it does not shrink after working, so that really articles of this class made here and from the same material and by the same workmen would be much more valuable, because more durable, than if manufactured in the moist climate of the East or anywhere on the sea coast. All our experience proves this, and the farming public are well acquainted with that fact.

The cost of freight on this class of goods from the East to California is a large item. On bulky articles, such as threshers, headers, cultivators, plows etc., the freight would amount to nearly or quite one-fourth the market value of the goods at this point—which would be equal to 25 per cent. in our favor. Again, a car load of manufactured goods such as we propose to make would cost for freight a given price, while a car load of unmanufactured goods would cost 25 to 40 per cent. less according to the class; and in addition, while it would be next to impossible to put ten tons weight of these manufactured goods into a car, it will readily contain full ten tons of the raw article. And if goods were to come by sea the proportion would be about the same. This is the law or the rule of all transportation companies, or, in other words, the law of trade. Then the manufactured goods, such as reapers, mowers and the like have to be boxed at a cost of \$20, and often \$30, and we have to pay freight on the box, besides paying for its cost. This saving on freight and boxing alone would be a fine profit for any such establishment in California, and is sufficient in itself to exclude Eastern manufacturers from underselling us, however cheap their capital may be. And I may say in addition that we can procure the best of Oregon ash laid down here at \$30 per M—and this is just the material for heavy machinery. This ash and Oregon pine are the principal woods we require, and in fact all we require for threshers, headers, harrows, cultivators and the like. For wagons and many other things we would require imported timber—but the bulk of our timber would come from Oregon. There is also another advantage which is often overlooked, but which is in fact and ought to be considered a prominent factor by those who enter upon enterprises of this kind—it will give steady employment at good wages to hundreds of our people—to those who live among us. That is one thing that California much needs—for the wealth thus distributed returns in time in one mode or another, if not in whole, then in part at least, to those who distribute it.

We hear also that a movement for home manufacture is undertaken in San Jose. It is said by the *Washington Independent* that a number of leading mechanics propose to establish a manufactory for constructing all kinds of agricultural implements at the Alameda foundry. This is between San Jose and Santa Clara, on the line of the new narrow-gauge railroad from Dumbarton point to the Santa Cruz mountains, which will deliver iron, coal, lumber and all other material where needed, at low rates. The company aim to supply farmers with all the tools they need from a garden rake to an improved straw burning engine. About \$50,000 are already subscribed, and as much more is expected before starting the enterprise.

or reservation, as I should certainly prefer to entrust my own business in your hands should I have any to transact in the same line hereafter. Yours, etc.

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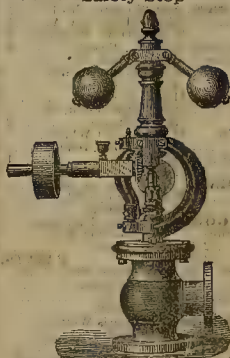
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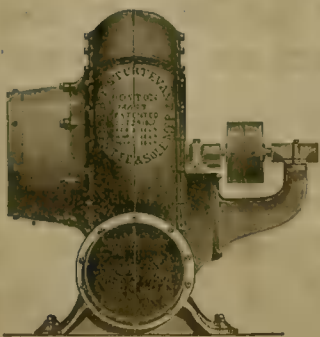
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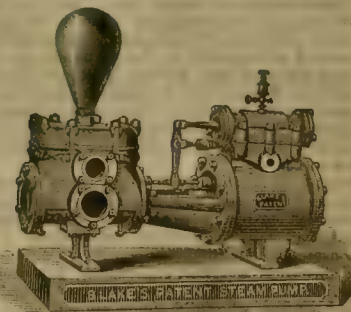
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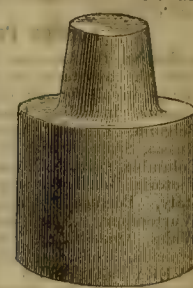
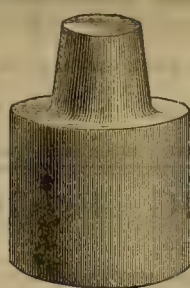
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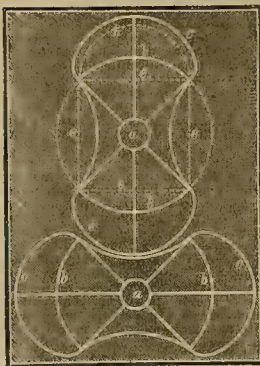
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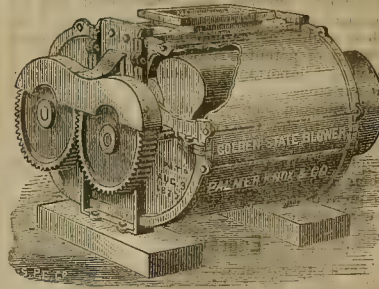
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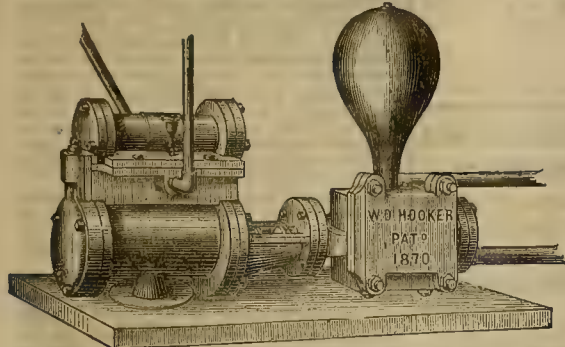
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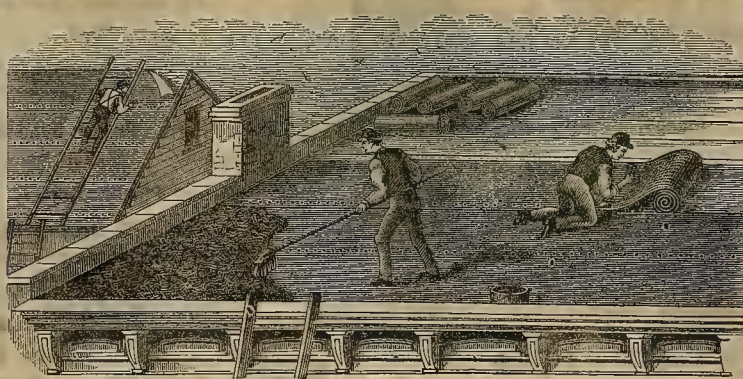
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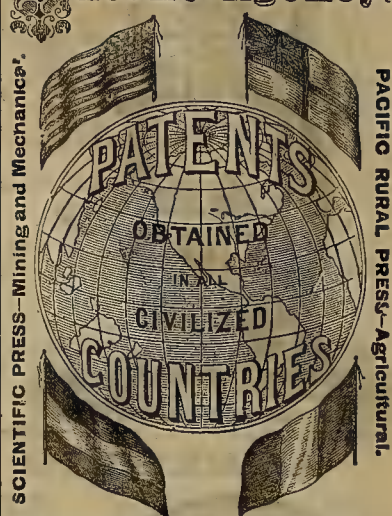
Messrs. DEWEY & Co.—Gents: Your letter containing the patent for my Centennial churn has come duly to hand, and you will please accept my many thanks for the prompt manner in which you attended to the business entrusted to your care, and I will take great pleasure in recommending you to any one having anything to attend to in your line. I am having a number of the churns put up, which will be ready for sale in a few weeks.

Yours truly,

JAMES ROOT.

"SPEAKS WELL," ETC.—We would return thanks for an exchange and back numbers of the MINING AND SCIENTIFIC PRESS, published by Dewey & Co., of San Francisco, Cal. It is a well edited, interesting, and valuable journal and speaks well for our Pacific neighbors.—U. S. Mining and Manufacturing Journal.

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The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting and under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improved retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners and prospectors' use. Price, post free, (in leather,) \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome Street, San Francisco.

Much Obligated, Etc.

PORTLAND, OREGON, June 26th, 1876.

DEWEY & Co., Patent Solicitors, S. F.—Gents: I am much obliged to you for courtesy shown me, and am well pleased with the manner in which you have done my business, and assure you, will cheerfully recommend you to my acquaintances needing such services. Hope to have a case again before long, of my own. I have been an inventor all my life, but let others reap the benefit, or had work sent from them. Please have the extra copies of my patent, etc., mailed to me direct, and oblige. Yours truly,

J. H. WOODRUM.

SUTTER CREEK, February 26th, 1875.

Messrs. DEWEY & Co.—I have received my Letters Patent through your agency. And, for your promptness, accept my thanks. Yours, S. N. KNIGHT.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 10, 1877.

VOLUME XXIV.
Number 6.

Comstock Papers.—No. 16.

Pan Amalgamation, and What It Led To.

The trial of pan amalgamation having proved a success, demonstrating the facility and cheapness with which the Comstock ores could be worked, confidence in the value of the mines was greatly increased, and many parties were encouraged to put up reduction works who would not otherwise have gone into the business. The popular idea that a vast deal of science, or at least much practical skill, was indispensable in the treatment of argentiferous ores having been thus partially dissipated, the California millmen were quite certain that they could deal with them successfully when a method so similar to that employed in reducing the gold-bearing quartz of this State would answer the purpose. Accordingly a good many of this class repaired to Washoe during the summer and fall of 1860, with a view to putting up mills and running them on this new school of ores. The arrastras that had been set up the year before were designed merely for working the quartz found at Gold Hill, in which the most of the gold was free and easily separated, no effort having been made to save the silver which it contained; the miners not then suspecting, in fact, that it carried any of this metal. When the sulphurated silver ores of the Comstock proper came to be handled, this style of apparatus was found to be wholly inadequate; hence early recourse to more effectual methods became necessary.

Era of Active Mill Construction

The completion in August, 1860, and the successful operations of the Paul and the Coover mills, was immediately followed by the inauguration of numerous other enterprises of this kind, several having, in reality, been planned prior to the above date and in anticipation of the success that it was expected would attend these pioneer establishments. So rapidly, indeed, did this business of mill construction thereafter proceed, that no less than 86 works of this description, carrying a total of 1,200 stamps, and costing an aggregate of over six million dollars, had been finished and started up by the end of 1861, some 40 or 50 arrastras and several patio yards built and set at work meantime, not being included in this estimate. Work upon a good many other mills had also been commenced before the end of that year, the most of which were completed early in 1862, when the era of most active mill construction terminated in so far as the Comstock mines were concerned, this industry having, for the next three or four years, been transferred to Esmeralda, Reese river, Pine Grove, Humboldt, and other interior districts.

Location, Cost and Capacity.

Of the mills built for reducing the Comstock ores eight, carrying 114 stamps and costing \$200,000, were located in Ormsby county; six, carrying 106 stamps, and costing \$1,200,000, were located in Washoe county; forty, carrying 573 stamps, and costing in the aggregate \$3,700,000, were located in Storey county; twenty-two, carrying 360 stamps, and costing \$1,000,000, were located in Lyon county, and ten, carrying 84, and costing \$300,000, were located in Esmeralda county, there having been erected, up to the end of 1861, not more than two or three small establishments of this kind in any other portion of Nevada Territory.

The First Parties to Put Up Water-Driven Machinery.

East of the Sierra, for the purpose of ore reduction, were Judge James Walsh and his partner, Joseph Woodworth, who, on their first visit to Washoe, in the latter part of June, 1850, threw a slight dam across the Carson river, at a point about one mile above the present town of Dayton, then Chinatown, and, diverting the water into a side race, employed it for propelling a couple of arrastras, which they constructed and put up there for testing the Gold Hill ores, they having bought from Comstock a small claim at that point before purchasing the silver bearing deposit a mile further north, and which afterwards constituted the site of the great Washoe discovery. The water right so secured on the river was, the

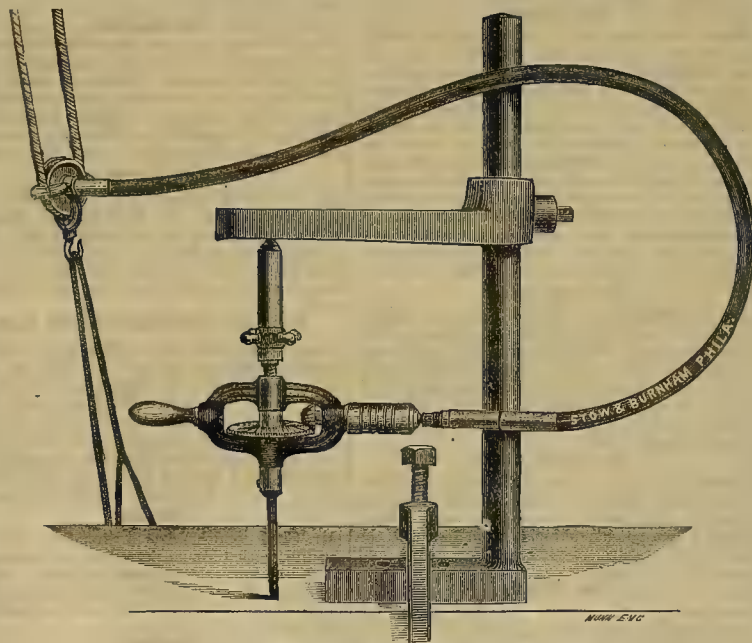
next year, further utilized by the construction there of additional arrastras and, finally, by the erection of extensive reduction works, this now being the site of the present Ophir company's large and efficient mill.

Besides Paul, Coover and Harris, the following parties commenced the erection of mills, and, in some cases, completed and had them running before the end of 1860: Richard Ogden and J. Downes Wilson, who, in November, 1860, finished the Ogden & Wilson mill, the first one completed in the Virginia City district; Henry G. Blasdel, Alphens Staples, Israel W. Knox, who built the Olive Branch mill, Flowery district; McNulty, who built what was afterwards known as the Bacon mill; Peter Frothingham, who put up a small establishment on Carson river, four miles below Dayton; John B. Winters, connected with Woodworth & Mosheimer in the building of the Carson River mill; John Atchison, Logan and Holmes, whose works were also on Carson river; Trench & Sparrow; De Land, Eclipse mill; and various other persons, whose names we cannot now recall to memory. Among the mills that were begun this year and completed near the end of it or early in 1861, was that of the Spanish

Flexible Power Transmitter.

This is a very simple and useful device, as the accompanying illustration will show. It is the first successful application of a flexible shaft for general purposes of transmission of power. The *Polytechnic Review*, during the late exhibition, thus described this piece of mechanism: Passing along the north avenue of machinery hall, our attention was attracted to what appeared to be a section of inch leather hose, with a revolving twist drill for a nozzle, the hose lying quietly on the floor and the drill or nozzle making a clean, smooth hole through a chilled car wheel already perforated several times by the same means.

Following the "hose" backward and around a corner it was seen to terminate in the arbor of a rapidly revolving grooved pulley fastened temporarily to the floor and driven by a braided round leather belt, which after several corner turnings is seen to be driven by a grooved pulley high overhead. The mystery was explained.



THE STOW FLEXIBLE POWER TRANSMITTER.

company, at Virginia City; the Aurora, Keller, Dayton; the Sproul and several other mills on Carson river, besides a number of small establishments along Gold canyon, one or two about Virginia City and several along Six-Mile canyon, in the Flowery district. In the next number of these papers something will be said about the Ophir, Gould & Curry and other extensive works put up in 1861-2 at an enormous expenditure of money, but which, after a few years, ceased operations and were finally dismantled, with some remarks upon the causes that lead to these disastrous results.

REAR-ADMIRAL JAMES ALDEN died in this city on Tuesday last. Admiral Alden took part in the Mexican war, and was present at the capture of Vera Cruz and Tabasco. He commanded the *South Carolina* in 1861, the *Richmond* in 1862, and was at the engagement with Forts St. Philip and Jackson, and at the capture of New Orleans. In 1869 he was made Chief of the Bureau of Navigation.

The stagnation of certain manufacturing interests is indicated with terrible distinctness at Newark, N. J., where one-eighth of the population is dependent upon public charity.

One hundred and three deaths from small-pox were reported in London last week, the largest number during the present epidemic, except in the first week of January.

Whip-Making and the Effects of Steady Employment.

Simple as it appears, a first-class linen-plaited whalebone whip is constructed in an exceedingly interesting and ingenious manner, and it requires careful and honest management to uniformly produce a perfect and durable article. The stock for manufacturing must be judiciously chosen and the liquid or sticking material correctly compounded and applied in proper condition. The American Whip Company, of Westfield, Mass., well known in the trade in all American cities, is undoubtedly the largest factory in the world. In no other establishment is so large a variety of whips made in such perfection and great numbers.

Thirty years ago, says Mr. H. J. Bush (one of the leading founders of this company), a knife and plane were all the tools employed by a journeyman whip-maker. Now, we should judge that \$50,000 would not pay for the improved tools and machinery in this single establishment. The most ingenious in construction and operation is the plaiting machinery with its dozens of wheels revolving and carrying different strands of thread in an amazing number of different ways, rapidly forming perfect fitting braid to the varying surface of the whip-stock. One of the latest invented machines plaits the buttons on the stocks more evenly than, and as perfect as, the human hand.

The American Whip Company occupy a large four-story brick building, employing from 40 to 50 men when in full operation. One hundred and fifty dozen or about 2,000 whips can be turned out daily. Although the largest, this factory is only one of many equally well-deserving factories in the vicinity.

Westfield, for more than a quarter of a century, has been noted as being headquarters for whip and cigar-making in the United States. During the past 10 years the town has, from appearances, doubled in wealth if not in population. The braiding of horsehide and buckskin lashes, snaps, and the working of buttons, etc., on whips taken into the industrious homes of the villagers, has given the town a thriftiness rarely enjoyed of late years by their neighbors in other parts of New England. This exemplifies the great benefit to any community of having some light employment for women and children. Although the remuneration may be very low, such employment tells largely in its general results. Some such employment universal in California would produce a wonderful change in the happiness and prosperity of our people.

THE Centennial mine, Nevada county, has paid its first dividend, aggregating \$3,000. The *Foothill Tidings* says of the mine: When it is remembered that the Centennial is a new mine—that only a few months ago the locators of the mine were going round town soliciting parties to take a little stock in it at nominal or "bed-rock" rates, "just to help it on its feet you know,"—and that it has paid its expenses from the word go, and pays now dividend number one, amounting to more than the whole mine was held at a few months ago, we have a realization of why people will continue to put money into these legitimate mining enterprises, even though they do not all pan out as soon and as well as the Centennial. Some of them do and the average will turn out as well as most commercial ventures, if only good judgment followed by good management, go with the investment.

A USEFUL DEVICE.—We received a curious little arrangement this week from C. H. Barrows, of Willimantic, Connecticut, in the shape of a "moustache protector." It is a device to place on the edge of a cup to keep the moustache out of the tea or coffee, and is much better than the ordinary moustache cup. It is self-adjustable, and by means of spring clamps will fit any cup, tumbler, mug or bowl, and is really a useful thing for moustached gentlemen. It may be carried in the vest pocket, being made of very thin metal, nickel plated. The invention is a new one, and is just being introduced for sale.

A CALL has been issued for a meeting of the National Teachers' Association, to be held in Washington on the 1st, 2d and 3d of March. Subjects of interest to the cause of education have been arranged for discussion.

CORRESPONDENCE.

Mines of Beaverhead County, Montana.

[From our Traveling Correspondent.]

The first district encountered going south from Butte City toward Bannack, is that of

Vipond,

Being five miles in length, north and south, and about two miles wide. The general formation is limestone, the mineral belt bounded on the east by quartz, etc., and on the west by porphyry. The direction of lodes in the south end, northerly and southerly, while that of Quartz hill, or northern end, is easterly and westerly. Veins from two to 20 feet thick. Character of ore in the south end, gray copper and much of it plumbiferous, carrying a good percentage in silver, being both free milling and smelting. The ore of the north end is chiefly carbonate of lead and sulphides of silver, with a sufficient amount of the green carbonate of copper to work it, and in consequence a good free milling ore, that runs from \$30 to \$200, or probably making an average of \$60 per ton.

The Mammoth,

(South belt), Messrs. Patton & Branagan proprietors, shaft 40 feet, lode from four to five feet. Thirty-five dollars per ton were realized for 124 tons, sold on dump, unassorted, said to have worked \$62.50 per ton. Ore from the Mewonitoe and the Forest, belonging to the Vipond Bros., was given in as averaging (working process), \$175. The Iridescent (Brown, Leggat & Branagan) produced ore that worked upward of \$80 per ton in silver.

The Argyle,

(South end), owned by Mr. R. D. Leggat, has been worked for the last 18 months, and has a shaft 116 feet in depth, from which levels are now being run, showing as fine a looking body of ore as one could wish to see. The ore has given working tests fully satisfactory to the owner; the figures, for prudential reasons, being at present withheld from the public; suffice it to say that it is one of the most noted and best paying mines of the district, and will probably demand and secure the services of a mill the ensuing season for the working of its ores. Messrs. Dewey, Brubaker and others are reported as having made valuable discoveries on the same vein. The Aurora, North Star, Bismarck and Humboldt, (owned by Prof. Knabe, assayer at the Dexter mill, Butte City,) are developed to a greater or less extent, the first named showing from three to six feet of good milling ore, and all said to look promising.

The Excelsior Lode

(Branagan & Bodge), 80 feet shaft, four feet of quartz, 18 inches of which is high grade, estimated to work \$100 or more to the ton. A Mr. Spur, an old Californian, was met with here, who is fully impressed with the value of his several claims, but requiring some capital to work them. Ore from one of them worked at Reno, Nev., \$122 per ton.

The Monroe Silver Mining Company,

Mr. James Logan Superintendent, have a mine also in Vipond district, and a 15-stamp mill at Dewey's Flat, six miles below the mines. It is provided with a Blake rock breaker (large size), five pans, two of which are of the Purvine pattern, three settlers, three concentrators, (Hendy's), and a large furnace. The mill is large, very substantially built, and conveniently arranged throughout, being planned and constructed by Mr. C. S. Masten, the retiring Superintendent, who is entitled to full credit for its present admirable working condition and efficiency.

The Purvine Pan.

In the absence of Mr. Purvine, who makes his headquarters here, Mr. Masten, who had introduced and used his pan, volunteered the following statement in regard to it, which may be worthy of publication, as it is now attracting considerable attention throughout the Territory. "It is made of wood and combines together all the advantages of the barrel and all other pans, with none of the disadvantages of either. The same ores that have been worked up to 60% in other pans have worked up to as high as 90% in the Purvine pan."

What was said in regard to its mode of construction must necessarily be omitted until the patent is secured.

Copper Sponge and Copper Bars.

Some admirable samples of both were seen here, manufactured (as informed by Mr. Masten) by Mr. Wm. Purvine, inventor of pan and assayer at the mill, and as the facts are of so much interest they will be given as near as possible in his own language. "He has recently worked some of the copper ores of Butte by the Hunt & Douglas process, used by a company in Colorado of which Mr. C. O. Stewart is Superintendent, with very great success, demonstrating that both copper sponge and bar copper can be produced in Butte at very much less cost than copper can be imported, thus adding greatly to the value of the copper ores of Butte and other districts in the Territory, as also to the cheapness of reducing the silver ores."

The Trapper Mines (Burnt Pine P. O.)

Bryant, I think, is the name of the district,

but the above caption has been selected as better known, from the Trapper mine, the first located and opened, being somewhat remarkable both from the quantity and quality of the ores it has produced. Some samples are reported as assaying \$12,000 in silver. It has yielded, according to the best information at hand, about \$40,000 in ore shipped and sold, to say nothing of 2,000 tons on dump, estimated to be worth upwards of \$140,000. The greatest depth attained is 130 feet. The mine is owned by Bryant & Co., who have now a tunnel extended nearly 400 feet, with about 40 feet more to run before tapping the vein at a greater depth.

The Franklin Lode,

Owned by Gild & Co., greatest depth by incline, 65 feet, showing a width of ore at the bottom of 10 feet. One hundred and fifty tons, reduced at the smelting works of Dahler, Armstrong & Co., Glendale, averaged about \$135 per ton, the lowest running \$60 and the highest about \$300 in silver. The general character of ore, carbonate of lead, argentiferous galena and some gray copper ore—the plumbiferous carrying 45% lead. There are 400 tons on the dump, valued at \$75 in silver, taking no account of the lead. The ore at present coming out is of a fine grade, sample assays running \$250 and upwards.

The Elmorlou,

Ford, Lowe & Driscoll, lies in the limestone, the usual formation of the district, with lime on the foot-wall and quartzite on the other; dip south; course east and west. It is opened by shaft 130 feet and a tunnel of 400 feet, for the most part along the vein. The width of ore in some places from one and a half to two feet and widening again to five or six feet. About 500 tons have been shipped and sold, which gave an average as per returns of \$192 in silver, the lead running from 35 to 40%. They have near 300 tons of second-class ore on hand, valued at from \$75 to \$100 and some 60 tons first class for shipping at \$180 in silver. The mine has not only been self-sustaining, but also dividend-paying, a remark that could probably be made truthfully, with some little qualification, about nearly all in the district.

Comparisons, as an old aunt used to say, are "odorous," but odious or not, from what was seen (and by far the best mines were not visited on account of their elevation and the severity of the weather) the remark may be ventured that the districts are few and far between that will show "a hand" with this.

The Cleopatra,

Pease & Co., main shaft, 90 feet; average width of ore vein, six feet, consisting of a solid body of carbonate of lead, giving working assays of 40% in lead and \$50 in silver. The Ariadne, belonging to the same, shafts 55 and 25 feet respectively, average of two feet of ore, mostly sulphide and carbonate of lead. Value of ore from north shaft, \$239.43 silver and 33% lead. The ore body in south shaft is five feet wide, but ore of lower grade thus far, giving about \$20 in silver and 35% lead. The Mark Antony, with about the same amount of developments as last, has a 15-inch vein of ore, chiefly sulphides of lead, running 55% and \$60 in silver.

The True Fissure,

Larwell, Milligan & Co., of Bannack; deepest shaft, 120 feet; ore body, from four to seven feet. Two hundred tons shipped to Salt Lake averaged \$75 in silver. Four hundred tons second class, smelted at Glendale and Argenta, yielded on an average about \$115 per ton. The ore runs in lead from 20 to 50%. Thought to be a very valuable mine.

The Niagara Group.

Owned by Kepler & Co., of Bannack, has three shafts of about 25 feet each. Width of ore on the Niagara proper, three feet; assay value, \$60; 2,788 pounds shipped from one of the group gave returns of \$420 in silver, \$18 in gold and 23% in lead.

The Atlant's,

Armstrong, Atkins & Co. Greatest depth, 140 feet, the ore vein varying from six inches to four feet; character, carbonate and sulphide of lead, and gray copper (fahlore), with a small percentage of carbonate of zinc, carrying also some oxide of iron, and, taken altogether, a good smelting ore. It runs 35% in lead and may be generally considered high grade in silver, some picked samples assaying as high as \$1,500. The mine is systematically worked, and the buildings and fixtures above ground are all arranged for comfort, convenience and effective work. The company own four other claims, the Alta, adjoining, with similar ore; the Cleve, shaft 50 feet and the Avon, 130 feet, running less in lead, with spots of very high grade silver ore, and opening in places to the width of 25 feet. The Hecla has exhibited some of the finest samples found in the district. Work will be prosecuted vigorously the coming spring, and in all probability a mill erected near the mines.

The Sampling and Reduction Works

Of Messrs. Dahler, Armstrong & Co. are situated at Glendale, 10 miles below the mines, where all classes of ore, from free milling to the most rebellious, will be worked, when all the arrangements in progress or in contemplation are fully completed. The furnace, of the cupola form, is built wholly of boiler iron, surrounded by a water jacket. The diameter at the tuyeres is about 30 inches, and it is from 16 to 18 feet high. The flue passes at right angles to a large condensing chamber, having an exit through an underground passage to the stack 80 feet distant. From one to one and a half tons of dust, as rich as the original charge, are collected daily in the condensing chamber. This furnace has

a daily capacity for smelting of about 25 tons, having all the necessary facilities at hand for preparing the ore for further treatment, such as crushers, rolls, screens and jigs. Another furnace had just been completed of the reverberatory form, with condensing chamber built of brick; length, 40 feet by 12 in width. Driving power of works, Leffel's turbine wheel, the water brought by ditch one-half mile in length.

Utopia District,

On Birch creek, has several copper claims, represented to run from 30 to 40%, and one silver claim, a recent location, known as the Franco-American, and located by Longley, Armstrong & Co. It has a three-foot vein of ore, with six inches of high grade, giving assays from \$85 to \$150 in silver and 60% in lead, none as yet being tested by working process.

The Argenta Mines

Contain a larger percentage in lead and a smaller in silver than those of surrounding districts, but the galena ores are utilized and made profitable for fluxing the richer ores from Trapper and other neighboring camps, 50 per cent, being allowed for every unit above 45 per cent. in lead and the full amount for all the silver over \$10 per ton.

There are two smelting furnaces here, one of which was run last year for a few months by Stapleton & Co. with very good results.

The Louis Phillip & Rittenhouse

(Mauldon, Loughridge & Barber), the former showed by means of an open cut a 7-foot vein, rich in lead (66 per cent.), and carrying \$25 in silver. The proportion of silver in the other was higher, the lead running somewhat lower.

The Eaton,

(E. S. Ball), shaft 112 feet, 7 feet from wall to wall, with 42 inches of ore, principally carbonate of lead, averaging 66% per cent. lead and \$22 silver.

Elkhorn District,

Twenty-eight miles west of Bannack, shows many good veins, encased in granite, running principally in silver, with some copper and lead. The Elkhorn, owned by Steele, Graves & Peck, of Bannack, has a shaft of 40 feet, and a 4-foot vein of solid ore, some of high grade, a carload shipped to Salt Lake bringing in the neighborhood of \$150 per ton, silver.

The Storm Lode,

(Steel & Shineberger) has a good large vein, from 4 to 8 feet of similar ore, a lot shipped going about \$140.

The Emerald,

(Mead & Roe), in same direction but 8 miles nearer Bannack, had made a shipment to Utah that yielded upwards of \$100 per ton in silver. It is thought that first-class, selected would run much higher, as it gives assays as high as \$300. About 10 miles north of Bannack promising gold and silver quartz have been discovered at

Bald Mountain.

The formation is limestone and quartzite, and also granite. Mr. A. H. Odell, of Bannack, who has an interest in several silver leads, gives average width at from 2 to 3 feet, and the assays from \$60 to \$400 for silver, the gold quartz running from \$15 to \$50; water and wood in abundance.

The Mines at Bannack—The Del Monte,

Three miles from town (Blue Wing district); fissure, seven feet, and two veins of ore, eight inches each; general character, arsenical and ruby silver. It has yielded to date about \$50,000, and is represented as having paid handsomely. After sinking to the depth of 225 feet, water was encountered and the work was stopped until heavier machinery could be procured. Owned by Messrs. Smith & Sears.

The Czar

(Mr. Clark Smith), has a three-foot fissure in granite, with 12 inches of silver ore, averaging \$100 per ton, selected running as high as \$160 per ton. It is opened by tunnel; the greatest depth from surface, 110 feet; and has paid from the start.

The Huron

(S. Bachelor). Vein varying from a few inches to four or five feet, the ore high grade, but found in pockets. A lot shipped to Swansea brought upwards of \$400 per ton.

The Charley Oak.

(Herr & Ney Bros.) Lode from two to ten feet in limestone, but as yet not well defined, so much of it being barren, the ore being found in chimneys. It gave sample assays as high as \$400 per ton, and a few tons were reported from which about \$100 per ton were realized. It exhibits some rich specimens, and, in view of developments, the prospect may be considered good.

Some Mines of Bannack District.

Mr. Innis is opening a vein somewhat contorted and broken up at the surface and near the border line between the lime and the granite, showing considerable gold quartz, valued at \$20 to \$30 per ton, and other promising indications, that would be considered very flattering in California or Nevada.

The Lookout

Peneluna & Underwood, is giving forth some fine gold quartz, from pockets and small veins, that works from \$30 to \$60. Being near the surface, there is no well defined vein, but has the appearance, in miners' parlance, of a "big blow-out," and indicative of a chimney of ore in a more concentrated form, if followed to a sufficient depth. It matters not whether a vein is well defined or not, so it pays. This mine, with expenditures light, has (within a compar-

atively brief period) produced something upwards of \$10,000 in the gross, handsomely rewarding its owners for their time and labor.

The Dacoto Mine,

Owned and worked by Mr. Phil. Shenon, consists of two claims, opened by three shafts; the greatest depth reached in the lead, 325 feet; and good hoisting works on what is known as claim No. 8. The developments show it to be a contact vein between the lime and the granite, averaging four feet of ore, which pays, in gold, \$50 per ton, some having worked as high as \$65. It is represented as one of the oldest and best paying mines of the district and of the Territory.

Dividend Paying.

In this same vicinity there are four other gold leads, owned and worked by Messrs. Shenon & Co., that have yielded a large amount in the past, and are said to be paying their regular dividends.

The Excelsior,

The most promising, perhaps, of the number, is also a contact vein, with an average of six feet of ore, decomposed and oxidized above water level, changing, as might be expected, below this point to sulphurets of iron. The ore is exceedingly rich, some of it said to yield as high as \$500 per ton, and to average throughout \$100 in gold. Extravagant as these statements may appear, they are deemed wholly reliable, as the mines are not far sale.

This letter closes notes of the mines of Montana. If the reader has carefully perused what has been written (generally conscientiously and guardedly), he must come to the conclusion that no more inviting field is probably presented anywhere in the wide world for the profitable investment of capital; the only drawback, its inaccessibility; its greatest need, a railroad.

A. C. K.

Arizona as a Mining Country.

EDITORS PRESS:—Although the PRESS has many readers in this Territory, few of them take pains to send to the editors such items concerning our mines as would be gladly received and published, yet the remark is frequently made that the PRESS does not have anything in it about our mines, except what it gets out of the *Miner* or the *Citizen*. So, for the purpose of giving some items to the public through your columns, and to fulfill a promise made some months ago, this communication is begun.

As the Southern Pacific railroad approaches the western boundaries of Arizona, and travel hither is made easier, a great deal of interest is manifested in the Territory by mining men in California, Nevada and Oregon, and information of our mineral resources and prospects is sought in every available method, and a few general remarks on that subject will serve as a prelude to statements concerning particular localities, mining districts and mines. The isolated situation of Arizona, erroneous impressions as to the climate, productiveness of the soil, value and extent of the mineral lands, and above all, the Apache war, which was brought to close only two years ago, have all tended to keep the progress of the country back, and, until recently, no reports of the richness of the few mines that were producing bullion caused any desire among outsiders to come here to examine the country and learn for themselves.

The fact is, Arizona is pre-eminently a mining section. There is mineral almost everywhere, productive, valuable mines of gold, silver, copper and lead exist in each of the six counties of the Territory, and large deposits of coal, iron and salt are known of, but remain untouched. The agricultural portion of the country is limited in comparison with the whole area, the valleys of the Colorado, Gila and Salt rivers having the only large bodies of tillable land, but there is enough to raise supplies for a large mining population, and but little chance of a surplus, even at this time, and as the mines are further developed, a good portion of our flour must be brought from Mexico and California.

Grass grows everywhere, but in many sections the scarcity of water prevents stock-raising on a large scale. From Prescott, east, 300 miles to the line of New Mexico, the country is heavily timbered with pine, oak, fir and black walnut, and in the southern portion, below Tucson, the mountains have a heavy growth of the same, but the greater portion of Arizona is destitute of timber suitable for manufacturing into lumber, though sufficient cedar, pinon, mesquit and other scrubby wood is found in nearly all sections for firewood.

The remark is often made, even by the oldest settlers, that if Arizona is not a good mining country it is not worth what the Apache war cost for any other purpose. It is now about 14 years since the excitement caused by the wonderful placer diggings at Antelope Hill and Weaver, 50 miles south from Prescott, drew hundreds of miners into the northern portion of Arizona, and all who explored the country at all were astonished at the discoveries made of quartz veins in all quarters, and of such promising character that many settled down here, determined to look no farther for mining prospects, believing that at most but a year or two could pass away before there would be a rush here to the quartz mines, as there was to Nevada in the days of the Washoe excitement; yet those men

Continued on page 86.

MECHANICAL PROGRESS.

A Crack in the Great Gun.

We have formerly given an outline of the method which the English are employing to make their mammoth cannons. Just on the eve of the completion of the 81-ton gun, a vexatious mishap has occurred which *Iron* says is serious enough, but not thought of sufficient importance to prevent the carrying out of the programme. The holes pierced through the body of the gun, for insertion of the pressure gauges, have been calculated to weaken it considerably, and it should be mentioned, to the credit of the gun, that it has fired 166 rounds, in which it has consumed no less than 23 tons of powder, and discharged 130 tons of projectiles. To this must be added the fact that the charges fired in the later stages of the trials have been much heavier than contemplated when the gun was originally designed, and that the closer confinement of the powder gases obtained by the use of the gas-check has also to some degree added to the work imposed upon the great gun. The authorities, therefore, have regarded, and still regard, with satisfaction, the unimpaired condition of the main structure, while they at the same time admit, as they have invariably done, that the steel tube, or lining of the gun, is its one weak and untrustworthy part. In this steel tube a crack has been discovered. Gutta-percha impressions of the bore have been taken at various stages, and the examination made in this way, preparatory to the renewed trials arranged for this week, revealed evidence of the incipient fracture. It is considered somewhat remarkable, although not surprising, that the 81-ton gun should have followed so closely the example of the original Woolwich infant, the first 35-ton gun, which in a similar manner endured some enormous pressure and then cracked its steel lining; after which mishap it, however, fired many more very heavy rounds, and proved that a defect in the steel tubing was scarcely to be regarded as any very serious detriment to the weapon. English artillerymen, generally speaking, have no faith in steel, in consequence of its brittle nature, but they require a hard, smooth and unyielding surface within the bore, to take the rifling and endure the friction of the projectile; and they have, therefore, reluctantly adopted for this purpose a material, the characteristics of which are the opposite of the tough and elastic wrought-iron coils which compose the body of the gun. The thickness of the steel at the place where the crack has occurred, is about four inches, and it is situated at some distance from the powder chamber, and is at present scarcely perceptible, and of small extent. It is calculated that two or three rounds have been fired since the injury occurred, and that the gun is as fit for work as ever it was, the tubing never being calculated upon as contributing anything to the strength of the barrel. The trial of the gun against the enormous armor-plated target will therefore probably be made, as arranged, at Shoeburyness, before it is retubed.

Design in Steam Boilers.

We find, in the *Indianapolis Mechanical Magazine*, some points in the designing of steam boilers, which, though rather abstract, are worth bearing in mind: It has become a general assertion among writers on the steam boiler that the most important object to be attained in its design and arrangement is thorough combustion of the fuel. This is only partially true, as there are other conditions equally important, among which are *strength, durability, safety, economy and adaptability* to the particular circumstances under which it is to be used. However complete the combustion may be, unless its products can be easily and rapidly transferred to the water, and unless the means for the escape of the steam from the surfaces on which it is generated are easy and direct, the boiler will fail to produce satisfactory results, either in point of durability or economy of fuel.

Strength means the power to sustain the internal pressure to which the boiler may be subjected in ordinary use, and under careful and intelligent management.

To secure *durability* the material must be capable of resisting the chemical action of the minerals contained in the water; and the boiler ought to be designed so as to produce the least strain under the highest state of expansion to which it may be subjected—be so constructed that all the parts will be subjected to an equal expansion, contraction, push, pull and strain, and be intelligently and thoroughly cared for after being put in use. These objects, however, can only be obtained by the aid of a knowledge of the principles of mechanics, the strength and resistance of materials, the laws of expansion and contraction, the action of heat on bodies, etc. The economy of a steam boiler is influenced by the following conditions: Cost and quality of material, design, character of workmanship employed in its construction, space occupied, capability of the material to resist the chemical action of the ingredients contained in the water, the facilities it affords for the transmission of the heat from the furnace to the water, etc. The *safety* of any structure depends on the designer's knowledge of the principles of mechanics, the resistance of materials and the action of bodies as influenced by the elements to which they are exposed; and in the case of steam boilers the safety depends upon the judgment of the de-

signer, the quality of the material, the character of the workmanship, and the skill employed in the management. Safety is said to be incompatible with economy, but this is undoubtedly a mistake, as intelligent economy includes permanence, and seeks durability.

Adaptability to the peculiar purposes for which they are to be used, is one of the first objects to be sought for in the design and construction of any class of machines, vessels or instruments, and it is undoubtedly this that gives rise to the great variety of steam boilers in use at the present day, which are, with very few exceptions, the results of thought, study, investigation and experiment.

Machines in New South Wales.

In the months of April and May an exhibition will be held at Sydney, New South Wales. There is in this colony a particular need of labor-saving machinery and inventions. Manufacturers of such may find it profitable to co-operate in the exhibition. The following extract of a letter from the Executive Commissioner of the colony at the Centennial offers some valuable suggestions as to the kinds of machines required: The greater portion of the best pastoral lands of Australia are wholly without surface water, and generally when wells are sunk they only reach salt water. Therefore, the great requirements are apparatus for sinking through the saline stratum to the fresh water which probably lies below; and especially appliances for excavating tanks or reservoirs, into which the rainfall may be led from the plains. The most effective pumps for use on land or in ships are desirable objects of exhibition. So, also, are the best agricultural machinery and implements, being strong and simple in construction. Timber saving machinery always finds a sale, and, if adapted to felling standing trees, and to cut them into lengths when on the ground, so much the better. This opportunity of bringing railway appliances to the notice of the Australian governments, which own nearly all the railroads, should not be neglected. Such a display would undoubtedly attract the principal civil engineers from all the colonies, and many prejudices would be removed. There are very many articles in the Centennial buildings which would, when known, be introduced into Australia advantageously to the makers. I will mention a few only: Brickmaking machines, if cheap and strong; small cheap planers and matchers; scroll saws; the latest improved wood-working machinery; any small, ingenious household goods of the latest patents; spring wagons of best construction; lightning cross-cut saws; samples of furnishing goods, etc. There are very few articles subject to duty in New South Wales, but any reasonable quantity of dutiable goods for exhibition will be admitted free of the custom house, which will have no control over anything which enters our exhibition buildings. Everything for the exhibition should be addressed to Jules Joubert, Esq., Secretary of the New South Wales Agricultural Society, Sydney, so that it may be taken free of expense to the exhibition building, and otherwise cared for.

Starting the Drill.

Prof. Sweet makes the following note in the *Polytechnic Review*: In the ordinary practice of drilling it is customary to locate the center of the hole and make a small indentation with a center punch; then to strike a circle with the compass the size of the hole to be drilled, and to firmly fix the location in case the circle gets obliterated, four center punch marks are made on the four sides of the circle, so that in starting the drill, if it does not start truly central, as they seldom do, the four marks will indicate the direction in which it is out of its proper place. It is also customary, when starting the drill, to examine carefully to see that it is starting true, or if it draws to one side to chip out with a round nose chipping chisel on that side, so as to bring the drill back central. I do not think this the best way—at least, the best for only those who have worked that way for years. When a man has followed one practice, and has become an expert at it, then a new way must be a very superior one to make it to his interest to change; but with you who have two ways put before you, neither of which you are familiar with, then I think the plan of drilling a small hole as quick and more certain of success. If the indentation of the center punch be as large as the small drill, then the small drill cannot be started anywhere except in the right place; and if the small drill be about as large as the thickness of the point of the large drill, then a large drill hole will follow the small one to a certainty, if there are no flaws or blow-holes in the metal, and they are hard to fight against in any case. The use of the small drill, and then the larger one, calls for a change of speed in the machine. To overcome this objection, I have thought of making a drill chuck to fit upon the same spindle, that shall have within itself a speed gear which will give the drill a speed eight or ten times faster than the speed of the spindle of the machine; then by simply changing chucks the small drill will have the proper speed when the machine is set at the proper speed for the large one. The nature of the mechanism to accomplish this is only a planetary gear, the same as the back gear of our lathe made on a small scale. Another improvement, that can be made on drilling machines, is some better method of securing chucks—the present method is to slow—some modification of the bayonet fastening is the thing.

SCIENTIFIC PROGRESS.

The Laws of Taste and Smell.

Dr. Hughlings Jackson, whose name has long been familiar as that of one of the first neurologists of the age, has just published a series of observations as to the relative functions of the olfactory and gustatory nerves, which are summarized by the *Phrenological Journal*: To understand how complex the sensation of taste, as generally spoken of, really is, it must be remembered, that the membranes of the mouth and the surface of the tongue are abundantly supplied with tact-buds, or papillae of ordinary feeling; so that what is styled taste is always accompanied by a perception of form and consistence, and of heat or cold. Sliminess, for example, is a perception of the tact-buds, not of the taste-buds. Lastly, the distribution of the olfactory nerve is so intimately connected with that of the nerve of gustation that the two usually act in unison. Thus what is generally, though inaccurately, styled taste is a triple sensation, involving the simultaneous impression of nerves of feeling, smell, and taste. It becomes important, therefore, to discriminate, since the fifth pair, the glosso-pharyngeal, and the olfactory nerves are all involved in the function of taste, and an impairment of the function, in the ordinary acceptance of the term, may imply lesion of either. In point of fact, as a general rule, when patients complain of impairment of the sense of taste, it will be found on experiment that the olfactory nerve is the part especially affected, and that there is really no loss of function in the fifth pair. A very simple experiment will settle this question. Drop a little essence of peppermint on a lump of loaf sugar, and place it upon the patient's tongue. The tact-buds will respond with a sensation of heat, and the taste-buds will perceive the proper taste of the sugar, if the function of the fifth pair is undisturbed; while, if there is defective olfaction, what is styled the taste of peppermint will be absent. Conversely, if the latter is present, and it is the sugar that remains unperceived, then the taste-buds have lost their function, and the olfactory nerve is not the seat of the lesion. Camphor in solution, dropped on sugar, is also a good test. The point is, that neither peppermint nor camphor have any proper taste, but are in reality smelled. Blood is said to have a salty taste; but in reality it is not the albuminous constituents of the blood, but several salts, held in solution in them, that are tasted. The remainder of the impression is one of flavor and of consistency, apprehended by the nerves of feeling and the olfactory filaments. And this brings on the distinction in function between the olfactory nerves and the filaments of gustation, as founded in nature. It is thus: Crystalline bodies, soluble in water, or in the secretion of the salivary glands, are tasted; colloid bodies, oxidizable in air, and susceptible of diffusion, are smelled. Thus sugar, salt, etc., are tasted, and have no effect whatever on the olfactory nerves; while, with colloid compounds, the sensation is due to an aroma that is apprehended by smell. With mixed bodies, colloid but holding crystalline elements in solution, such as animal and vegetable tissues, the so-called sensation of taste is always a mixed one. It would be a mistake to suppose that, because an aromatic body has a sweetish taste, the aroma and the taste are due to the same constituents. Carbolic acid has a sweetish taste, but aroma proceeds from unseparated impurities, and the more refined the acid, the less it impresses the olfactory nerves. The distinction, then, between smellable and tasteable bodies, is purely one of solubility in water or in air; and the sense of taste may be as readily destroyed by loss of function in the salivary glands as by loss of function in the taste-buds themselves. It will be seen, therefore, that to make a correct diagnosis in a case of this kind, involves an exceedingly careful and exact analysis of all the functions represented by the mouth and nose.

The Wheeler Surveys.

A dispatch from Washington gives the following information:

The annual report of the surveys west of the one hundredth meridian, under the direction of Lieutenant Wheeler, United States Corps of Engineers, is now about ready to be issued. It will exhibit many interesting facts regarding the topography and resources of the regions examined in Colorado, New Mexico and California during the last fiscal year, under special instructions from the War Department. An examination was made to ascertain whether the waters of the Great Colorado River of the West could be diverted to the adjoining plains for purposes of irrigation. The report thereon is accompanied with illustrations and regulated data, showing the problem to be difficult if not impracticable. Special investigations have been inaugurated with a view to distinctively delineating in colors upon the atlas and maps of the survey the irrigable, grazing, mineral and mountain sections of the whole region hitherto explored by the Wheeler expedition, covering, since the year 1869, nearly 400,000 square miles. These expeditions have been sent out by the War Department principally for the purpose of gathering topographical data for the mapping of the country, and incidentally to report on the mineral, agricultural and other resources of the re-

gion west of the one hundredth meridian, and its geology, climate, etc. Maps of a large portion of the area have already been published. The matured results of the survey are to be published in seven quarto volumes. Two of these, viz., geology and zoology, have already appeared; the third, paleontology, is nearly ready for distribution, and the remainder well advanced. Topographical and geological atlas sheets will be issued from time to time. There will be also issued a monograph upon the routes of communication, showing distances between elevations, wood, water, grass, etc. This information is much sought for by parties contemplating the locating of colonies, the transfer of large herds to grazing grounds, etc. The appropriations for this work last year, although limited in amount and not available until late in the summer, have afforded gratifying results, several field parties continuing their labors up to December, and returning to headquarters in Washington well laden with data to be elaborated and submitted directly to Government and incidentally to the public. If Congress makes adequate appropriations during the present session, parties will be put in the field early in the coming spring, as skilled assistants, instruments and outfits are all at hand ready for camping at any time.

The English Believe in the Sea Serpent.

The *London Spectator* gives full credit to the last reported observation of the sea serpent. Its appearance coincides with what is now agreed upon, that it must be of a Saurian character, like the monsters of geologic periods. The *Spectator* says, "In the Straits of Malacca the sea-monster, so repeatedly seen and so repeatedly declared to be mythical, appears at last to have been carefully observed by competent witnesses. The creature was seen by the passengers and crew of the ship *Nestor*, on her voyage to Shanghai; and on her arrival at Shanghai the master of the ship, Mr. John Keiller Webster, and the surgeon, Mr. James Anderson, made a statutory declaration of what they had seen before a magistrate, as a mode, we suppose, of formally attesting that they spoke in good faith. The creature (which resembled a huge salamander, only that instead of being about six or eight inches long, these dimensions must be multiplied by at least 75 or 100, the body being from 45 to 50 feet in length, the head 12 feet, and the tail, it is said, no less than 150 feet) was first seen at half past ten o'clock on the 11th of September, 15 miles northwest of the North Sand Lighthouse, in the Straits of Malacca. The weather was fine, the sea smooth, and the air perfectly clear. The Chinese on deck were terribly alarmed and set up a howl. The whole watch and three saloon passengers saw the creature clearly and observed its movements. It traveled for a long time about as fast as the steamer, appearing to paddle itself by the help of 'an undulatory motion of its tail in a vertical plane.' The body and tail were marked as those of the salamander are marked—with alternate bands, black and pale yellow in color. 'The head was immediately connected with the body, without any indication of a neck.' Both witnesses state positively that the only resemblance was to some creature of the frog or newt kind, while one of them (the surgeon) says the longer he observed it the more he was struck with its resemblance to a gigantic salamander. Its back was oval in form. No eyes or fins were seen and it did not blow or spout in the manner of a whale. The greater part of its head was never seen, being beneath the surface. Probably the creature is of a race which survives from that very different world in which creatures of gigantic size seem to have been so much commoner than now. There appears to be no manner of reason for doubting the very express evidence so succinctly and soberly given."

The Distance of the Sun.

If some celestial railway could be imagined, the journey to the sun, even if our trains ran 60 miles an hour, day and night and without a stop, would require over 175 years. Sensation, even, would not travel so far in a human lifetime. To borrow the curious illustration of Prof. Mendenhall, if we could imagine an infant with an arm long enough to enable him to touch the sun and burn himself, he would die of old age before the pain could reach him. According to the experiments of Helmholtz and others, a nervous shock is communicated only at the rate of about 100 feet per second, or 1,637 miles a day, and would need more than 150 years to complete the journey. Sound would do it in about 14 years if it could be transmitted, and a cannon-ball in about nine, if it were to move uniformly with the same speed as when it left the muzzle of the gun. If the earth could be suddenly stopped in her orbit, and allowed to fall unobstructed toward the sun under the accelerating influence of his attraction, she would reach the central fire in about four months. I have said if she could be stopped, but such is the compass of her orbit that, to make its circuit in a year, she has to move nearly 19 miles a second, or more than 50 times faster than the swiftest rifle ball; and in moving 20 miles she deviates from perfect straightness by less than one-eighth of an inch. And yet, over all the circumference of this tremendous orbit, the sun exercises his dominion, and every pulsation of his surface receives its response from the subject earth.—Prof. C. A. Young, in *Popular Science Monthly* for February.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

TALIMAN.—*Amador Ledger*, Feb. 3: We have been shown specimens of the rock from the recently discovered vein of quartz in this mine. It shows large quantities of gold bearing sulphurets, and also free gold scattered plentifully through it. Good judges pronounce it the finest looking ore ever seen in Amador county. The richest part of the ledge is about 20 inches wide, with good paying rock on either side.

EAST KEYSTONE.—We are informed that a fine ledge of quartz was struck in this claim last week.

GREEN POINT.—The 10-stamp mill will be started to-day (Saturday). There appears to be any quantity of rock of fair grade. Sanfrancisco persons estimate the ore at \$15 or \$20 per ton, but the owners will be satisfied if it averages \$8 or \$10 in gold. There is some talk among the shareholders of increasing the capacity of the mill to 20 stamps, should the actual trial of the ore prove satisfactory.

THE MECHANICS mining company have leased the old Downs mill on Sutter creek. It is intended to put in 20 stamps and start running without delay. All the shares thrown upon the market for obtaining working capital have been disposed of.

PROSPECTING.—A large number of persons are still prospecting for quartz between Amador City and Plymouth. Some Italianes struck a rich ledge on Wednesday, the particulars of which have not reached us. It is safe to assert that the stimulus imparted to prospecting operations in the region indicated can scarcely fail to lead to the development of permanent mining operations.

THE 80 STAMPS of the Phoenix mill keep up their ceaseless beating, grinding out the usual quantity of bullion. We visited the mine during the week. The mine is looking as well as ever.

CALAVERAS.

TIGER.—*Calaveras Chronicle*, Feb. 3: We understand that the new mill at the Tiger mine, Rich Gulch flat, works admirably. The mine is kept constantly employed and the mine is looking first rate.

UREKA COUNTRY DOTS.—Work has been recommenced in the Hall and Lacey tunnel, near West Point, the object being to tap a quartz ledge which cannot be worked through a shaft on account of the prevalence of water. The tunnel is in over 300 feet and is expected to cut across the vein at a short distance further. Excellent rock continues to be taken from the tunnel. The breaks on Clark's ditch, caused by the late rains, have been repaired and miners are busy throughout the section of country covered by the canal.

INYO.

LARGE PURCHASE.—*Coso Mining News*, Feb. 3: Mr. H. W. Fortune has succeeded in purchasing for his company the Hidalgo mine and the Portals furnace site, for the Santa Rita mining company, of which he is one of the principal owners. The mine is considered one of the best in the district, there being now on the dumps several hundred tons of most excellent ore. The furnace property is good, so far as goes, but is not of sufficient capacity, and the machinery for another one has been shipped. A contract has been let for running a tunnel for exploiting the mine and for convenient facilities. We understand that the most energetic operations are to be inaugurated at once, Mr. Fortune having gone below to consult with his co-owners relative thereto.

KERN.

HOT SPRINGS.—*Cor. Courier-Californian*, Feb. 1: Dr. Blatchley, the mining engineer of the Bull Run mines, passed up to-day. Operations are to commence there in earnest. The prospects of that camp improve constantly, in spite of the general dullness in mining affairs. The S. & G. company are preparing to erect a mill on Erskine creek at once. There is every encouragement in the showing made so far, and Erskine creek will yet secure the name promised it so many years ago. Some extraordinary rich ore has been struck in the Big Blue, but the working party was driven out by water. The new and powerful pump, however, will dry it out in a few days. The placer mine at Keyville is still going on, paying well, with good prospect of increase.

NEVADA.

ROUGH AND READY.—*Grass Valley Union*, Feb. 4: Good progress continues to be made on the mine. The machinery for the hoisting works is about in running order, so that sinking below the first level can be commenced. Work is on the first or tunnel level being done steadily. A good strong ledge shows all the way, and the rock is of good quality. In about two weeks more the mill will be ready to start up.

DIVIDEND.—The Trustees of the Idaho company held a meeting yesterday and declared a dividend of \$7.50 per share of capital stock of the company. The dividend is payable immediately.

ALASKA.—This mine is proving itself to be worth something as a gold producer. A crushing of ore was made last week at the Omaha mill, and the result was very cheering. Thirty-five loads of rock, in which there were considerable "waste" matter, was put through the mill and yielded about \$50 per load in free gold—not counting the sulphurets.

NEVADA.—*Nevada Transcript*, Feb. 3: The pump at the New England mine has drained the ground adjacent to the hoisting works so that a company is able to prospect a ledge running parallel, and a short distance east of the New England. Gold flat has a large number of small veins through it, most of which prospect well on the surface, but the ground has always been so full of water that but little work could be done on them.

THE GOLD RICH mine has been still sinking their incline. It was intended to go down 200 feet before any more drifts would be run. They have gone between 130 and 140 feet now.

NEW ENGLAND MINE.—We visited the above mine on Saturday last and found everything working admirably. Rock is being taken out of the ledge east of the shaft, and the work of drifting west to strike the main ledge is progressing as fast as the nature of the ground will permit of. There was about 40 tons of ore on the dump, and it is considered by all who have examined it to be first-class. It is filled with sulphurets and prospects well. Fifty tons of it will be crushed at Keith's mill, in this city, several tons having already been drawn, and crushing on it commenced. No one estimates the yield at less than \$25.

THE PITTSBURGH mine has the softest thing on the wood and water question of any mine in the country. The V flume runs directly over one corner of the mill and all the wood used can be dumped directly from it and supplied for \$3.50 per cord. Fresh pure water can also be obtained for the boilers from the flume by simply attaching a pipe.

PLAOR.

BLAST.—*Dutch Flat Forum*, Feb. 1: On Friday a charge of 2,000 pounds of Giant powder, No. 3, was exploded in the Baker claim, doing good execution, and on Saturday work was turned on and washing commenced. The explosive used is new article in the market, and is known as Judson or Giant No. 3, and is said to be three times as strong as the common black powder.

THE LIBERTY HILL company are now washing with all the water they can use to advantage. With a large force of men, assisted by powder and a derrick, they are now making a splendid showing.

THE DUTCH FLAT, owned by B. Huysink, of Dutch Flat, situated north and adjoining the Liberty Hill mine; it has a width of 300 feet by 1,200 feet along the channel. The gravel was tapped in this mine through a tunnel 600 feet in length, run from Liberty Hill ravine. They have

already run several prospecting drifts, we understand, with satisfactory results, the gravel in places being very rich.

LITTLE YORK.—The Empire and Christmas Hill mines are both washing, with a full head of water. Being fitted up in fine style Mr. Morgan, the superintendent, who is an experienced miner, expects to make a splendid showing this season out of the different claims under his supervision, which includes the Liberty Hill mine.

MINING AT FOOL'S HILL.—The mines at this place are owned and carried on under the supervision of McManus & Preston, and are situated on the north bank of Bear river, immediately below Fool's hill. They embrace a deep channel, 75 feet in width and 900 feet in length, and sink the bedrock has never been reached. The run rock on both sides of the channel scale worked several years ago by other parties, through tunnels, and was very rich. The present owners tried the deep channel through a shaft, but after reaching a depth of 50 feet below where the ground had been worked, they were forced to abandon it on account of the large increase of water. They are now running an incline at an angle of 45 degrees, and are sinking 50 feet. The bedrock works on Wilcox pass a force pump are run by a horse wheel, all of the machinery working to a chain. The gravel through which they are now passing only carries sufficient gold to pay for hydraulic, but they expect to strike a bonanza on reaching the bedrock, as the gold found on both sides of the channel and on Fool's hill was very coarse and lying on the bedrock.

THE YUKON.—There has been a great deal of work done in the Opal claim since our last mention. The loose top ground has all been washed off and a shaft raised from the bedrock tunnel, through which they have been washing for some time, receiving their supply of water from the ditch of the Green Valley Co. Hayden Hill Co. is being worked under the supervision of James Ross, one of the owners. They have been busily engaged for the past several months in getting in shape, during which time there have been several necessary improvements added to the works connected with it. A large head of water is now used, and the work of removing the gravel is progressing rapidly. Novey Co. have their cement mill built and in readiness to commence crushing, the tunnel is also completed and the work of raising a stopes will be finished in a few days, when the mill will be started up and kept crushing what is said to be very rich cement.

PLUMAS.

RICH QUARTZ.—*Plumas National*, Feb. 3: Some developments recently made on a quartz ledge near the head of Rich creek, about 10 miles from the mouth of the river, have brought to light some of the richest quartz ever seen in Plumas county. We are credibly informed that specimens have been taken out which, when the rock is broken up, hang together by the gold, and that tons now in sight will pay at the rate of \$100 to the ton. The ledge has been claimed for many years, but little or no work has hitherto been done on it, and until lately it was not considered a rich ledge. Operations were commenced in 1875, and probably hundreds of such chances await the hand of the lucky prospector.

ITEMS.—The Eureka mine is paying largely, and provides right to the title of the best quartz mine in the State. Tommy Ivy and Tommy Taylor are opening a new claim near Taylor creek, with good prospects. The Gold Stripe mine is looking better every day. Wolf creek is bound to be a rich mine. The Marysville land office, against the Plumas Eureka Co.'s claim to the Hooper Extension of the Eureka ledge.

SIERRA.

WATER.—*Mountain Messenger*, Feb. 3: The recent storm made some water for the Bald Mountain, so that they were enabled to commence washing on the dumps. **GOOD PAY.**—Peter Kelley has been getting good pay in a tunnel under the street, near Bosch's brewery. In one forenoon he and his partner took out \$50, which is very good for these desperate days.

PROSPECTING.—Several others have been endeavoring to sink a shaft on the hill north of town and above the Garibaldi ranch. They got down only 40 feet on account of water. We understand they intend running a tunnel, being satisfied that they can strike the channel, if one exists, at the proper angle, from the data gained in the shaft.

EXPERIMENT.—The Brush Creek quartz mine, at the Mountain base, has been at last being worked. It was prospecting by Jos. Middlemiss, of San Francisco, J. P. Brown, of Camptonville, and D. T. Cole, of Sierra county. Rich rock has been discovered directly under the old works and in other places where these gentlemen figured it must be. Mr. Middlemiss is entitled to much credit for the ability and success with which he has induced capitalists below to interest themselves in this matter, and we trust that both he and his associates will be rewarded with handsome dividends, which the rich quartz specimens extracted fully warrant. As soon as practicable their mill will be crushing rock.

SISKIYOU.

THE EMPIRE QUARTZ COMPANY.—*Yreka Journal*, Feb. 3: The members of this company held a meeting during the week for the purpose of hearing a report of how things were going on at the mine and deciding upon how they should proceed. As we stated a few weeks ago, the company have most excellent prospects. They have just made the connection between the shaft and the tunnel, the shaft being about 50 feet deep and the tunnel in between 100 and 120 feet. The ledge is full five feet in width, with good walls, and all the quartz taken out prospects evenly and regular, which fact we hold to be one of the best indications of a good permanent ledge. The company have determined to push the tunnel ahead a little further, and then sink an incline on the ledge again to prospect it still further down. If at the depth of 50 feet more the ledge proves to be what it now promises, the company will not doubt increase their force of miners and proceed to put up a mill. We sincerely hope the enterprising owners of this mine will reap a golden harvest for their pluck and enterprise.

SONOMA.

GREAT EASTERN.—*Sonoma Democrat*, Feb. 3: The Great Eastern mine near Guerneville is proving to be a mine of considerable value. We were informed by the Superintendent, D. Haskins, that the yield has been about 100 flasks per month for some time back and that it could be increased with a larger furnace. After three years' work the mine continues to improve and those who have given the subject close attention have come to the conclusion that under the management of the present owners, the mine will be a large deposit of this class of ore below. The smaller veins lead to breasts of ore varying in richness. The average is about two per cent. Forty men are at work and the mine is paying the owners and lessees.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, Feb. 7: Daily yield, 235 tons of ore, keeping the Consolidated mill steadily running. The yield of bullion for the month past will nearly reach \$100,000, which will considerably more than pay the current expenses. There is little or no change in any of the ore-producing sections of the mine. The drift running south from the deep winze just north of the California line on the 1650-ft level is being pushed ahead as fast as the hard character of the ledge will permit. The ore in the face of this drift is still of a fine quality, but the heat is great and the progress necessarily very slow. The west drift from the C. & C. shaft on the 1650-ft level is steadily advancing, the face in very favorable ground. The character of the ore and the formation of the vein at this point is equal if not superior in richness to any level yet opened. The progress, however, in the development, must necessarily be slow on account of the intense heat and bad air, until a connection is completed with the

north winze. There is nearly 100 feet of solid ledge to penetrate before this drift and the one running south from the winze can make a connection. On the 1500-ft level the enlargement of the drifts and air connections is about completed.

SILVER HILL.—Sinking the main incline is now being pressed steadily forward at the rate of 124 feet per week. The rock in the bottom is quite hard and the flow of water somewhat less. The east cross-cut on the 650-ft level is still advancing toward the ledge, with favorable indications of soon reaching it. The face of the northwest drift on the 444-ft level, running to connect with the Justice mine, is in very hard blasting rock, and is advancing at the rate of three feet per day. According to the survey this drift now only lacks 35 to 40 feet of connecting with the Justice. A drift has been sent down a prospect hole to meet the drift on the 444-ft level, so that the connection will soon be completed.

GOLD & CARRY.—The shafts and water tanks in the main shaft are all completed, and the lowering of the pumps and pump-bobs into place has commenced. The shaft and works have not been in as good working shape for the past three years as at this time. In fact, the entire mine is now in better condition than it was a few years' work than it ever was in the past. On the 1700-ft level the south drift is being advanced rapidly to connect with the Savage combination winze on the south line of the mine. The east drift on the 1700-ft level is also being driven forward to reach the clay body in which the diamond drills in use some weeks since stuck fast. The winze below the shaft is being repaired and put in good working condition preparatory to a more thorough prospecting of the 1800-ft level.

CALIFORNIA.—Daily yield, 550 tons of ore, keeping the mills all steadily running. The ore breasts on the 1400, 1500 and 1600-ft levels are all looking splendidly and yielding good ore. The bullion yield for the month of January will not fall much short of \$1,000,000. This income is the result of the regular dividend of \$1,000,000 with a considerable surplus to carry over to the February account. The south drift on the 1600-ft level is steadily advancing toward the north winze, the face still in good ore. This drift has yet 30 or 35 feet to run to connect with the winze. Sinking the C. & C. shaft has been stopped for the present, on account of the need of all the compressed air obtainable in the west drift on the 1650-ft level. The mine is now in a brighter or more prosperous look than at the present time.

LADY BRYAN.—As soon as the setting of the boiler is completed the powerful new pumping engine will be started up, draining the water from the mine. The connections are all made, ready for starting up. The water is only about 350 feet deep in the shaft, but it will take some little time to drain the mine to that depth.

IMPERIAL CON.—The north and south drifts from the bottom of the north winze on the 2135-ft level are each steadily advancing in very favorable ground. The north drift from the bottom of the south winze on the same level is also making good progress. The same may be said of the two east cross-cuts on the 2000-ft level, which show no important changes during the week.

MEXICAN.—The west drift on the 1465-ft level has penetrated the ore vein to very near the west wall of the ledge, cutting some rich spots of ore, but not developing any large or permanent bodies. The north drift on that level is running to connect with the winze below the 1300-ft level is making good progress and is finding some very good indications of ore. The east cross-cut from the north drift on the 1000-ft level is nearly across the vein without finding any large body of pay ore. The prospects, however, developed by this drift are excellent. The north drift on the 1700-ft level is steadily advancing along the west wall of the vein, the face in very favorable vein matter, carrying some streaks of good ore.

BULLION.—The north and south drifts on the 1500-ft level are each showing a fine character of ore-bearing quartz, and have the appearance of being on the top of a fine mineral vein. During the first part of the week the east drift on the 1600-ft level tapped a strong flow of water, which has since been stopped and all work at that point until the water is drained. This flow of water is carried down through the winze to the 1700-ft level, and thence to the Imperial and Yellow Jacket shafts, from which it is taken to the surface.

LEVATHAN.—After extending the main north drift at the 600-ft level nearly 60 feet, following the foot wall of the ore vein, a cross-cut is now being made to the east. This shows a width of about 15 feet of ore, some streaks of which give high assays. It shows constant improvement as the drift is extended.

JULIA.—The south drift on the ore vein on the 1800-ft level is being pushed vigorously forward, the face still in fine quartz and low grade ore. An east cross-cut from this drift has been started 100 feet south of cross-cut No. 1, the face of which is showing a highly improved character of quartz, the assays reaching from \$14 to \$18 per ton.

YELLOW JACKET.—Sinking the new shaft is making splendid progress. There is still a high flow of water at bottom. It is now down 450 feet. On the 2040-ft level the south cross-cut to the eastward has penetrated 40 feet of ground which carries seams of good ore.

MINT.—Opening the station at the 1400-ft level is making the best of progress. As soon as that is finished the shaft will be sunk 25 feet deeper in order to have a pump room for a flow of water, should any be encountered. Then a new ore will be recorded in the history of the mine, and the 1,100 feet of virgin unprospected ledge of the company, stretching a distance of 1,200 feet north and south, will be cross-cut and prospected.

SOUTHERN CONSTRUCTION.—Owing to the very encouraging developments at the 300-ft level, Superintendent Lennon is engaged in cutting out a tank station to catch the flow of water from the shaft, preparatory to sinking the shaft deeper for a new level.

NORTH CON. VIRGINIA.—The putting in of the pumps at the 1150-ft level has been completed and sinking the shaft resumed. Bottom of shaft in very favorable ground and the flow of water light.

SIERRA NEVADA.—The flow of water at the bottom of the main shaft on the 1700-ft level is gradually subsiding. The face of the north drift on the 1700-ft level is still showing a very encouraging character of quartz and low grade ore.

SAVAGE.—Pumps are steadily at work and water is being again gradually lowered. It is now reduced several feet below the 1000-ft station, and is steadily on the increase.

CHOLLAR POROSI.—The main incline is now down 1,790 feet. Sinking the combination shaft is also making the best of headway. Daily yield, 100 tons of ore, the assay value of which is \$29.50.

PROSPECT.—Face of main west drift at the 400-ft level in hard ledge porphyry, with streaks of quartz and clay.

BEST & BELCHER.—The north cross-cut on the 1700-ft level has been started up and is steadily advancing eastward, the face in porphyry mixed with ledge matter.

UNION CON.—The ore prospects in the bottom of the winze below the 1800-ft level are improving daily. The ore and quartz in the face of the north drift on the same level is also showing well.

NORTH CARSON.—At the 500-ft level drifting is pushing ahead lively, with good ore indications.

OVERMAN.—A cross-cut has been started in the ore vein on the 1900-ft level south of the shaft. The upraise on the streaks of ore found in that portion of the mine prove that they give out in ascending, and that they grow wider and richer in descending, so that the appearances are that only the top of the ore has yet been reached by any of the drifts on that level. This is, without doubt, an entire body. The winze being sunk on the ore vein north of the main shaft, the steady improvement as it descends toward the 1800-ft level. The east drift on the 1300-ft level is being advanced cautiously toward the ore vein, as it is not the intention to tap the water at that point if it can be avoided. The east drift on the 1400-ft level is being forwarded with all possible speed in order to drain the water from the vein and thus permit a steady prospecting of the 1300-ft level while the water is draining.

LADY WASHINGTON.—The bottom of the winze being sunk on the ore vein below the north drift on the 850-ft level is still in vein matter of a fine character. The face of the main north drift on the same level is almost solid

quartz of an excellent character, showing a steady increase in assay value as the drift progresses to the north-west toward the Overman. The prospects for finding a paying body of ore in that portion of the mine are daily growing better.

BALTIMORE AND AMERICAN FLAT.—A considerable flow of water was encountered at the bottom of the north winze below the 1650-ft level during the first part of the week. This water is being drained by a small pump run by compressed air. The ore and quartz at the bottom of this winze is showing much more favorable than for some time past.

JUSTICE.—Daily yield, 350 tons of ore, keeping the mills all running up their full crushing capacities. The ore breasts on the 400, 600, 700 and 800-ft levels are looking well and continue the usual yield of milling ore. The water is drained from the face of the southwest drift on the 1000-ft level, and preparations are being made to resume work in the face.

OPINION.—Daily yield, 15 tons of ore, the assay value of which is \$36 per ton. The main incline is now down 35 feet below the 1800-ft station.

BECHER.—Sinking the drain shaft is making good headway. Sinking the main incline is also making fair progress.

HALE & NORCROSS.—The pumps are kept steadily running and are gradually drawing the water from the shaft below the 1900-ft level. It is now reduced 25 feet below that point. The connecting drift with the Savage on the 1000-ft level is very badly caved, the drift being closed and the work of opening it very difficult.

DOWN.—The main incline has reached the 2000-ft level, and as soon as sufficient pump room is obtained the opening of a working station at that point will be commenced.

HOMERTRAD.—The new machinery will soon be on the ground, and a largely increased force of laborers employed in the prosecution of the work.

ASOK & GLASGOW.—The face of the north drift on the 400-ft level is still showing favorable ore and ledge matter.

KOSUTH.—The west cross-cut on the 600-ft level is steadily advancing, with more and more favorable prospects of soon reaching the main ledge.

DAYTON.—The ore prospects in the face of the north drift on the 700-ft level are steadily on the increase.

FLORIDA.—A new pump lift is to be put in at the 780-ft level in a day or two more.

SECOR.—The flow of water is considerable, but is easily handled by the pumps.

TROJAN.—Sinking the winze on the ore vein below the 300-ft level is making good progress, showing a steady continuance downward of the ore body.

NEW YORK.—The completion of the third compartment of the shaft for the pump is being pushed forward as fast as possible.

BUCKLE.—The extraction of ore from the stopes on the 350-ft level north is going steadily forward. It is being crushed at the Hope mill as fast as it is taken out.

GALENA DISTRICT.

PROSPECTS.—*Silver Star*, Feb. 3: McBeth and Melander are working the Buena Vista, and have struck very good galena ore in the shaft, which is now 225 feet deep. They are also working on the Little Giant, located on what is known as the Trinity ledge, and are taking out galena ore rich in silver. The prospects of this being a paying mine are very flattering, and it looks as if McBeth was about to make another raise in mines. The White & Shiloh Co. have resumed work and men and machinery are being sent to connect the shafts of both mines by a drift for ventilating purposes, so as to further develop both locations. The company is now making preparations to build furnaces for the purpose of reducing the ore into bullion on the ground. This will give others who have ore in the vicinity an opportunity to dispose of it or have it reduced at home. The company have a Krom concentrator on their mines, but as it is not of sufficient capacity, Times have been dull in the camp, but they are brightening up a little and Galena will soon be on a sound basis.

Arizona.

THE MINES.—*Arizona Enterprise*, Jan. 21: There is not much that is new in mining matters in Yavapai county since our last. The miners in the several districts are busily at work, and evince an energetic disposition to develop their mines. There seems to be a good prospect that Mr. C. A. Luke will take a mill into Bradshaw district. The Crook mill has closed down for the present, on account of the snow in the mountains in that vicinity. At the Salvador mine, on Lynx creek, which is a gold-bearing ledge, there are 175 tons of first-class ore on the dump. The last ore worked on this mine yielded an average of \$60 per ton. In the Peck district, Joseph Minges has located a silver ledge called the Monitor, and Angus McKinnon and three others have located the Little May ledge. Fred Williams has located a good ledge in the Exchequer lode, in Peck district. Fred McIntire who is in from the Santa Maria placers, where he has been dry washing on a claim abandoned by some Mexicans, brought in some very fine coarse gold. Some of the pieces were worth as much as \$20, and he had some smaller pieces ranging from \$2 to \$10, amounting to \$120 in value. Harry Ashton and John H. Berry have bought places at the mouth of the Crook mine, upon which they intend to go to work immediately. A rich strike has been made in the Silver Flake, in Agua Fria district. The shaft is now down some \$3 feet and the ore at the bottom of the shaft and in the drift is richer than any before found in this rich mine.

Colorado.

THE RISE.—*Colorado Miner*, Jan. 27: The rise in the price of ore and silver has caused all sorts of speculation, and has been the cause of much excitement. It is gratifying to the deserving boys who handle pick and drill.

GREEN MOUNTAIN.—Work is actively progressing on this lode on Leavenworth mountain, and it is already turning out rich ore. The last run had by the lessees, Messrs. Smith and Scott, gave a return of 1,168 ounces silver per ton for first-class, and 537 ounces for second-class. The last report Messrs. Green & Tarbell have been timbering shaft and doing other development work. The drift has been run and shaft sunk a short distance, the latest working revealing the best mineral yet struck in the mine, ore carrying 15,000 ounces silver, and some showing masses and wires of native silver.

The total number of mining claims recorded in Hinsdale county up to the first of the new year was 1,550, of which number 900 was recorded during the year 1876.

Idaho.

MINER OF OWTZIE.—*Idaho Avalanche*, Feb. 3: At the Golden Chariot work is progressing under the most promising auspices. Large quantities of high grade ore have recently been taken out and there are several hundred tons ready for crushing. The existence of a very rich ledge is now placed beyond the shadow of a doubt, and an unbroken continuity of the same to the surface is vouched for by practical men, though it is not accompanied with the mine. That there is a combination of the most valuable mining property in the country embodied in the several claims of the Golden Chariot company, we have now the best evidence. Since the present Superintendent assumed the management he has, at a small outlay, placed the company in possession of the Crane & Driggs and Ewsdale ledge, the first of which was at one time the richest mine in the camp. This fine property turns out to be a most opportune purchase for the Golden Chariot, as the ledge unites with one of the principal veins going east from the Chariot and both are known to be very rich as far as developed. Work has been progressing on a small scale at the Illinois Central for the past few weeks. Mr. Thomas Kilde has had a limited number of workmen employed there and several tons of rich rock have been taken out. A few days ago Mr. K. exhibited to us a quantity of the ore taken out which, he believes, will yield over \$275 to the ton. From the Wagontown mines favorable reports continue to be received. Some of the ore sent here from this camp during the past

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are now but just beginning to see the realization of their hopes.

The Territory seems to be traversed from north to south by a continuation of great mineral belts, connected with the mineral deposits of Nevada and Mexico. The most western of these runs through Mohave and Yuma counties, parallel with the Colorado river, and varies from 30 to 50 miles in width; on it are found several notable mines, as the McCrackin, Keystone, Cupel, Fairfield, Hackberry and Planet, in Mohave county, and the Peacock, Isabella, Constantia and Castle Dome, in Yuma county. Eastward from the Peacock range of mountains, in which the Hackberry mine is situated, is a strip of country 75 miles wide, in which there is no mining carried on, nor have any mines of value been discovered, and much of the surface is covered with volcanic rock, which gives out in the neighborhood of Prescott, where the Sierra Prieta range looms up, formed of granite, porphyry and slate, and the mines of Yavapai county are found in a mineral belt, 50 miles wide, extending eastward to the Verde river, one of the main branches of Salt river, and southward into Sonora. On this belt are the settlements of Prescott, Lynx Creek, Walnut Grove, Weaver, Antelope, Aqua Fria, Black Canyon, Wickenburg, Alexandra and Bradshaw, near many productive mines, from several of which ore has been shipped to San Francisco, yielding good returns, and which are supplying the various reduction works of the county at the present time. The best known are named the Peck, Prince, Senator, Union Pacific, Kit Carson, Silver Belt, Silver Flake, Accidental, Davis, Crook, War Eagle, Grey Eagle, Tiger, Cougar, Vulture and Montezuma.

In a succeeding paper I will continue the subject, and so far as possible, give items concerning the production of bullion from the principal mines in the Territory, with the inducements Arizona offers to the mining public and for the investment of capital. H. A. B.

Prescott, Arizona, Jan. 15th, 1877.

The United States Arsenal at Frankford.

The following description of the United States arsenal at Frankford was written by R. L. M. Camden, Jr., in a private letter to his father, R. L. M. Camden, of this city. The writer is a California boy of the best type, and his course in life thus far has been a credit to his native State. For the four years he has been in college his record in behavior, scholarship and high averages has never been excelled. With hardly a single exception he has always stood at the head of his class and he now has his hard earned degree of A. M.:

MY DEAR FATHER:—At the kind invitation of one of the officers of the United States arsenal at Frankford, I recently visited that institution, and thinking a brief description of it (as you had never been there) would interest you, I will endeavor to give it to you—preliminary, of course, that this description must, from necessity, be in that peculiar style known as the "pedantic school boy style." But so far as I can, I will try and avoid this troublesome Charybdis, and possibly, aye, probably, my efforts to do so will wreck me on the Scylla of no style at all. "There, there," methinks I hear you say, "that will do—another word and you will be wrecked before you fairly set sail."

You are aware that Frankford is not esteemed an aristocratic portion of Philadelphia, and yet there is much in its shaded streets and pleasant homes to make it attractive, and I am sure one ought not to complain, even though his lines are cast in such a suburb.

On entering the large and well kept grounds of the arsenal, I found myself in the presence of what I will call the negative form of "grim-visaged war." At all points the nature of the place is voiced in shot and shell and cannon. And though no ponderous columbiad frowns upon you from his well poised and imperial throne, yet enough of his children are scattered about the place to assure you that, if necessary, the air could be made to quiver with "explosions dire," and be filled with an iron storm that would make Destruction happy and cause Death to sing paeons of joy and triumph! In general terms I would say that the arrangement of the buildings is such as is dictated by convenience, prudence and safety. Nor has architectural effect been wholly neglected. For example, the officers' quarters are handsome buildings, with enough ornamentation to place them, if not in the category of the grand, yet in that above the common. They are nicely fitted up in the interior, and, though having a somewhat belligerent aspect, are nevertheless pleasant and agreeable. There are two houses on the grounds for the men (who at present number 30), one of which is occupied by the married, and the other by the single men. I am not advised why these laborers and artisans, married and single, cannot, or do not, live together, unless it be from the nature of their occupations and surroundings; these, being ever suggestive of disputes, wrangles and war, may impart such a contentious spirit to the men as to render the single and plural impossible to agree. Among other buildings there is quite a large one which was erected for a rolling mill (for copper), but there being at present not a sufficient demand for cartridges—for which the copper is used—no machinery has been put in the building. And I cannot help the prayer,

"May Heaven so order events that the machinery will never be wanted."

The first building I went into was what might be called the business building, that is, the bookkeepers, inspectors, secretary and others have their offices in it. In one office I was shown many specimens of

Experimental and Service Cartridges.

The United States service cartridge is what is known as the Springfield. There is shown a wrapped cartridge, that is, one formed of exceedingly thin brass wrapped by hand around the "former," and having a solid head soldered in. The objections to this are want of accuracy and the expense of manufacture. I say want of accuracy, although I do not doubt that a possible variation of 2-1000ths of an inch, above or below a standard, seems very little to most persons, and not worth making a fuss about, yet these critical and exact arsenal officers will not tolerate a variation of 5-10,000ths of an inch, above or below the standard! This looks like splitting hairs with a vengeance—but it marks the great superiority of stamped-up copper cases. A Gatling gun cartridge, made at the arsenal, is of the same general form as the Springfield rifle cartridge, but the ball is sometimes replaced by a sort of grape shot arrangement which makes it fearfully destructive. In fact, it can be made to rain shot thick as hail from a thunder cloud, and hurl death in horrid forms through ranks of men. Cartridges were shown me which were so arranged as to fire the powder near the ball first, and many kinds of fuses are made to be used by friction, percussion and electricity.

The Process of Making

The service cartridge is as follows: The copper is brought in sheets of the required gauge and subjected to the action of several stamping presses in succession. The first of these cuts out a circle of the required diameter and forms it into a shallow cup. The second, third and fourth presses gradually change this cup to a long cylinder, closed at one end. These are called cases, and are now fed to a machine which cuts them to the exact length desired; and lastly, the shell, or case, is slightly tapered towards the open end. There is now placed in the closed end of the cartridge case a "cup anvil." And this is a little shallow cup of copper having a depression in the center of the outside, with two small vent holes at the extremities of the diameter of the depression. Thus far the cup anvil has gone through four processes.

The depression is now filled with fulminate of mercury by a very ingenious machine, and is then ready to be placed in the shell. And this is accomplished by another machine, which at the same time crimps the copper around the edge of the anvil, thus holding it firmly in its place. The cases thus far finished, are now taken to another building, where they each receive a charge of powder and ball. The machine which charges the shells is very complicated, and seems almost endowed with human intelligence. Watching its motions, one will notice, among other things, that if a shell passes the feeder uncharged, it starts up and rings a bell, thus notifying an error in the work. The finished cartridges are packed in pasteboard boxes, 20 in each, which boxes are made by machinery at the arsenal, and are so shaped as to allow the cartridges to be taken out of any part of the box with perfect ease. These boxes are also furnished with a string by which they may be ripped open in an instant. They are finally packed in wooden cases, each case containing 50 boxes, or 1,000 charges, and are then stamped with the date of manufacture and packed away ready for use. The bullets used in charging the cartridges are of the Minie pattern, and the grooves in them are filled with a kind of lubricant. The lead for the balls is bought in the rough, and is rolled down to the proper diameter, and then pressed into shape. Cast bullets are not used because of their want of homogeneity. Attached to the arsenal is a carpenter's shop, where all the wood-work required is done. The powder magazine at present contains only 1,500 barrels, which, though comparatively a small quantity, is nevertheless enough, if fired, to produce a good edition of a California earthquake in and near Frankford.

In the Arsenal Ground,

Near the river, are placed two targets, one of which is 300 and the other 500 yards distant from a firing house. Near each target is a house protected by banks of earth, and supplied with a camera obscura, which throws an image of the target, reduced to one-twelfth of its real size, on a table at which an observer sits and notes the shots made. The observation and firing houses are connected by telegraph, and there are several instruments for finding the velocity of the bullets. One of the instruments measures the velocity by the vibration of a pendulum of a given length, and another by the vibrations of a tuning fork. A switch board enables the observer to register the velocity by all or any one of the apparatus in use.

I was shown specimens of all the finest breech-loaders in use, and also specimens of the Springfield rifle, both muzzle and breech-loaders. The change from the former to the latter was made in 1866. Mr. O'Reilly has invented a shell fuse which is so constructed that it will cause the shell to explode in a certain time, unless it strikes some object, in which case it instantly explodes. This fuse is very ingenious, and no doubt will accomplish the results claimed for it.

But I will not weary you with any further

description of this piece of property belonging to our venerable Uncle Samuel. Still, in bidding it adieu, I cannot help wishing that human nature may, sometime, be so inwoven with the bright elements of self-abnegation, love and peace, as to render arsenals useless, and shot and shell and cannon but so many mementoes of a past "dark age."

R. L. M. CAMDEN, JR.

Philadelphia, Jan. 15th, 1877.

Agriculture and Mining.

We take the following communication on the above subject from the columns of the *Pacific Rural Press*. It will be seen by the first paragraph that that journal reproduced from this an extended article on the subject, which has attracted considerable attention among the farmers. In order to show our mining friends the feelings of the farmers on the question, we give the annexed letter:

EDITOR PRESS:—In your issue of January 13th, 1877, is copied an article from the *MINING AND SCIENTIFIC PRESS* on the above question, and which has been extensively read and discussed in this vicinity. It is generally conceded that while it gives the views and position of the hydraulic miners with fidelity to their interests; it passes over lightly or ignores entirely the agricultural interests of our State while purporting to be a discussion of both interests. By your permission I would offer a few remarks on this (to us all) important subject, and would ask, if found worthy, for a space in your valuable publication.

There is a principle involved in this question that is as old as law itself. It is not a question of local importance or application. If this well established law and precedent can be ruthlessly violated in two or three counties in the State, it carries with it the right for any enterprise to crush out all antagonistic interests if necessary for its own successful prosecution. If we concede the necessity of sacrificing the agricultural portions of Butte, Yuba, Sutter and Sacramento counties to the claims of hydraulic miners, we virtually give up agriculture in California, and every interest connected therewith, at the call of this one interest, however remote it may be. In the name of our beloved State and her past, present and future history, her renowned accomplishments in agriculture and commerce, I protest against such a surrender as against all law and precedent; against our true State policy; as against robbing our children of their inheritance, finally, as against selling the glorious future of our State for present gold. Let us examine a few of the leading arguments of our mining friends and endeavor to see if they are treating us with deserved candor.

We are told we went upon these lands knowing the danger we subjected ourselves to. I deny this assertion. All our rich alluvial bottom lands were owned long before the discovery of gold. The land upon which the city of Marysville now stands was so owned and occupied, and the city itself named after the wife of one of our earliest pioneers, Mr. Coriand, whose splendidly improved farm in the suburbs of the city, consisting of orchards and vineyards, houses, barns, etc., have all been covered up and destroyed by this "lava" of sand and mud, and the proprietor and his wife, "Mary," are inhabitants of the city of the dead and their children bereft of their true inheritance.

The whole Yuba river valley was occupied before there was a hydraulic mine in existence; the same is true of the American, Bear and Feather rivers. Mining as prosecuted in this State the first ten years did not materially injure these lands. It is not denied that these lands were periodically overflowed, but these deposits rather enriched them otherwise, and no injury resulted until the year 1862. To guard against this debris at the time of settlement would have been to waste means on an imaginable evil that might never have come.

We are also told that because the mines furnished us a market for our products we have no right to complain; that our profits were equal to theirs and dependent on them. I concede the truth of this only for the first few years of agricultural experience, after which our market over-leaped the bounds of California and the United States, and our products were sought by the people of Europe, Asia and Australia. To this epoch dates our great prosperity as a State, and our commercial importance. Our mines furnish the agriculturists not a tithe of a market for this surplus.

But we are told that it would not do to interfere with hydraulic mining, as the precious metals are required by our government to enable it to preserve its credit and to assist it to resume specie payment. I would ask in all candor—Shall we be sacrificed that the government may flourish? The position is utterly untenable. I will not occupy space to refute such a monstrous proposition. Our friends in their distress are seeking to unite the entire mining interest on the Pacific coast in an offensive and defensive alliance against the farmers. Now, it is well known that we have no complaint to en-

ter against any but the hydraulic process; all others as yet are not encroaching upon our rights or interests. We are only asking for that consideration and protection that is vouchsafed to the humblest miner as against his neighbor. There is an old and trite saying, "whom the gods would destroy they first make mad." The alliance spoken of will necessitate a counter alliance by the farmer and his sympathizer, and then it will go into politics. In my opinion it will not require a very far reach of imagination to foretell the end.

We are told that some of the leading mine owners attempted to procure seasonable legislation on the subject at the last session of our legislature. Now, we happen to know that the very reverse is true. The agriculturists made such an attempt to have the subject examined in all its bearings by a committee, together with competent engineers and report their observations to the next legislature. But this reasonable request was denied us by the miner, and the best we could get was a resolution calling the attention of congress to the subject. When they get through making presidents we may hear of the resolution and we may not. If the object was to gain time, the miner could not have chosen a better course. However, the miners did offer a resolution looking to State investigation; but the Commission was instructed to report the great benefits to the farmers of this detritus to their lands, past, present and prospective. Now, if that was not jesting it was an insult, at least could not be accepted by the farmers.

Finally, it is suggested that miner and farmer unite and conduct this sediment to the great tule marshes, and thus reclaim them. At first thought it seems feasible if the means were provided. But on fuller investigation, I apprehend it will be found to have insurmountable objections. The greatest that presents itself to my mind is that these great tule lakes serve as a receptacle or reservoir for the great surplus waters that periodically precipitate themselves into the inland valleys in a few hours. The natural fall of these valleys and their rivers being insufficient to carry the waters to the bay as fast as received from the mountains, it would follow that the entire valley would be inundated if these tules were reclaimed as proposed. I am confident that a scientific examination would find this the greatest obstacle to be overcome.

I have made no allusion to the great destruction already accomplished, that was largely done a year ago; although made light of recently, it yet remains a stubborn fact. But I prefer to address myself at present to the saving of what yet remains to us. Much money has already been spent in constructing works to keep off this detritus, and much more will have to go the same way. But that we shall ultimately triumph, I have no doubt, for this valley is too valuable to be given up for a dump to the hydraulic miner.

Let me foreshadow the final decision of this question, for I have no hope that the miners will accept anything until driven to it.

"The waters of the State belong to the people of the State for purposes of navigation and the use of man and beast. No one will be permitted to use it to the injury of all others." Every industry must be so conducted as not to injure any other industry of equal paramount importance." When this is done the cloud that now overhangs us will clear away, and agriculture asks no more. GEORGE OHLEYER.

Yuba City, Jan. 29th, 1877.

Lincoln and Ione Coal.

The Ione coal, from which so much has been expected, has been tested and found wanting. It has been used at the water works and in various mills in Sacramento, and, compared with the coal at Lincoln in this county, is only worth about two-thirds as much. The Ione coal is delivered in Sacramento at \$4 per ton, while the Lincoln coal was sold at \$5, yet the former, compared with it for steam-making, is worth only \$3.43. The building of the branch road to Ione was undertaken mainly to secure a supply of this coal, and it may occur to our readers to ask why a road was built to a coal mine when one was already open on a line now in operation. The solution of this problem is easy. The railroad company wish to use large quantities themselves, and they also desire to monopolize the trade in this article along their lines. The mines at Lincoln are in the hands of private parties who ask a high price for them. Those at Ione are owned by the company, and they considered it cheaper to build a road to them than to buy the Lincoln mines. Partly in consequence of the high price at which their inferior coal has been held, the Lincoln mines have suspended, though capable of producing large quantities of cheap fuel with profit to their owners. We do not think the proprietors are acting wisely. We have been assured that their coal can be mined at a cost of 60 cents a ton. It surely can be delivered in Sacramento at a profit for less than \$5 a ton, and now that it has been shown by actual test that two tons of Lincoln coal are worth three tons of the Ione article, we think the proprietors ought to take steps to work their mines, the first and most important one being to place it on the market at a price that will make it a cheaper fuel than wood. This county is deeply interested in the development of all its resources, and the coal-beds at Lincoln have been regarded as one of its most considerable elements of wealth.—*Placer Herald*.

How Bullion is Produced.

We have mentioned our furnaces in a desultory way, but do not remember having seen any detailed description of their workings, although it is generally conceded that the furnaces in use here are as perfect in construction and capacity and do closer work on argentiferous ores than any in other localities. In fact, a smelter who has acquired his knowledge at the Eureka furnaces, has a reputation that no other place gives, sort of guarantee of competency. All the furnaces in Eureka, with the exception of two water-jackets at the Richmond, are modifications of the Raschette and Piltz furnaces, altered and improved to suit the combinations and qualities of the ore smelted. They are built of stone from the quarries in the vicinity, and lined with a porous fire-proof sandstone, of excellent quality, from Pancake mountain, about 20 miles distant. The inside diameter will average 4½ feet at the hearth, and the height to the charging windows is about 16 feet. The hearth rises about 2½ feet from the ground and projects 18 inches from the mouth in the front of the furnace. On three sides and one foot above the hearth, eight tuyeres pierce the shaft, three on each side and two at the back. The shaft is carried through the floor and the charging windows open on the second story, or ore floor of the works, but the masonry extends to and through the roof, connecting with the flue or fume arrester. The tuyeres are double wrought iron pipes, a space intervening between the outer and inner pipe, through which a constant current of air flows, preventing the melting of the tuyeres where they are exposed to the fierce heat. The blast is furnished by a Root blower, with a capacity of 600 revolutions per minute, and is conveyed to the tuyeres by a system of tin pipes and canvas hose. The front of the furnace is open to a height of 10 inches, the space between the melted slag and masonry being temporarily filled with a mixture of fire-proof clay, and removed at the pleasure of the smelter, when it becomes necessary to "bar out" or remove the slag. At the side is the lead well, connected by a pipe with the bottom of the furnace, the lead rising to the same height in the well that it attains in the furnaces. The projecting hearth is supplied with two spouts, through which the iron and slag are drawn off into the cast-iron slag-pots. In the working process the furnace is filled with the ore mixed with a certain proportion of charcoal. Fire is applied, the blast turned on, and the furnace is in operation. The ore smelted is argentiferous galena, and contains from 40 to 60 per cent. lead, some iron, sulphur and arsenic. The heat concentrated on the ore at the mouth of the tuyeres, will reach 2,000° Fahrenheit, and under its influence the metals contained in the ore and the silica or quartz melt and flow to the bottom of the furnace. The lead, from its greater gravity, goes to the bottom, carrying with it the precious gold and silver. On the top of the lead the melted iron floats, and on this again swim the lighter materials termed slag. As the lead accumulates it is ladled out from the well into molds, forming base bullion bars, averaging 120 pounds in weight. These bars will assay from \$200 to \$400 per ton, varying with the quality of the ore smelted. Each charge is composed of 46 shovelfuls of ore, intermixed with 12 bushels of charcoal. No flux is necessary, with the exception of a shovelful of silica or slag, as the ore smelt freely. One of the furnaces at the Eureka Consolidated, now running, was built for a reduction capacity of 50 tons per day, but it goes considerably above this, averaging 65 tons every 24 hours, and has reduced as high as 90 tons, producing 10 tons of bullion.

The working force consists of one smelter, two slag-wheelers, two feeders and three ore and charcoal tenders. The smelters receive \$5 per day of eight hours, and wheelers \$4. The work is rather unhealthy—those most exposed to the fumes being subject to lead paralysis; but of late the attention paid to ventilation has remedied this in a great degree.

As we stated in the commencement of this article, there is no place in the world where smelting has attained a higher degree of perfection, and we are constantly improving our methods and processes. —Eureka Sentinel.

Electric Signals for San Fernando Tunnel.

Mr. J. R. Scupham, engineer of the Southern Pacific Railroad Company, is at the San Fernando tunnel, for the purpose of superintending the work of placing electric railroad signals therein. The signals to be employed are known as Robinson's patent wireless electric railroad signals, and they are simple in construction and reliable in operation. They are to be placed, one at each entrance to the tunnel, the connection between the signals being made by means of the rails. A train entering the tunnel connects the two rails together by means of the axles of the engine and cars, cutting off the galvanic battery current, causing the signals to show a red flag at each end of the tunnel, thus warning other trains from entering while the track is occupied. When the train passes out of the tunnel, the electricity again passes along the rails, charging the signals and removing the red flags from view. A break of the rails or a failure of the battery or any derangement of the apparatus, causes red signals to be shown. These signals are being put in place by the Electrical Construction and Maintenance Company, of San Francisco. —Los Angeles Express.

USEFUL INFORMATION.

Instructions for Handling and Using Tri-Nitro-Glycerine.

The following rules are laid down by Mr. Mowbray, in his excellent treatise on "Tri-Nitro-Glycerine," viz.:

1. Handle carefully, avoiding a sudden jar or concussion, and be very careful, if any is spilled outside the can, to avoid striking it against any hard substance.
2. When solid, thaw out by placing the cans in a tub of warm water, not hotter than the wrist can bear, first pouring warm water into the can, and always remove the can before adding more hot water to the tub.
3. To fill cartridges, etc.: Hold the cartridges to be filled over a tray, say two feet by three feet, the bottom of which should be covered with plaster of paris (which will not readily explode when saturated with nitro-glycerine.) The soiled plaster of paris should be frequently renewed.
4. If nitro-glycerine in a liquid state is kept in a store or magazine for some time, the cork should be loosely inserted, and a pint of cold water poured into each can, to be frequently poured off and replaced with fresh cold water in warm weather, taking care to retain the bladder under the cork. It is preferable, when ice can be procured, to congeal the nitro-glycerine.
5. Use funnels (gutta-percha, if they can be had) for filling water holes. Under no circumstances whatever attempt to tamp the drill holes; it is unnecessary, and may kill the man who attempts it.
6. Hot irons to warm the water, or for soldering the cans, will be sure to cause explosions.
7. Never sledge or attempt drilling in a hole or seam where nitro-glycerine has been spilled; fire an exploder, which will effectually clear it up.
8. Never pour nitro-glycerine into a hole unless perfectly sure that it is a sound hole, or will hold water; if seamy always use cartridges.
9. To obtain the best results with nitro-glycerine, drill deep holes, six feet or more. Use powerful exploders and well insulated wires. It is cheaper to fire by electric battery with simultaneous explosion, than to fire several holes with tape fuse.
10. Look out after a blast for any unexploded cartridges lying around.
11. Never allow any but the most careful persons to handle or have charge of the nitro-glycerine, and insist upon the use of every precaution to prevent an accident or explosion.
12. Never allow empty glycerine cans to be used for any other purpose, but destroy them by a fuse and exploder, or by building a fire under them; first, however, removing them to a safe distance.
13. Examine your cans from time to time and notice if, at the level of the nitro-glycerine, any pin holes have eaten through; in such case procure a new can, or stone jar, and empty the contents out, not trusting your hold to the upper part of the can, lest it may give away.
14. When solid or congealed it is absolutely safe; if possible, therefore, any surplus should be stored surrounded with ice, since no explosion can take place when it is solid.

AN INVENTOR WANTED.—The *American Manufacturer* says: It isn't a new notion, but a leading Georgia cotton planter is renewing and emphasizing the demand for a cotton-picker that shall do for cotton what the reaping machines do for the grain crop of the world. Since the invention of the cotton-gin nothing is so much needed in the South, and there can be but little doubt that the man who solves this mechanical problem will win not only fame but fortune. It is not necessary, says the planter, that the cotton-picker should do its work cleanly; if it can but garner two-thirds or three-fourths of the crop, manual labor will take care of the remainder. The customary price of picking cotton by hand is 75 cents per 100 pounds of seed cotton, the average yield of which, in marketable lint, is 33 pounds. The cost of hand-picking, therefore, is 2½ cents per pound, a very large item, which ought to be reduced, by appropriate machinery, by more than one-half. A successful inventor, who should exact as his royalty only one-eighth of one per cent. per pound upon the cotton crop of the United States, might fairly figure his annual income at more than \$3,000,000, a sum worth striving for by any mechanic who has the gift of invention.

LEECHES AS WEATHER PROPHETS.—The *Journal de Medecine de Bruxelles* states that a leech will prove an accurate barometer: Into a flask of the capacity of 1½ liters (about 45½ fluid ounces) pour one liter (about 34 fluid ounces) of water, introduce a leech, cover the bottle with coarse linen and place it in the window. If the leech remains motionless and coiled up at the bottom, this indicates lasting fair and clear weather, in summer or winter. If the leech ascends into the neck, rain or snow will follow, during which time it remains above. If windy weather is approaching, it swims about restlessly, and ceases only to do so when the wind abates. A few days before a severe thunder-storm with rain, it remains entirely outside of the water, and throws itself about, apparently in convulsions, from one side to the other.

GLASS VENEERS.—A company was recently formed in New York for the purpose of manufacturing, as they term it, "glass veneers and decorations on glass." Specimens of their work are said to be excellent imitations of the various woods represented—such as birch, ash, French walnut, grey maple, rosewood, mahogany, bird's-eye maple, satin wood, etc. For panelings, wall and ceiling decorations, marquetry, imitations of the different marbles, tiles, etc., we know of nothing to equal this new manufacture, and predict for it a great success, combining, as it does, cheapness and beauty. Mr. Budd, the inventor, has had a single pianoforte in use for the past two years, covered with glass veneer, during which period it has been removed three times without breakage, or even a scratch.

SKIN CURING.—An Australian correspondent recommends the following method of preserving opossum, otter, and other small skins, as the result of 15 years' experience. A very strong decoction of fresh bark of wattle saplings should be prepared beforehand. Into this the skin is thrown as soon as it is stripped from the animal, and left for eight days; it is then taken out, fleshed, and returned to the liquor for a couple of days more; lastly, it is pegged out to dry. The skin will then be perfectly cured, impervious to rain; the fur well set, and with a nice lustrous appearance.

COFFEE LEAF TEA.—A correspondent, in a measure apparently prompted by the gradual deterioration in quality of Chinese tea, advocates the use of a decoction of coffee leaves, and the introduction of Mate or Paraguay tea. Mr. Alexander, of Redbank, as stated in the *Queenlander*, it appears, showed at the exhibition then recently opened at Brisbane some coffee tea, prepared from the leaves of trees growing on his estate, stating that the beverage prepared from these leaves was delicious, and far preferable to that obtained from the berry.

WEIGHT OF BELTS.—Rankine says: Leather belts, when new, are not quite of the heaviness of water—say about 60 pounds per cubic foot; but, after having been for some time in use, they become thinner and denser by compression, and are then about as heavy as water. The weight of a single belting may be approximately estimated at 0.068 pounds per foot, length and inch breadth.

GOOD HEALTH.

Sunlight Necessary to Health.

In his last quarterly report, Dr. John Liddle, the medical officer of health for the White-chapel district, says: I firmly believe that many persons who are compelled to occupy rooms in which the rays of the sun never enter, soon lose their health, and find it necessary to change their residence; and this remark applies, although perhaps with less force, to those who are confined to counting-houses during the day in which no sunlight is admitted. Sunlight is especially necessary for the healthy existence of children; and this is strongly pointed out in the evidence of the late Mr. N. B. Ward (the inventor of the "Wardian cases," for rearing plants in towns, and conveying them to and from distant places, a gentleman of great eminence in the medical profession, and who has given much attention to the influence of the temperature, of air and light upon the health and growth of animals and plants) who says, in his evidence before the commissioners appointed for inquiry into the state of large towns and populous districts, that, as the result of his experience, the influence of light is a matter of the highest importance to the proper physical development of the human species; and whatever stunts the growth of a child certainly operates upon his physical capacity for labor; that the amount of disease among persons occupying light rooms is infinitely less as compared with that in dark ones; and that the influence of light, especially solar light, in preventing the fatal termination of disease, is a fact well known to him. In further illustration of this subject, Mr. Ward quotes a fact stated on the authority of Sir James Wyllie, "that the cases of diseases on the dark side of an extensive barrack at St. Petersburg have been uniformly, for many years, in the proportion of three to one to those on the side exposed to strong light." —Public Health.

HIGH HEELS.—Prof. Sayre speaks of a form of what we may call fashionable disease: Accident may occur in descending stairs or steep declivities while wearing high-heeled shoes, which throw the weight of the body upon the front part of the foot, and the extra effort made for the purpose of retaining the body within the center of gravity produces a direct strain upon these tendons, causing rupture or stretching of the annular ligament sufficient to allow them to be displaced. It is no wonder then that fashionable women waddle in a most ungraceful manner when they attempt to walk. They destroy their comfort to follow a ridiculous fashion, and acquire an ambling and undignified movement. People do things to follow fashion that their good sense would cause them to be ashamed of under any other circumstances. Ladies wearing such shoes are often obliged, for safety, to go down stairs backwards; and our author says that they can be seen "every day descending the stoops of our fashionable residences in this manner, making pretense of talking to some imaginary person in the front door as an excuse to hide their awkward movements."

Lead Poison in Sewing Silk.

The *Moniteur d'Hygiene* startles its readers with the revelation of an ingenious fraud, not generally known, but likely to be in the long run very dangerous to the health of tailors, seamstresses and others who use silk thread in sewing. Nothing is more pernicious to the system than lead, and yet it may be constantly introduced into the stomach by those who use sewing silk. The fact is important if lead be the metal used for giving weight to silk. Lead acts very surreptitiously on the system; it is essentially "a slow poison," and it is very difficult to combat its effects. It acts on the teeth and on the intestines, in which it produces paralysis, frequently followed by death. "We have seen," says the writer in the *Moniteur d'Hygiene*, "among other cases, that of a lady who keeps a large sewing establishment, who, by the use of such silk thread, was, together with her workwomen, attacked by lead colic, some of them losing their teeth—the result of the habit of putting the ends of the silk into the mouth before passing it through the eye of the needle. Such is the way in which the lead poison is directly absorbed, whilst, by continually handling the silk, the fingers may retain a portion of the lead, to be indirectly introduced into the system with the food that may be touched by the hand. The poison may be avoided by refraining from putting the silk into the mouth—dipping it in gummed water instead—but perhaps the best remedy will be found by the large dealers refusing to buy silk thread by weight unless it is proved to be free from metallic adulteration.

FOOD FOR IMPERTEMPERANCE.—A writer in the *Herald of Health* on the "relations of intemperance to food" makes this point: What is the remedy for intemperance? I answer, nerve food—building material to supply the waste of the nervous tissue in the masses. I answer, further, a reform in the present popular system of dietetics, by reducing the proportion of fat and muscle forming elements, and increasing the nerve and brain building material in a proper ratio. Let the supply in each case meet the demand and no more. A study of this subject, and a practical application of the theory that I am advocating for the past 15 years, gives me a solid basis of fact on which to rest its advocacy. Food beverage—a liquid food composed largely of brain and nerve building elements, a combination, concrete, soluble, and one that is so rapidly taken into the circulation that the patient feels immediately its invigorating, energizing power, has proved in my hands an almost certain remedy. It at once, and at the same time, allays thirst and invigorates without stimulating, imparting to the system a permanent basis of nervous vigor and energy.

PHYSICAL TRAINING.—Mr. MacLaren, on physical education, says: "However weak the boy, gymnastic exercises under proper training must be beneficial; use gives facility of execution, and facility of execution causes frequency of practice, because we all like to do that which we can do well; and thus eventually, being based on the organic law of development, the weaker parts may, by proper cultivation, be strengthened. Systematized exercises can modify the growth and distribute the resources of the body, so that each particular part shall have its legitimate share, and so increase the resources that each part of the growing frame shall have its wants supplied. During growth it is possible to add to proportion, consolidate and sustain every cell of every fiber or tissue as it is added to the frame; after growth this is not probable, but it is still possible; aye, still a certainty, to recover a valuable portion of the material well-being of every man, and add to that strength and vital stamina which will help him at all times, at all seasons and under all trials."

APPETITE AND WORK.—Pavo says that a falling off of the appetite indicates a diminished capacity to labor. A farmer was once asked why he paid his hands so much, replied, it was economy to pay them well, so they could buy sufficient food. One might as reasonably expect much labor from a meager diet as much fire from a little wood. A good appetite is generally synonymous with health and ability to do much labor. Great workers, whether by body or brain, or both, are usually liberal eaters. Lawyers and ministers are apt to be good eaters. They should eat wisely as well as liberally, otherwise, dyspepsia will be the result. The old notion that great thinkers are small eaters is incorrect, except in the case of those who live very quiet and inactive lives. —Dr. Holbrook.

DANGEROUS IVORY.—For some time past the market is supplied with a substitute for ivory, which, owing to its cheapness, bids fair to curtail the use and sale of genuine ivory goods in many respects. But this peculiar compound has two great disadvantages. One is, that, by handling it with warm, moist hands, or attempting to clean it with water, it becomes soft, swells up, and gets sticky. But the other drawback is more serious. Its composition being water, 80.80; lead peroxide, 16.04; barium sulphate, 26.05; glutine, 34.21; and various other less important substances, the employment of this compound in the manufacture of toys for children, mouth-pieces, eating utensils, etc., is highly dangerous. —New Remedies.

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, Feb. 10, 1877.

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NEW ADVERTISEMENTS.

Hotel of the Netherlands, F. Meyer, Manager, Port Said, Egypt; Webster's Dictionary, G. & C. Merriam, Publishers.

METEOROLOGICAL.—The movement for the application of the Signal Service to the practical observation of the Pacific coast weather, and the foretelling of storms, etc., is advancing. At the last meeting of the Academy of Sciences Dr. Gibbons proposed the formation of a section in meteorology, as the Signal Service at Washington desired to open communications with a scientific source on this coast, and steps were taken to carry out the idea. Professor Davidson stated that the Central Pacific railroad had 50 signal stations from the Rocky mountains to the Gulf of California, and that the observations had been full, reliable and of considerable use, and regularly reported to the Smithsonian Institute at Washington. It was now proposed, by a number of private gentlemen in this city, to establish nine meteorological stations on the North Pacific, from Alaska, where the United States Government is about to establish a tidal station, through the Aleutian islands to Kamchatka. Dr. Gibbons said that this subject was of great importance to the agricultural and mining interests of this coast.

By the suspension of Congressional work at the public printing office in Washington about 600 persons were thrown out of employment. The Public Printer has no money, except the unexpended balance of appropriations to departments and the congressional library, and for printing the proceedings and debates of Congress.

The testimony in the case of Henry D. Bacon, and other stockholders in the Morgan mine, against William Irvine and the management, brought before the Nineteenth District Court on motion of defendants to remove the temporary injunction, was concluded Tuesday. The motion will come up for argument on Monday next.

Miners' Wages.

The agitation of the question of reducing miners' wages has commenced, and a few companies have already inaugurated the movement. At Smartsville, Yuba county, a notice was posted, on the 23d ult., stating that after February 1st, all wages heretofore paid mine laborers would be reduced fifty cents, signed by all the companies except the Blue Point and Nevada Reservoir ditch companies. The reduction of wages extends to all the gravel mines in the northwestern portion of Nevada county. On the date mentioned the reduction of wages of fifty cents per day was put in force by all the companies except the Union, which continued to pay \$3 per day. The miners formed a procession, with a brass band, flags, etc., and marched around in an orderly manner to all the claims, requesting the men at work to join the procession.

The North Bloomfield gravel mining company gave notice, through its superintendent, that from the 1st inst., all men in the steady employment of the company should receive daily pay of \$2.75 from the 1st of December to the last of May, and from the 1st of June to 1st of December, \$2.50 per day. The San Juan Times says some of the miners say that they will not stand the reduction; others think it useless to try to resist the mandate of so strong a corporation, therefore they bow to the inevitable; still others argue that the reduction is made use of as a feasible and sure method of eliminating the white laborer, thus affording a plausible excuse for filling the vacancies by the cheaper Mongolian.

In connection with the labor matter, an organization called the "Caucasians" has been formed, and the Caucasian camp at San Juan now numbers 150 members. It numbers among its members people residing at Columbia Hill, Badger Hill, Cherokee, San Juan, Sweetland, Birchville and French Corral. The object of the Order is to get rid of Chinese labor, and to induce capitalists to employ white labor instead. Our Nevada county contemporary, the *Foot Hill Tidings*, says that V. G. Bell, of French Corral, Superintendent of extensive mining operations there, and who now employs about 170 Chinamen, as we are told, offered to discharge them provided the camp will supply their places with white labor at \$2.50 per day. Commenting on this fact, the *Grass Valley Union*, another journal in the same county, says: "We do not agree that the proposition is so very reasonable, and we do not see that the Order of Caucasians will do much for the cause of the white labor if it enters the market and goes to bidding down the price of labor as against the Chinamen. We fully understand that no camp of the Order has yet proposed to do that thing, but we are not as yet informed as to what action the San Juan camp has taken on Col. Bell's proposition. It is probable that the company represented by Col. Bell has already determined to reduce the wages of white miners to \$2.50 a day—indeed we are quite certain of that fact—and it may be good policy to have the Chinamen ousted from the gravel mines and white men put in, under the inevitable reduction that is coming. In other words, it does not look like sound policy in having the wages of such white miners as may be employed reduced to the figures named, and then have Chinamen still retained in such great numbers, to do most of the work."

The discussion on this subject promises to be a hot one, as the miners are naturally unwilling to accede to the reduction, as, once reduced, the wages are not likely to be raised again. The reduction of even half a dollar a day among these men will be severe to them, as few of the working miners have any store laid by. The cost of living in the mining localities allows no very large margin, and those miners with families are compelled to economize as it is. It must be confessed that the large companies have the best of the matter, as they hold the purse-strings, and men will work for little rather than not at all. The matter, however, lies between the miners and mine owners, and the miners understand the situation well enough to take care of their own interests. A miner's life is hard and dangerous enough under any circumstances, and he ought, at least, to make a comfortable living. We are not fully informed of the cause of the action of these companies, but the reduction is the beginning of an agitation of the wages question, which it will probably take some time to settle.

BULLION SHIPMENTS.—Since our last issue shipments from the prominent mines have been as follows: Tybo Con., January 27th, \$4,287.79—total to date, \$44,249.06; Manhattan, 31st, \$11,500—total to date, \$100,310.45; Chollar, 31st, \$4,217.89; Northern Belle, 30th, \$10,186.74, Feb. 1st, \$10,079.64; California, Feb. 3d, \$167,939.19—total to date, \$1,161,023.12; Con. Virginia, Feb. 3d, \$63,866.97—total for January account, \$519,346.85; Empire, Feb. 2d, \$17,782; Leopard, Feb. 1st, \$5,054.20; Gila, Jan. 30th, \$2,460; Modoc, Feb. 3d, \$5,610—total for February, \$11,290; Tybo Con., Jan. 31st, \$4,477.44—total to date for January, \$48,726.50; Manhattan, Feb. 6th, \$12,900.

The steamer *Ethel* has been wrecked on the English coast, and nineteen persons drowned.

Locating Claims for Friends.

One of our mining friends writes us and says: "Can a resident miner of any of the mining districts on this coast locate and hold a mining claim for any relation or friend, if such individual is a resident of any of the Eastern States?"

There is nothing in the law preventing such action, and it used to be common enough throughout the coast. Since the passage of the law of 1872, however, this is not done so much as formerly, as now one man can take up the whole 1,500 feet for himself. Under the old law, when the discoverer could only hold 400 feet but could locate as many other people in with 200 feet apiece as he chose, they used to resort to this, get deeds back from the others and hold the ground alone. This is not necessary now.

The law simply states that locators must be citizens of the United States. There is no more reason why, when the mine is in Nevada or Utah for instance, a person living in New York or Florida could not be located, than one living in California. Lots of people living in this city have claims located for them in other States and Territories. We have carefully examined the law and decisions under it and can find no reference which would prevent any one in the East being located in a mining claim here.

Of course the law is binding on all, whether residents of the mining district or not, and the annual expenditure must be made, in failure of which the mine is subject to a relocation. In case of any legal proceedings as, for instance, in the case of a contest of patent, it would, perhaps, be necessary for the owner to be in the district. Some time in 1873, the Commissioner of the Land Office rejected an adverse claim to a patent because it was not sworn to, as required by law, in the district where the land was situated. If we remember aright, it was in the case of the Dardanelles company, in Gold Hill district, Nevada, when they applied for a patent for the Bosphorus. The California company filed a protest through its President. The protest was sworn to before a Commissioner of Deeds for Nevada, but was sworn to in this city. The Commissioner ruled that the law required an adverse claim to be sworn to before some officer authorized to administer oath within the land district where the claims were located, and the adverse claim was accordingly rejected.

Although, as far as we know, there is nothing to prevent the practice of which our correspondent, and many others, complains, it is none the less an objectionable custom. No individual should be allowed to come out here and locate half a district for his relations who will never see the ground. One consolation is, however, that such claims are not held very long, the expenditures necessary annually cleaning out such non-residents after a year. Still, some harm may be done to actual miners by people holding such ground even for a year, as it might prevent important developments. Some districts, we understand, have laws on the subject, which if they do not conflict with the United States law would, of course, stand. We do not recollect ever having heard of any legal contest on the point in question, so that it might be brought before the courts, but we feel pretty certain there is nothing in the law to prevent the practice, no matter how objectionable it may be.

NEW STEAMER FOR THE HAWAIIAN ISLANDS TRADE.—Williams, Blanchard & Co., agents for the Hawaiian government, have contracted with the Risdon Iron Works for the building of a wooden steam propeller of about 600 tons—the hull and wood work to be constructed by Dickey Brothers, and the machinery, boilers, etc., by the former firm. The contract price of the vessel is \$90,000, which is under what she could be built for at the East. The following will be her principal dimensions: Extreme length, 174 feet; length from rabbet of stem to after side of main stern post, 162 feet 3 inches; beam molded, 26 feet 6 inches; extreme breadth, 27 feet 3 inches; depth of hold to under side of upper deck, 17 feet 3 inches. All timber used in the construction of the vessel (except where otherwise specified) to be of best quality of Puget sound pine. The rig will be that of a fore-and-aft, and she will have a compound surface-condensing engine. The work will be executed under the direct superintendence of Captain Martin Bulger, the efficient superintendent of the Pacific Mail Company. This will be the largest steamer ever built in San Francisco. She will be employed to ply between Hawaiian Islands.

SUTRO TUNNEL.—Measurements taken in the Sutro tunnel, on Friday last, were as follows: Distance made at the header since last measurement, 148 feet; total for the month of January, 388 feet; total length of the tunnel, 15,865 feet. For the week, from the 22d to the 29th, 106 feet were made. The month's work is a very heavy one. The *Enterprise* says that one day last week 15 miners' inches of water were struck. This water was warmer than any heretofore encountered, which would seem to indicate the header to be in the vicinity of some of the eastern fissures of the Comstock. The total flow of water now is about 113 miners' inches.

Twelfth Industrial Exhibition of the Mechanics' Institute.

Steps have already been taken for the twelfth industrial exhibition of the Mechanics' Institute, which is to open on Tuesday, August 7th, 1877, and continue for at least 30 days. The exhibition will be held in the Pavilion on Market, Eighth and Mission streets. The building is 200 feet wide, 550 feet long and 100 feet high, with a gallery around the inside 50 feet wide, besides a promenade 16 feet wide and 1,000 feet in length. In addition to this space, there is a horticultural garden 70 by 220 feet, for the display of fruits and flowers. The "mechanical annex," for the display of special machinery, is 200 by 50 feet.

A large and powerful engine will furnish the motive power for all machinery required to be in motion, while steam and water will be supplied in ample quantities to such machines or appliances as require them. The main line of shafting is 500 feet long, with sufficient pulleys for all requirements.

The art gallery is 400 feet long by 50 feet in width, well lighted by sky-lights during the day and at night by the most improved reflectors. It will be made specially attractive, the directors announcing that many noted works of art are already promised, so that it is confidently expected that this department will excel anything ever before seen on this coast. A grand instrumental concert will be given each afternoon and evening by an orchestra composed of the best musical talent on this coast, and under the leadership of an experienced and popular conductor.

In accordance with the general request of exhibitors, the management have decided to offer liberal premiums at this exhibition, consisting of medals and cash, all to be for the first degree of merit only. The medals will be of a new design, three and a half inches in diameter, and somewhat similar to those awarded at the Centennial exhibition. This idea is a good one, as it promotes a spirit of emulation among exhibitors and encourages them in making their displays as attractive as possible. The miscellaneous diploma system is worn out and we are glad to see that the managers intend giving medals and cash for only one degree of merit, instead of giving everybody something to keep them all in good humor. The proposed method will entail some intelligent work on the part of the committees, but the awards will be more satisfactory on that account.

A carefully prepared classified list of premiums will shortly be published. The circular of the managers states that articles may be entered for competition or exhibition only; but if for the former they must be so designated when placed in position. A copy of the premium list, blank applications for space, rules and regulations and any information regarding the exhibition will promptly be given or sent, by addressing the Secretary of the twelfth industrial exhibition. J. H. Culver, 27 Post street, is the Secretary. The Board of Managers consists of A. S. Hallidie, H. L. Davis, George Spaulding, Asa R. Wells, Daniel E. Hayes, Jeremiah Browning, James Drury, P. B. Cornwall, James Spiers, James C. Patrick, Charles Elliott, Henry S. Smith, J. H. Stoutenborough and J. B. Stetson.

It is important that all parties intending to contribute to this exhibition should give early notice of the amount and kind of space required. Those who intend exhibiting should commence to prepare as soon as possible, so as to have their articles ready for display on the opening day.

A VISIT FROM FRANK LESLIE.—We have the pleasure of first announcing the contemplated visit of Mr. Frank Leslie to California and neighboring States. It is his intention to leave New York in March, with artists and editorial assistants accompanying, and he intends business. By the publication of correct California views and scenes, drawn on the spot, and published broadcast over the world, Mr. Leslie's illustrated journals will do our coast a material benefit, hence our people are all interested in the success of Mr. Leslie's tour among us. We recently visited Mr. Leslie's newspaper establishment in New York, and found it, even in these dull times, a perfect beehive of industry. Seventeen regular publications are edited, composed and printed entirely in the building. The business, drawing and engraving, added to the other departments, makes up an immense concern, all built up with remarkable rapidity, to the credit of Mr. Leslie's dashing enterprise and judgment.

THE suit which was on trial in the District Court, between the Providence mining company, and the Fryer Noble Metal mining company was decided in favor of the plaintiffs. The suit was brought to recover the value of 16 tons of ore sent to the Fryer works for treatment. The judgment of the Court was that defendants pay \$1,523, which, according to our figuring, is at the rate of \$95 and over per ton.—*Nevada Transcript*.

THE Secretary of the Treasury says he has sufficient silver to meet the legitimate demands, and declines to re-exchange United States notes for silver brought to the department in sums varying from \$10 to \$100.

The "Packsaddle."

What a hardy, independent race of men the early backwoods pioneers of America were! The "pioneer" of to-day, as, seated upon his gang-plow, he turns over the loose soil of his San Joaquin valley ranch, while his wife chafers at the gate with the pedlar over the price of the vegetables and fruits she has just bought to furnish forth the family table, can scarcely realize how, 60 or 70 years ago, his grandfather could have spent years hewing and grubbing and burning out the scanty "clearing," from among whose stumps and rocks the old-fashioned single plow was to find sustenance for perhaps half-a-dozen hungry young mouths beside his own, aided by "mother's" hoe in the little vegetable patch behind the cabin. Nor does the settler upon the more rugged lands of Northern California and Oregon, who depends upon the "store" for his clothing, his bacon, his candles, his "canned goods" and a thousand other necessities, and who discusses with his neighbors the expediency of establishing a co-operative store to buy his goods at first hand "down at the bay"—seldom does he reflect that his ancestors in the backwoods of the East prided themselves upon the fact that all they needed they could produce themselves, if need be, and that their visits to town were made but once or twice a year.

Here has been a change indeed. But the chief factor in it is not far to seek; it is the mightiest agent in our modern civilization—the locomotive. Great as is the contrast between the rural life of to-day and of the earlier decades of the present century, it is as nothing when we think of the difference in the means of transit then and now. To-day the emigrant to Colorado or California rattles along over the iron road with the speed of the wind, and in a week's time has left behind him two or three thousand miles and finds himself safely landed, family and household effects, without any real exertion on his part, wherever he may have chosen to settle. Then it was a different matter. The farmer of the Atlantic slope who had resolved to emigrate to the then Great West, whether it be to the smiling banks of the beautiful Ohio, the rich Blue-grass region of Kentucky or the blooming prairies of the Hoosier State, had before him a long, tedious and arduous journey—one that would likely call all his powers of endurance into requisition. If he resolved to wagon it he must see to it that his wheels and whiffletrees were of the stoutest, and be prepared for all sorts of accidents and emergencies upon the rough mountain roads leading from the seaboard across to the valley of the Mississippi. If he chose to go by any of the few water-ways that had been sought out to lighten labor, he must carry with him a good stock of patience, steady nerves, and an arm ever ready to assist in getting over shallow or dangerous places.

The view upon this page, which we have taken from the *Rural Press*, represents a locality somewhat celebrated in those days of primitive travel. It is situated upon what was then, and is now, one of the favorite routes to the central West, being very much the same that is now followed by the Pennsylvania railroad; in those days, however, the iron horse had not yet made his advent, and water was the means of transit. Leaving the valley of the Susquehanna, the traveler journeyed slowly and laboriously up the Juniata—first by keel-boat or canoe, afterwards by canal-boat—until its headwaters were reached. Here there was a portage of 20 or 30 miles across the Allegheny mountain summit to the waters of the Conemaugh, a bright little mountain stream which empties into the Allegheny some 30 miles above the junction of that river with the Ohio. Upon this Conemaugh river is situated the "Packsaddle," represented in our engraving. This was a point where the plucky little river, having forced its way through one of the outlying ranges of the great Allegheny chain, tossed and foamed down through the gorge it had made in a style that forbade all attempts to pass it with any save the lightest of crafts. Keel-boats and, later on, canal-boats, coming either way, were compelled to stop and unload their freight on to the backs of mules or horses, and in this way it was carried on a well-beaten trail over the steep mountains, past the obstruction to the clear water on the other side.

This was the origin of the name "the Packsaddle," which still clings to the locality, though the railroad has long since done away with the old water-travel, and an old-fashioned packsaddle would now be looked on in the neighborhood as a curiosity.

The view will call to the minds of many of our readers similar ones among our own mountains, and probably scenes grander in proportions and more rugged in outline. It would be difficult, however, to find in California, such heavy and varied forest growths and such dense and closely matted underbrush as covers these Pennsylvania hills. The length of the Packsaddle gorge is some six or seven miles; the height of the mountains (Chestnut ridge,) through which the river has forced its way is from 700 to 900 feet above the river, but the sides are exceedingly rough and precipitous, and with the river roaring and foaming over the rocks in its bed below, a picture is formed that has few equals in the East for wildness and picturesque beauty.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening. L. A. Scowden was elected a resident member.

A communication was read from the Royal Academy of Sciences at Turin, giving the clause of the last will and testament of Dr. Cesare Alessandro Bressa, providing for a biennial

county, noting a mistletoe found on a pear tree, etc., and reporting the discovery of two grave-stones two into six feet, an inch and a half thick; one conical and both bearing raised letters like Egyptian inscriptions. They were found four feet under ground, near Kern lake. Between them was a vase and bones of a human skeleton, with arrows, spear-heads, etc. Mr. Jewell stated that he would inquire a little further into the subterranean mysteries of that locality.

Dr. Stout, Corresponding Secretary, stated that he had advised the discoverer to take casts of the relief letters. He pointed out characteristic differences between the raised letters of the Kern county stones, and those cut into the Egyptian stone itself, and pronounced the Kern discovery the site of an ancient Indian mausoleum.

Dams Across Rivers.

Professor Davidson read the first of his papers on the practical application of his deductions on the irrigation of Asia and Europe. He treated of the location of dams across rivers, and the rules governing such works. He held that a dam should be located on a natural bar if possible, or at least treated like a natural obstruction. It should be located in the broad reaches of the stream, instead of a throat, and be run at right-angles with the direction of the channel. This position was illustrated by numerous examples in India and Italy.

Pacific Coast Meteorology.

Dr. Gibbons proposed the formation of a "meteorological section" in the Academy, thinking it would form an important branch. He

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Mechanical Ore Concentration and Separation—No 21.

(Written for the Press by FRANCIS M. F. CAZIN, M. E. Santa Fe, New Mexico.)

Test of the Product of the Successive Sieves by Assay or Microscope.

No one versed in metallurgical matters will doubt the benefit to be derived from assays in all stages of metallurgical operation, whether mechanical or chemical. But the mineral dresser, though bound to be governed by the result of the assay in the different stages of his operation, can derive no benefit therefrom as far as the indication of the course to be pursued by him goes. The lens or microscope has to instruct the mineral dresser more than the chemical test.

It is of the highest importance for the mineral dresser to know, in case the reserve sieves (3, 4 and 5) contain valuable parts, in what shape these parts are: first, whether the metallic particles are still unbroken from the rock; second, whether the metallic particles are broken from the rock, but differ in size so much from the particles of rock that their specific gravity in effect is neutralized by the bigger size of rock particles mined therewith; third, if the metallic particles are in size equal, and are also free from rock, and have gone over only from the first sieves, because their percentage was too high for the capacity of these sieves.

The remedy against loss, or the mode to recover the contents of what the later sieves turned out, will be and must be a different one, accordingly to what the microscope shows. In the first case the ore so showing must be kept separate, and be submitted to further breaking; in the second case, this portion of the ore must be assorted closer according to size; in the third case the feeding only should be slower and the material be fed back, which in the two other cases would only make the result worse instead of better.

If by the operation of any machine or work it is thus established that certain modifications have to be entered into on account of the nature of the ore, no hesitation should stand in the way of doing so at once.

The best constructed establishments, therefore, provide in their construction for certain modifications, as almost certainly will occur with the changes in the ore to be treated, as

stopes, furnishing the ore.

LIDA.—A correspondent writes us from Lida, Esmeralda county, Nevada, that very little is doing there in the way of mining. A half dozen men or so are "chloridizing" in some of the richest old mines and working the ore themselves. They make from three to six dollars per day to the man. The writer thinks the camp will, some time in the future, come from under the cloud which has been hanging over it for the past few years and make a showing equal to any of the neighboring camps which are now turning out their thousands per day. The mines are there and also any amount of timber and water enough to run all the mills that need to be built to work the ore.

In the Senate on Saturday, Hamlin offered an amendment to the Postoffice Appropriation bill appropriating \$500,000 for steamship mail service between San Francisco and China and Japan for one year, and authorizing a contract with the Pacific Mail Steamship Company for transporting a monthly mail between the ports designated.

THE *North German Gazette* reverts to the anti-German articles in the *Revue des Deux Mondes*, and says: These expressions are significant in France, because a renewal of war against Germany is considered by every one only a question of time and constitutes a permanent factor in all political calculations.

The Southern Pacific Railroad Company has already laid its track to a point 20 miles east of Indian Wells, and is extending it beyond at the rate of two miles per day. Two thousand men are employed in grading, etc., and it is sanguinely anticipated that the road will be completed to Fort Yuma before March 15th, next.



THE "PACKSADDLE," CONEMAUGH RIVER, PENNSYLVANIA.

prize for the best scientific literary production.

Abnormal Formation of Deer's Horns.

Dr. Kellogg read an interesting paper on further evidences of a curious law of abnormality in the horns of deer. The facts had been brought to his notice through a collection of horns reported by Joseph Clark, of Mendocino county. These facts were considered worthy of record, chiefly for the sake of future confirmation by zoologists. It had been observed that in each instance of abnormal growth, the animal taken had been in some way maimed; and the law was thence reduced to the following definition: "Any particular injury to the animal, such as the loss of an eye, lameness, or the loss of a leg, or a simple wound of the side, more or less grave, is always ultimately recorded in the deviation of the horn on that side of the head from its normal symmetry. In cases of general injury, both horns become greatly distorted and strangely abortive, like a mass of coralline growth, and at length the male deer becomes altogether hornless." Common observation showed that the characteristic form of the horn, as shape, symmetry, size, power, etc., was the resultant product of the animal, and therefore duly and truly represented the animal itself. This law extended to all horned animals. The mysterious monstrosities were supposed to bear a subtle relation to the wonderful sensitiveness and marvellously rapid growth of deer's horns, but the philosophical speculation of the subject was reserved for future papers.

Dr. Kellogg also presented a new species of spruce, discovered by George W. Dunn, in some of the passes of Arizona, locality not reported, and read a paper on a new species of *Listera*, discovered by Dr. G. Eisen, in the Kings river section of the Sierra Nevada mountains.

Indian Relics from Kern.

A letter was read from S. W. Jewell, of Kern

stated that the Signal Service in Washington desired to open communication with a society in this line on this coast, and if those interested would join and form the section, benefit would result. Mr. Scapham stated that the Central Pacific railroad had fifty signal stations, from the Rocky mountains to the Gulf of California, and that the observations had been full, reliable and of considerable use, and regularly reported to the Smithsonian Institute at Washington. He had no doubt that their data would be reported to the meteorological section of the Academy also, if desired. The President said that a number of gentlemen of this city proposed to establish a number of meteorological stations on the northern coast, between here and Alaska. The Government itself is about to establish a tidal station at some point on the Alaskan coast. This subject is one of great importance to the agricultural and mining interests of the coast.

The twenty-fourth of a series of papers on Pacific coast *Lepidoptera* by Henry Edwards was filed for publication. This series is a very valuable one to entomologists, and Mr. Edwards, who is a patient and persistent worker in this line, has gleaned very many new and interesting facts in his researches.

At the annual meeting of the Sheffield Chamber of Commerce on Saturday, the President said Sheffield manufacturers and workmen had only themselves to blame for the loss of trade with America, and successful American competition with foreign countries. Sheffield workmen had not come up to the make and style required by their customers.

The legislative appropriation bill as passed by the House on Saturday reduces the President's salary from \$50,000 to \$25,000, and fixes the annual salary of Senators and Representatives at \$5,000.

THE ENGINEER.

Chemistry Applied to Engineering.

At the meeting of the English Civil and Mechanical Engineers' Society, a paper was read by Mr. Bernard Dyer, F. C. S., on the subject of "Chemical Analysis Considered in its Application to Civil and Mechanical Engineering." Mr. Dyer's paper opened with some remarks on the close connection of chemistry with other sciences, drawing attention to the marked and subtle relations between the chemical composition and physical properties of various kinds of matter. The influence of minute proportions of certain foreign substances, such as phosphorus and sulphur, upon the quality of iron and steel, was alluded to under this head, as also were the variations in the electric conductivity of copper wire designed for telegraphic purposes when certain impurities chanced to be present even in minute traces. The composition and properties of some of the principal alloys of copper having been briefly referred to, the value of chemical science in studying the nature of furnace action, with the view to the economy both of heat and fuel, was considered, the desirability of systematic chemical analysis of the coal or coke used in most metallurgical operations being also pointed out. The subject of furnaces led to some observations on the nature of fire-clay and other refractory materials, the author showing that while, for all practical purposes, chemical analysis should decide upon the suitability or otherwise of a given clay for use in a high temperature, there was still room for sound chemical research in discovering the best artificial substitutes for natural fire-clay.

The subject of water analysis was treated at some length, both as regarded the supply of drinking water and the suitability of various waters for boiler use, some practical remarks being introduced on the occurrence and prevention of boiler incrustations. The distinction between "hard" and "soft" waters, and the softening of the former under treatment by Clark's process, were described, the author quoting a recent statement by a well known engineer, to the effect that no less a sum than £50,000 is annually lost to the people of England by the wasteful consumption of soap entailed by the use of hard waters. The London water supply if treated by Clark's process would probably deposit upwards of 50 tons of chalk daily. The subject of oils and other lubricants, with reference to their adulteration with drying oils and the consequent damage to machinery, having been alluded to, the paper was brought to close with a passing reference to sewage purification, agricultural chemistry as affected by engineering, and gas, matters into which the author regretted that the limits of space and time at his command forbade him to enter further.

A discussion followed, in the course of which it was suggested that chemistry might be applied with advantage to the art of building, in order that edifices might no longer be constructed in London of stone which crumbled under the atmospheric influences to which it was exposed. General agreement was expressed that the analysis of samples of material was very important, as tending to insure greater uniformity of quality in manufactured articles used in engineering, and supplied by contract, though, with regard to steel rails, it was pointed out that there was great difficulty in obtaining anything like a uniform quality of product, the same bar often furnishing different results if analyses were made of two or more parts of it. Mr. Dyer replied, observing that he did not think chemical analysis could be expected to throw much light on the nature of wood with regard to building, or, in all cases, the durability of stone; but he thought microscopic examination of the first named material might possibly be found useful if carefully studied; and as to stone, the softest chalk and the hardest marble, for example, were chemically the same substance.

Changing the Course of the Danube.

To avoid the rocks by which the navigation of the Danube has for ages been obstructed at the point known as the "Iron Gates," a new bed has been prepared for the river, of which the Danube has taken possession for itself without waiting for any opening ceremony. This river was dug out in three sections, separated from each other by two dykes, which were left, and over which the roads led to the old bed. The embankment has been raised all along the line and reveted with stone. It was determined to make an opening in the upper dyke so as to allow the stone barges to pass through. Scarcely was the channel opened when the stream rushed in, widening the gap soon from 12 feet to 100, carrying away the bridge which had been constructed. The dyke being in an oblique direction, the gap was made toward the right bank, the consequence being that the force of the stream rushed in that direction, carrying away the masonry and stone pavement for a considerable distance. In less than 12 hours the basin filled. Curiously enough, the difference in the level of the old channel is found to be not near so great as might have been expected, 18 inches being registered as the fall, and for the present there are two streams, the old one not having been as yet stopped. The new channel is nearly nine and one-half miles long, and brings the water of the Danube with-

in a short distance of Vienna. It consists of two parts: The minor channel, which, in ordinary times, will receive all the waters of the river, is 245 meters wide and three to 3.50 meters deep; the other, which is to provide against floods, is 515 meters wide and two meters deep, with a dam 6.32 meters high. Sixteen millions of cubic meters had to be excavated for raising the level of the soil and forming the dam, and half of this by dredging; the stone work of the new dams represented a cube of 350,000 meters, and the pitching nearly as much. The quays absorbed 35,000 cubic meters of concrete and 30,000 meters of masonry.

Engineering Items.

THE Government authorities are still at work on the jetties for the protection of the beach in front of the lighthouse at Atlantic City.

THE Hell Gate improvement has not yet been of any benefit to New York shipping. The officers in charge complain of want of funds to complete the works.

THE latest important engineering work is the Bergen hill tunnel, New Jersey, on the line of the Delaware, Lackawanna & Western railroad. It was begun three years ago, and gave employment to a force of about 600 men. It is nearly a mile long, 27 feet wide and 18 feet high. Two tracks will be laid through it.

THE Suez canal is looked upon as a success by European capitalists. This water-cut, connecting the Mediterranean and the Red seas, is at present patronized by 24 regular lines of steamers, employing 234 steamers, of 509,437 tonnage. Classified by nationalities, the quota of England is 152 vessels, of 390,273 tonnage; France, 18 vessels, of 112,624 tonnage; Holland, 15 vessels, of 36,585 tonnage; Austria, 18 steamers, of 28,227 tonnage; Italy, 10 steamers, of 15,518 tonnage; Russia, 8 steamers, of 13,386 tonnage; Germany, 8 steamers, of 11,336 tonnage; Spain, 5 vessels, of 10,751 tonnage.

A WRITER in the *Polytechnic Review* on "Style in Engineering Constructions," says: "Style may be defined as the principle of form, both in architecture and in engineering structures. Architecture growing up simultaneously with history, has been influenced quite as much by the political, religious and artistic tendencies of nations and races, by local, social and climatical conditions, as by the materials at their disposition, their knowledge of mechanical and physical laws, and their tools and skill in using them. Engineering, in the present age of quick intercommunication and widely diffused knowledge, is more cosmopolitan, and thus mainly under the influence of the last named conditions. To adapt our structures to the objects in view, to give them sufficient strength, and to do this with the least expenditure of material and work, must always be the first and paramount consideration. To combine with this pleasing and graceful outlines, to study the details carefully, so as to obtain uniformity of the whole, ought to be the aim of every constructor, and within these bounds he has certainly a wide range, either to be led on by his own fancy, or to follow, without copying slavishly, the examples that have already established certain principles of form for the different branches of engineering.

THE EAST RIVER BRIDGE CABLES.—The Board of Trustees of the New York and Brooklyn bridge, says the *Iron Age*, have decided that crucible steel must be employed as a material for the wires from which the cables of that structure are to be spun. The Executive Committee reported that in consequence of the strong vote of the board in favor of awarding the contract for the wire for the large cables to the lowest bidder for crucible cast steel as decisive against the use of Bessemer steel, for so important a matter as the main cables, it would, in their opinion, be unwise to adopt a material which is distrusted by any considerable portion of the trustees. The question of cost is an important one, but is subordinate to that of safety, and the difference of expense between the two is comparatively too small to permit such difference to prevent unanimity and entire confidence. They therefore, recommend that the contract for the steel wire for the large cables, as provided in the specification issued for that purpose, be awarded to J. Lloyd Haigh at 8 7/10 cents, gold, per pound, he being the lowest bidder for crucible cast steel wire, provided he furnish that kind of wire stipulated in his communication to this board, dated January 9th, 1877.

A DAM.—The following is a description of a dam recently constructed across the Kansas river, at Lawrence, and which has been estimated to furnish about 3,000-horse power: The dam is 788 feet in total length, 274 feet of which is based upon solid rock and built of masonry. The remainder spans a gravel and sand foundation, and is constructed of crib work, thoroughly based, anchored, grouted and backed. The dam has a base of 21 feet, presents an average angle of 45° to the current, and is so constructed that the power can easily be increased by adding to its height. The flume upon the south side is 60 feet wide, and, as it now stands, 180 feet long, and is simply supplied with arches for the convenient delivery of power to penstocks. The track of the Kansas Midland railroad, connecting the Atchison, Topeka & Santa Fe railroad with the Kansas City railroad system, runs within a few feet of the flume walls.

The Battle Creek Mines in the Black Hills.

A correspondent of the *Eureka Sentinel* writes from "camp on Battle Creek" as follows: One has hardly time to locate himself comfortably here until the report comes that still better "diggings" have been found, and away we go with our blankets, grub and cooking utensils on our back or a pack animal. The latest excitement is Battle Creek, and a general stampede followed the first rumor. The diggings are nearly north of Custer City, about 30 miles from that place, in the foothills of a low range of mountains that until recently the prospector would not idle his time away examining. Battle Creek is about 20 miles in length and reported to be very rich from one end to the other. The bedrock has not been reached but in few places, and will lay at an average depth of 20 feet. The discoveries thus far are what are known as placers and will make a good showing. One nugget taken out three weeks ago by Captain Timblin

Weighted Over Fifteen Dollars.

And lots of others have been since found, and many of greater value. A pan of dirt taken from the same locality washed out \$10. When it is understood that four and five cents per pan is considered good pay in ordinary diggings, the value of this claim, which is owned by a French company, may be readily estimated. Gardner & Turner's men washed seven loads of surface dirt from their dry gulch claim one day last week, and realized \$35 in three hours. The firm is now building a ditch 1,200 feet long, preparatory to working the claim on a larger scale in the spring. There are about 60 men working on the creek at present, and as many more upon dry diggings, while an army of prospectors are scouring the adjacent country.

Mining affairs in this vicinity are becoming interesting, to say the least, and the present outlook is such as to reaffirm the assurance given a year ago, that Custer is destined to be "the metropolis of the hills." Its advantages over all rivals in being 75 to 100 miles nearer railroad facilities (no mean consideration in these days of high freight tariff) and its delightful and healthful location are important

Points in its Favor.

In addition, there have been quartz leads discovered, which, if they come up to assayed samples, eclipse anything yet reported in the hills, and equalled by few anywhere. The principle leads are the "Centennial," "De Smett," and "Webfoot." The last named is the richest—claim No. 2 (second from discovery) assaying \$36,000 to the ton, the samples being taken at a depth of 8 feet from the surface. Claim No. 8 is said to be still more valuable—the vein producing almost a solid mass of gold. The lead commences near the city and runs due north. The principal claims are held by a company of Eastern capitalists, who will have a stamp mill here in time to begin work early in the spring.

Custer is almost deserted. The miners have either gone home for the winter or else joined in the stampede to Battle Creek. Vacant houses outnumber by far those occupied, and but little business is transacted. The few who remain, and the merchants, are, as a class, far above the average quality of men to be found in mining camps. There are no dance houses or gambling institutions in the place, and the utmost order prevails.

The Nevada Bullion Tax.

An important joint meeting of the Finance committees of the two Houses of the Legislature was held at Carson yesterday, at which there were present representatives of the leading mining interests of the Comstock. The bonanza companies were represented by Superintendent J. G. Fair; the Belcher by Superintendent W. H. Smith; the Yellow Jacket by Captain Taylor; C. J. Hillyer and W. S. Wood, attorneys, were also present, with representatives of other leading companies. The object of the meeting was to consider the bullion tax. The discussion was informal, but full, free and pleasant. The mining men found no difficulty in getting their views before the committees, with whose intelligence, earnestness and candor they were highly impressed. The immense amount of capital represented at this conference pays more than half the tax of the State, and is therefore entitled to all the courtesy and consideration accorded it. The mining interests do not ask a repeal of the bullion tax, nor any release from the payment of their fair and equitable proportion of the tax required for the support of the State Government. But what they did ask, and what they sought most earnestly to impress upon the committee is, that their property should be taxed precisely as other property is taxed. Real estate, merchandise and other property subject to taxation is assessed at an easy valuation, usually arrived at by guess work, never sworn to, and rarely at anything like its actual value; whereas the mining companies are required to make return under oath of every ounce of bullion, which is assessed at its full value, and the tax is rigidly collected. The mining companies are willing to pay their tax on this basis, provided all other taxable property is treated with the same severe exactness. Such a course, they think, would greatly increase the general assessments, and so materially reduce the rate per cent. of tax on all. They also showed to the committee as another instance of the present law's injustice to them, that they are required to pay their tax monthly, while no other taxes are collected

but once a year. They protest against this discrimination as unfair and unjust. Of course the result of the conference cannot be known until the committees report to their respective houses.—*Virginia Chronicle*, January 27th.

Home Encouragement for Mining.

The following from the *Nevada Transcript* contains many good points: While we have any quantity of quartz ledges, and large fields of unworked gravel claims, and while every one here knows that the prosperity of the county depends upon their opening and development, yet there is but little local encouragement to outsiders to come here and invest. It is an even bet that if 10 men succeed in inducing capitalists to come here on a trip of inspection, with a view to investment, that there will be at least one man, if not a dozen, in the community, who will undo all the 10 have accomplished, with the least imaginable effort. Hardly a mine has been opened in this vicinity by strangers, but has to be worked in opposition to the croakers or smart Alecks. Even the Providence owners, after they had expended over \$25,000, were visited by a committee, who told them there was nothing in their mine and never would be. Capitalists on attempting to open new claims here, find another difficulty, which is a worse curse to the county, even, than the predictions of the impetuous smarties who use their tongues only. No matter where developments are commenced on new ground, they will not proceed far before adverse claimants will appear, and an expensive lawsuit will have to be engaged in before a title can be secured, and the chances of winning a suit against such claimants are very doubtful.

It is almost impossible to prove abandonment of a mine in our courts, even if a claim has laid idle for years, and is generally understood to be abandoned and worthless. All such original claims are generally held by poor men who have not been able to open them, and are waiting for something to turn up. It is probable that nine-tenths of such claims never will be touched after those are driven off who are willing to spend money to prospect them. We don't want to find fault with men for desiring to hold a mining claim, when they do so under the law and with a view of future development, but we do think it their duty to notify all who commence to work on their claims before they expend money and time, that the ground is claimed and will be defended. It is a fact that these possessory claims held by those who intend to do no work further than to barely comply with the existing law, are a damage and a ruin to the county. When a few men who are willing to invest means to open new industries are prevented by such claimants, there will be little inducement for others to try, and the result will be just what we now complain of, viz: A vast area of country with boundless resources, but no development and consequently no general prosperity.

Shipping Ores from Idaho.

The bill introduced in the council by R. A. Sidebotham, levying a tax on all ores shipped from this Territory for reduction has created great excitement among the people of Alturas. These Eastern companies, who never work for the interest of the country or the people at large, are bitterly opposed to this measure, simply because they do not wish to go to the expense of bringing in machinery to work the ore here. I want to see that bill passed and be made a law, and so does every working man in this county. If it becomes a law, then they will be compelled to bring in the proper machinery to reduce the ore at home. If it is defeated, these Eastern monopolies will continue to send all the money out of the country as long as it is in their power to do so. There have been several letters written from this camp, and every one is opposed to this measure, because they are owned by these companies. Laying all pledges aside, let every man in that legislative body support that measure. Then this camp will boom up and equal Virginia City. We have the mines; all we want is the right kind of men to develop them. Since my last, there have been three new strikes made. Wm. Irwin & Co., of the Moultrie, have struck an eight-inch vein of ruby silver. Simon Taylor, who has been running a tunnel for the extension of the Last Chance, tapped the ledge a few days ago. It is fully as rich, if not richer, than the original. Andrew Johnson & Co. have struck it rich in the Little Buffalo.—*Cor. Idaho World*.

MANHATTAN MINE.—A drift has been started to run east from the 577-foot winze under the large chimney the winze is in. This drift, as well as the one running west, carries a very large ledge of magnificent ore. A contract was let last week to extend the 600 east Panamint drift of the Bowman incline, and a large ledge was encountered containing \$200 to \$400 ore. This ledge is about 300 feet east of the chimney now being worked in the Curtis shaft and is an entirely new development.

THE board of managers of the Mechanics' Institute announce that the twelfth annual industrial exhibition will be opened on Tuesday, August 7th, and continue open for at least 30 days.

The Eureka Lake Water and Mining Company.

From a recent report of James D. Hague, the Nevada Transcript reproduces the following interesting items in regard to the property of the Eureka Lake water and mining company, situated on the San Juan ridge. The water improvements comprise over 200 miles of ditches, several large storage reservoirs and a series of distributing reservoirs. They cost in construction over a million dollars. The average possible delivery is stated at 2,000,000 inches a day, of 24 hours each, annually. The average price paid by purchasers of the water is 20 cents per inch per 24 hours. The average cost of operating the water property is about \$85,000 per annum. Part of the water is used by the company in running its own property. The average yearly receipts during 11 years past from the sale of water have been \$180,782. The mining ground owned by the company lies at several points along the ridge, mainly at Columbia Hill and Bloomfield. The Columbia Hill property comprises a body of ground two and a half miles in extent, all located on the ancient river channel. The deposit is estimated to contain \$18,000,000, the larger portion of which lies in the ground too low to be mined without long tunnels from the river. It is now being worked on a large scale. Last year's products from it amounted to \$120,803, at a cost of \$35,965 for other things than water, which was from the company's own supply. It is expected that the yield this year will be \$240,000, at an expense other than water of \$75,000. This can be carried on for 10 or 12 years with the present outlet. The water sales and proceeds of the Columbia Hill mine will produce an annual amount of available yearly profits—allowing 25% for contingent expenses not now contemplated—of \$150,000, or \$200,000 if the contingencies do not arise. The Bloomfield ground adjoins the North Bloomfield hydraulic mine on the south, and on the same channel. This can be opened by a tunnel 4,000 feet in length. There are 720 acres in the tract, and it is expected to be as rich as the ground of the North Bloomfield company on the north. The supply of water is lasting and the demand will continue as long as there is unworked ground along 20 miles of the line of the old channel, which is as yet hardly touched. The company also own rich claims at Relief Hill, Moore's and Woolsey's flats and Snow Point. The property is one of the most valuable in the State, and is capable of almost unlimited development. Marks Zellerbach is the principal owner. The property is ably superintended by K. McMurray, of San Juan.

FISH SPAWN FROM THE EAST.—A few weeks ago 300,000 whitefish spawn were sent to this coast from Lake Michigan by Professor Baird, of the United States Fish Commission, for shipment abroad. Of the consignment 150,000 spawn were shipped to New Zealand, 30,000 to Japan, and the balance reserved for California and sent to the hatching establishments near Berkeley. One hundred thousand of the last mentioned were successfully hatched and placed in Lakes Donner and Tahoe. One hundred thousand eggs of the speckled trout were also received at the same time from New Hampshire, and of the lot 60,000 have been successfully hatched. There is another large consignment now in the office of Wells, Fargo & Co.'s express destined for Australia. They are said to be in very poor condition, owing to the sudden change of climate.

The Olin concentrators are partially in operation, the hand jigs being worked and running upon a lot of 60 tons of second-class ore taken from the Mountain lode. On Friday last Mr. Olin received from Helena the long delayed and anxiously expected belting and castings, which have heretofore prevented his starting the automatic jigs, and now with everything requisite at hand there is no reason why these works should not within a few days be put in full operation at concentrating the low grade ores of this camp.—*Butte (Montana) Miner.*

SAYS THE PETALUMA ARGUS: Moore Brothers this week sold to Milton S. Latham their entire interest in the North Pacific Coast railroad, together with their saw-mill property and timber land situated near Moscow, the present terminus of the road. It is stated that Mr. Latham will immediately commence the construction of a new mill at Willow Gulch, about four miles from Moscow, which will be completed within three months, and will be one of the largest saw-mills on the coast.

CONDOR MILL LEASED.—The Alps mining company, so we learn from Theo. A. Hale, has leased the Condor mill in Condor canyon for six months. That company has also purchased the tailings and concentrations at that mill from W. F. Griffin. The Condor mill is to run in conjunction with the Alps mill. The report that was circulated in regard to stopping of the Alps mill in consequence of the company having leased the Condor, is without foundation, as both mills will be kept going.—*Pioche Record.*

ALPS MINE.—Good progress has been made in the upraise on the 204-foot level, the raise being 30 feet from the top of the drift, the streak of ore continuing all the way. Ore also continues in the winze now being sunk and the prospect is very encouraging. The mill has been running steadily on chlorider's ore, and plenty will be taken out of the mine to insure a constant run until spring.—*Pioche Record.*

Richmond Assay Office.

The building that has for years past been used at the Richmond smelting works for an assay office has proved, with the continued increase of business, entirely inadequate to the requirements of a first-class office, and a new assay department has been fitted up in the stone building, which is also occupied by the private offices. The new assay rooms are three in number, and called the melting, sample, and balance apartments. Each room is supplied with all the latest appliances necessary for conducting the business, and samples of all ores brought to the furnaces for reduction are carefully assayed and the proportion and value of all the different precious metals contained therein minutely ascertained. The scales used in weighing are marvels of mechanical skill. The largest used for weighing the dore bars produced at the works has been lately received from the West, and are the same as those used at the agency of the Bank of California at Virginia City. It is a standard balance, manufactured in Boston and cost originally \$3,000. With this is found the exact weight of the bars of bullion made at the place, and so perfect is its adjustment that the weight of the finest hair can be readily ascertained. Another balance scale is of so delicate construction that it is kept inclosed within a glass case. This is used in weighing the small particles of silver and other metals obtained from samples of the ores assayed. In the melting room a fine furnace has been constructed, and by a simple method is kept free from dust. Mr. Davis, the competent assayer employed by the company, has now a very convenient office in which to carry out his work, and he and his assistant, Orrin Miller, are much pleased with their new quarters.—*Eureka Sentinel.*

Second Bridge between New York and Brooklyn.

The projectors of this proposed bridge over the East river, between New York and Brooklyn at 77th street, by way of Blackwell's island, have, says the *Scientific American* in response to the invitation sent out, received ten separate designs and estimates from as many engineers. Ground will be broken as soon as a plan shall be decided upon. The preliminary specifications call for an approach on the New York side of 4,580 feet, 1,000 feet of which is to be in form of a tunnel extending from Fourth to Lexington avenues. From the end of the tunnel, an iron superstructure, curving to the center of the blocks between 76th and 77th streets, and thence direct, leads to the river. From the pier on the brink of the river, Blackwell's island will be reached by a single span of 734 feet. An iron structure 700 feet long will then lead over Blackwell's island, and the channel between the island and the Long island shore will be spanned by a single arch of 618 feet. The shore approach on the Long island side will be 3,900 feet in length. This will give in all a total length of 10,532 feet, or nearly two miles. A single track tramway will run across the bridge. There will be, in addition to the main approaches, two auxiliary ones, one from Avenue A on the New York side and the other from Vernon avenue, Long Island City. The spans are to be 135 feet above mean tide water. Double passenger elevators are to be placed at the piers on each side.

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CAMPO, SAN DIEGO CO., CAL., July 3d, 1874.
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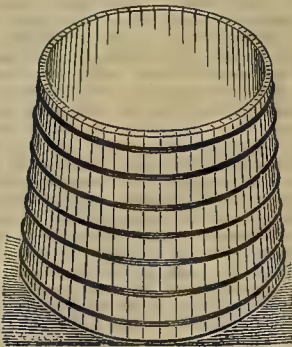
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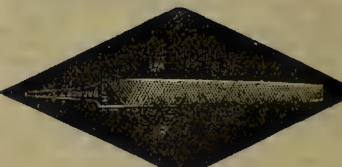
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Continued from page 85.

week goes as high as \$2,500 to the ton. There is said to be abundance of it in sight. There is no change to report in the status and prospects of the mines at South Mountain. Only a small force of men is employed there as yet, but there is a generally hopeful feeling that times will brighten up as the spring months approach. At the Belle Peak mine, near Fairview, there are some 20 men employed, who are taking out rich rock, which is improving in quality as the development progresses. The Potosi is looking well. There are over 100 tons of rock on the dump ready for crushing.

A GOOD MONTH.—January was a lively month among the miners. The proprietor of the Rocky Mountain mill informs us that they had a livelier trade in ore during the past month than for many weeks, and we presume such has been the experience of other purchasers.

DUNKIRK.—This well known mine, east of the Dives, the property of the Hermann mining company of New York, is now being operated by a force of 10 men. Sinking the main shaft is going on day and night. The shaft is now over 400 feet deep, and at the bottom there is a fine crevice with a good deal of scattered ore through it. The engine on this mine has a hoisting capacity for 1,000 feet.

DOWNIEVILLE.—The developments on Red Elephant mountain, and in other localities in Downieville district this season, have been such as to attract considerable attention to the mines of that locality, which have been too long lying idle. In addition to the active work now going on, with most satisfactory results, we understand that the prospector is abroad there now, with his pick and shovel, and we may soon expect to hear of other strikes.

Utah.

DRY CANYON.—Cor. Salt Lake Tribune, Jan. 31: In view of the numerous and extensive rich ore strikes daily being made in this camp, among which the one recently made in the Kearsarge is not the least, everybody seems to entertain a kindlier feeling toward his fellow man, being convinced that next summer will bring capitalists in our midst who can and will purchase mining prospects, those which, with a reasonable expenditure of money, will develop into dividend paying mines. There are at least a score of undeveloped mining claims to-day in this immediate vicinity that give every evidence of eventually proving as rich and inexhaustible in ore deposits as are the Mono, Deseret, Kearsarge, Queen of the Hills, Hidden Treasure and others in this canyon.

MINE.—The mines in this district are being worked with a will and they are continually improving. The character and value of the ores found at a depth of from 50 to 200 feet and over, improve very much. A number of miners are engaged in "chloriding," and they have so far met with success in a financial way. The only drawback that is felt by the miners and chloriders is the want of a custom mill in which they can have their first, second and third class ores worked. The Leeds company's mine is raising ore now, and have about 300 tons of first and second-class ore on their dump, which they have commenced to haul to the mill for reduction. The mill is inclosed and the batteries are expected to commence their work on Monday or Tuesday at farthest. The Tecumseh and Silver Flat mines are the great chloriding, and have been the richest paying mines. They have shipped a large amount of value rich ore to Salt Lake City, and hope for reduction, which has yielded its owners a very handsome dividend. The Barbee & Walker is sinking an incline shaft, which is now down 150 feet, the vein pitching at an average angle of 38 degrees, showing ore all the way down. The vein starts on the top two feet wide, and is not less than 14 feet wide at the bottom, showing no hanging or foot wall. The ore will go from \$20 to \$250 per ton.

Meetings and Elections.

WELLS, FARGO & CO.'S EXPRESS CO.—Feb. 5th. Directors—Lloyd Tevis, W. G. Fargo, A. H. Barney, Charles Crocker, Leland Stanford, D. O. Mills, Oliver Eldridge, Mark Hopkins and J. B. Haggis.

CALIFORNIA POWDER WORKS.—Feb. 5th. Trustees—J. H. Baird, N. C. Kittle, J. B. Haggis, J. O. Earl, G. F. Lawton. The Trustees elected J. B. Baird, President; N. C. Kittle, Vice-President; J. F. Lohse, Secretary and Treasurer; B. Peyton, Superintendent.

ATLANTIC GIANT POWDER CO.—Feb. 5th. Trustees—A. Dibblee, President; E. Judson, H. Brickwedel, F. Oppenheim, L. Stevens, H. Pichor, Secretary.

METALLIC CO.—Feb. 6th. Trustees—Geo. S. Dodge, A. W. Rose, S. Reinhardt, S. Heydenfeldt and Jeremiah Miller.

PACIFIC ROLLING MILLS.—Feb. 7th. Trustees—William Alvord, Louis McLane, D. O. Mills, L. B. Benchley and B. P. Bruner. At a subsequent meeting of the Trustees, the following officers were elected: William Alvord, President; L. B. Benchley, General Manager; B. P. Bruner, Vice-President and Superintendent; P. Noble, Assistant Superintendent and Samuel L. C. Sweeney, Secretary.

HENRY A. GOULD has been elected Assistant Secretary of the Nevada Stock Exchange.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

ARCTIC COMMERCIAL CO.—Feb. 6th: Object, catching, preparing, canning, smoking and salting of salmon, cod and other fishes, and trading in furs, provisions and dry goods, establishing trading posts, and carrying on a general commercial and manufacturing business in the Territory of Alaska. Capital stock, \$2,000,000. Directors—David Halliday, George R. Rosseter, Edward Cummings, F. G. E. Tittle and Jacob Shew.

GOLDEN WEST G. M. CO.—Feb. 6th: Location, Yuba Co., Cal. Capital stock, \$3,000,000. Directors—Jas. M. Jackson, Eugene Bradbury, Chas. H. Howland, A. J. Snyder and W. Benetick.

DUNSMUIR LAND AND LUMBER CO.—Feb. 6th: Object, to build vessels and buy and sell timber land. Capital stock, \$3,000,000. Directors, Alexander Duncan, Samuel M. Duncan, J. F. Byxbee, R. G. Byxbee and W. J. Dutton.

LOTTA G. M. CO.—Feb. 6th: Location, California. Capital stock, \$4,200,000. Directors—John F. Snow, E. P. Hutchins, J. C. Yale, G. W. Thomas, C. J. Holmes, J. G. Mather and G. W. Osborn.

AN ENTHUSIASTIC EXPLORER.—Commander Cheyne, of the English navy, in a recent lecture on Arctic exploration, said that rather than see another nation snatch from his country the laurels crowning the discovery of the north pole, he would be prepared to command a private expedition, drive the ship or ships as far north as possible by one of the channels west of Smith's sound, and, failing ability for pushing the vessels within sledging distance across the pole, en route to England via Spitzbergen, he would lead a forlorn hope in a balloon, with orders left to the commanding officer that, in the event of the balloon party not reappearing by a certain date, he should leave the aeronauts to their own resources, and carry on further discovery irrespective of their course of action. If necessary, he would risk two or three lives for the attainment of an object so desirable in the interests of English maritime supremacy.

WM. HOSKINS, a miner working in the Crown Point mine, was killed by being caught in the giraffe on Tuesday.

Notes on a Bruckner Roasting Cylinder.

[Written for the MINING AND SCIENTIFIC PRESS.]

Owing to want of room, and other reasons, the driving gear was placed in reverse position, that is to say, at that end of the cylinder which is next to the fire-box. As the toothed rack on the cylinder could not easily be moved, it was allowed to remain where it was, consequently the longitudinal shaft passed across the ore-pit, under the discharge ports, and the hot ore fell upon it during the discharge, which, however, caused no inconvenience.

To accommodate the transverse shaft, and the gearing in their new position, it was necessary to shorten the ash-pit at the bottom, and build its front wall so as to overhang the gearing, and thus furnish the required base for the iron fire-box.

The only defect developed by this arrangement was, that the overhang finally (after several months,) caused a crack in the side wall and threatened to fall upon the gearing, which, however, can easily be prevented by the use of proper supports to the masonry.

The arrangement has this advantage over the usual one, that it admits of the delivery of the fumes and dust from the cylinder directly into the main dust chamber, which, in this case, was a flue running transversely to the axis of the cylinder, 6 feet high, 3 feet wide, and 17 feet long, while a small opening in the wall, opposite to the cylinder, closed with a loose brick when not required, enabled the workmen to inspect the interior of the furnace when in operation, or, by means of a long iron spoon, to take samples of the ore for examination.

At a proper distance from the opening in the flue wall which received the neck of the cylinder, a second similar opening was left for the introduction of a second cylinder when required, being, in the meantime, of course, temporarily closed with masonry, just as "blind windows" are made in houses.

Conveniently situated openings at the base of the wall, closed by means of sheet-iron doors when not in use, enabled the removal of dust from the chambers without the necessity of stopping and cooling, so that a man could enter, though one of these doors was large enough to admit a man, the others being intended merely for the passage of a hoe.

The extent of dust-saving space was, first, as already said, a chamber at a right angle with the cylinder, 17x6x3 feet, and secondly, another chamber forming a right angle with the first, 10x6x2 feet, after which the bottom gradually rose, till, in the length of 10 feet, the height was reduced to three feet, at which point was a vertical offset in which was a damper, followed by another flue, 20x3x2 feet, connecting with the stack. I mention these dimensions because, though the space would appear to be ample for a single furnace, yet it was found that a considerable quantity of dust escaped, nor was the loss materially diminished by the subsequent insertion in the first two chambers of a number of vertical sheet-iron deadairs, which, however, did some good.

The cylinder was lined with common bricks of very inferior quality, placed with the narrow sides to the shell, without breaking joints, each brick being slightly beveled by grinding it against another, and dipped in a thin paste of clay and water. The ends were lined with fire tiles, which seems to be a needless expense. The iron firebox was also lined with common bricks.

The lining of the cylinder was placed without breaking joints, in opposition to the advice of the mason, because the bricks were of such unequal thickness that to have done otherwise would have necessitated the use of a great deal of clay between some of them, and while I doubt the expediency of breaking joints in any case, I am satisfied that, under the circumstances, it was decidedly better not to do so.

In practice I found that at first, while working a very "dry" (infusible) ore, a few bricks dropped out from time to time. The vacancies thus formed were filled with a mixture of clay, sand and ashes, slightly moistened and beaten in, which answered perfectly, and I am inclined to think it might be better to line the whole cylinder in this way in the first place, as there are so many boltheads and other projections in the way, not to speak of the diaphragm, that the cutting of bricks to fit them is tedious, expensive and wasteful. However, after some ore containing a good deal of lead had been roasted at a pretty high heat, the interior of the cylinder became so crusted and impacted with ore that there seemed to be no further danger of the falling out of the lining.

The common bricks in the firebox proved unfit to withstand the heat at that part for any great length of time, and would be advantageously replaced by firebrick. The conical throat of the cylinder, through which the flames enter, being exposed to great heat, was necessarily lined with firebrick, and to keep them from sliding out, I found it necessary to rivet a rib or flange into the iron shell, a notch being cut in the bricks to fit it.

I regret that I cannot give any statistics as to the quantity of fuel consumed in this furnace, as the wood was not measured, but as circum-

stances prevented continuous working, roasting being carried on only during 12 hours, or less, in each 24, it is certain that a great deal more was burned than would have been necessary under other conditions in proportion to the work done; yet I can say with confidence that the economy of this furnace, as compared with the reverberatory, is immense.

The working capacity of the cylinder is about 50 cubic feet of pulp to the charge, and the time required is from 3 to 8 hours, including charge and discharge; and as the weight of this volume of pulp varies with the quality and fineness, and the time required varies with the same circumstances, but in the opposite direction as regards amount of work done, I conclude that a single cylinder is competent to roast, on an average, from 8 to 12 tons in 24 hours, and one man on a shift can do all the work.

In working it was observed that a dense cloud of dust escaped from the stack during the first part of the roasting, or until the ore began to assume the "spongy" consistency characteristic of the chloridizing stage, when the dusting gradually ceased. The dust recovered from the chambers and flues amounted to from 10 to 15 per cent. of the ore treated; in richness it was equal to the ore, and about 60 per cent. of the contained silver was soluble in solution of sodium hyposulphite.

It is usual to work the dust without re-roasting, on account of the supposed difficulty of preventing it from passing immediately out of the cylinder with the draft, but I succeeded perfectly by moistening it with a solution of salt and iron sulphate before returning it to the roasting. The first ore worked was of such a character as not really to require roasting, and was specially ill-adapted to treatment in a furnace of this class, where the ore must fall literally through a gale of wind. It contained but little sulphur, while the silver was chiefly in the form of a soft, friable substance in the cavities of the quartz gangue. It contained \$197 silver per ton, and of this only 77 per cent. was saved, while the tailings carefully and thoroughly sampled only retained \$13 per ton, proving conclusively that a heavy loss had been sustained in the roasting. After this the results were more satisfactory, the ore being of a better quality for roasting, containing more sulphur, and the silver being in better form. The value ranged from \$40 to \$250, averaging \$74 per ton in silver, and the yield was 82 per cent. The assays of tailings still showed a considerable though much reduced loss in roasting, probably about 8 per cent.

It should be observed, in judging the work of this furnace, that the conditions were rather unfavorable. A portion of even the latter worked ore was deficient in sulphur; the furnace was worked irregularly, part of the time by a green hand. The ore also was crushed too fine. The assays for soluble silver in the roasted ore, made with sodium hyposulphite, or hot brine, seldom gave less than 90%, and sometimes gave more, and the assays of tailings, never extravagantly high, were sometimes as low as three or four dollars to the ton.

Ore to be roasted in any furnace of the class of revolving cylinders with "grooves, cavities or projections," by which it is lifted and showered through the flames, should be crushed only just so fine as is found absolutely essential for the complete roasting of the particular ore in hand. In some cases, as that of the La Dura ore, in Mexico, a screen of 18 or 20 meshes to the linear inch is sufficient, but when the metalliferous particles are inclosed in a compact gangue it may be necessary to crush finer.

It is also advantageous to have the particles as nearly as possible of equal size, which is promoted by thorough drying before crushing, and by abundant screen surface in the battery, with high speed of stamps; still more by having a very coarse screen in the mortar, and an arrangement for resifting, and returning to the stamps the coarser portion of the pulp.

It is frequently claimed for the different mechanical furnaces that they dispense with the necessity for skilled labor. I do not assent to this, for it is as necessary for the workman who has to work and care for a Bruckner or White roaster to possess skill and to pay attention, as it would be in working a reverberatory, or rather more so, the advantage being in the saving of labor and fuel which they effect, the latter especially in the White furnace, when receiving ore at the cooler end, as the waste heat as well as vapors of salt, sulphur, etc., which are evolved under the finishing heat at the other end of the cylinder, are utilized in roasting and partly roasting the continuously incoming ore, which cannot be the case in a furnace which works by charges.

There is, however, one drawback to the White furnace from which that of Bruckner is free, which is, that if the workman, through ignorance or neglect, or owing to a change in the character of the ore, fails to keep up the degree of heat needed for chloridizing the ore, which at a certain stage in the roasting is almost as mobile as a liquid, runs through the cylinder "like water," and must be returned and passed through again.

However, I do not wish to make comparisons between the two furnaces, for I consider both to be splendid examples of invention, and as I think there are cases and places where either may be superior to the other, I hope the inventor of each may reap the just reward of his ingenuity and perseverance.

C. H. A.

THE House bill, appropriating \$500,000 for the Eads jetty system, was reported back adversely by the Committee on Appropriations.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

The amount of bullion produced by the Empire (Grass Valley) in a run of 20 days was \$17,782.

In the Comanche all the ore stopes and breasts above the 550-levels are looking as well as usual and keep the mill supplied with ore.

The works of the Lady Bryan when finished will be complete in every respect and capable of working to a depth of 2,000 feet, and will compare favorably with any on the Comstock.

In the Justice the ore producing sections throughout the mine continue to look well, yielding their uniform grade ore. In the 800-foot level, as a whole, at no time since the level was opened was the general aspect brighter, in all prospecting points, than at present.

A letter from the Superintendent of the Manhattan, dated the 2d, says: During the past month the mill has reduced 517½ tons of ore. We also shipped \$100,310.45 worth of bullion. The clean-up has not yet been obtained, the pans being now stopped for that purpose. At the Frost shaft the 500-foot east stope shows much improvement, the ledge having increased in size and is continuing in high grade ore. In the 500-foot west stope a large quantity of fine ore is being extracted. To-day's samples assay \$251.33. The 517-foot continues to produce the same quantity of ore, but it is of a higher grade, to-day's samples assaying \$265.45 per ton.

From every indication the great amount of dead work now being performed in the Golden Chariot will open up large bodies of ore for milling in addition to the reserves now developed in 4th, 5th and 6th levels. All work of hand is progressing with the greatest dispatch and economy.

The chloriders in the Meadow Valley are still operating in the old abandoned levels of the mine, but revenue from that source has been rather light, as the ore extracted is of low grade. Owing to the extreme cold weather the parties engaged in concentrating the tailings at Dry Valley mill have been compelled to discontinue operations until the weather moderates.

In the Hale & Norcross they find that the north drift on the 1900-foot level, connecting with the Savage mine, caved badly during the overflow and rise of water reported last week.

They could not get in more than 57 feet on the 1700-foot level of the Gould & Curry mine, with the diamond drill, and they found nothing but porphyry. They are now drifting again to pass the ground that stopped them, and will then again commence drilling. The Superintendent says: It is unfortunate that we could not continue drilling on the 1700-level, as it is much the cheaper plan of prospecting deep, hot mines. I think in two weeks we can get the drift far enough ahead to use the drill again, and then can determine, at the rate of 50 feet per day, the prospect of finding anything east on this level.

On the 1650-foot from the C. & C. shaft they have had a decided change the past few days in the character of the ground, also have encountered some water. The rock is hard blasting and the water increases the heat and our progress will be necessarily slow until connection is made with some of the winzes.

The last clean-up of the Eureka (Grass Valley) was 325 ounces of amalgam.

The Manhattan Mining Co.

The annual meeting of the Manhattan mining company was held on Wednesday. John A. Paxton (President), J. D. Fry (Vice-President), A. K. P. Harmon, W. S. Sage and James S. Porteous were elected Trustees for the ensuing year. John Crockett was chosen Secretary, and Allan A. Curtis Superintendent. There were 45,817 shares represented. From the President's report we extract as follows:

During the year ending December 31st, there has been reduced 6,232½ tons of ore, producing \$1,229,679.57, being an average of about \$198 per ton. The receipts from other sources were \$3,686, making a total of \$1,233,366. Among the items of disbursements are, for ores extracted and tributes paid, \$445,988.38; reduction, \$183,377, being \$29.43 per ton; discounts and freights, \$170,477; paid for ores purchased, \$171,047; for permanent improvements, \$35,821, which includes the erecting of three sets of hoisting works. The total profits of the year were \$217,517, including four dividends of \$50,000 each. The heavy discount upon bullion has greatly reduced the profits, last year's outlay being \$99,769 greater than it would be at present upon the same amount of bullion. The mining expenses have been unusually large, owing to there having been a large amount of ground opened up, and which is now accessible for stoping. The prospects for the coming year are quite as favorable as they have been at any time during the past. There is a surplus on hand of \$68,246.70.

PROFESSOR THOMAS PRICE, of this city, has been appointed a member of the Assay Commission, which meets in Philadelphia on February 14th.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING JANUARY 30TH, 1877.
VETERINARY SURGICAL INSTRUMENT.—Lewis Woods Hamilton, Pendleton, Ogn.
SELF-ACTING STRIPS FOR MINING BUCKETS.—Henry S. Craven, B. F.

COIN WRAPPERS.—Ethan A. Scott, S. F.
METHOD OF SAWING LUMBER.—Jason Springer, S. F.
CAR STARTERS.—Samuel S. Vollum, S. F.
BOOK CLAMPS.—George F. T. Wood, S. F.

EXPLOSIVE COMPOSITIONS.—Egbert Judson, S. F.
The patents were not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of mention:

COIN WRAPPER.—E. A. Scott, S. F. Where silver coin is used in large quantities it is customary to make it up into twenty-dollar rolls, these rolls being enveloped in a brown paper covering, and when these rolls bear the mark or advertisement of any responsible firm, they are accepted as correct without the delay of unrolling and examining them, being simply weighed. This practice has led to attempts to defraud, either by inserting smaller coins between the half dollars in such rolls or by taking a piece of lead pipe, filing it until the proper weight is reached, and placing a real coin at each end of the roll, so that unless entirely opened the fraud will not be detected. Mr. Scott's invention is a wrapper for these packages of coin, to hold them in convenient shape for business transactions, and at the same time expose the coin so that at a glance the nature of the package can be determined without the trouble of unrolling and examining. These improved wrappers are formed of the usual size and material, and with a properly constructed die they are perforated with round holes. These holes are made in sets so as to extend from end to end of the roll, and are placed at such a distance apart that when the necessary number of thicknesses of paper have been rolled about the coins, the holes in the outer layer will exactly fit over the holes in the inner layer of the envelope. In order to expose all the coins there are two sets of holes, and one set stand opposite to the covered space between the other set, or, in other words, break joints with them. A sufficient space is left for advertisements upon the outside of the wrapper, and from the shape of the holes the strength of the material will be preserved, while the necessity for unrolling the coins will be avoided.

CAR BRAKE AND STARTER.—S. S. Vollum, S. F. This invention relates to an improved arrangement for operating brakes on street cars, and also to the combination with said brake operating mechanism of a device for enabling the driver, or other person standing on the platform of the car, to assist the horses in starting the car from a state of rest. This car starting device will be specially useful in case the horses, or either of them, should balk or refuse to pull, as the driver can start the car himself and thus relieve the horses of the strain until it gets started, which will generally set the balky horse to work. In case of accident to the brakes on a side hill or incline, as often happens, the chain used in the device will enable the driver to hold the car until the wheels are blocked. This brake and starter can be operated from either end of the car.

SELF ACTING TRIP FOR MINING BUCKETS.—H. S. Craven, S. F. This is a novel device for dumping and discharging buckets from mines or wells, when they arrive at any level where it is desired to empty them. It consists of an attachment for the bottom of the bucket, which will engage with a slot in the discharge chute, and when the bucket is lowered over the chute will reverse and empty it.

The worst apprehensions are felt of a strike of the Durham colliers in consequence of a difference with the masters about the recent arbitration awards. The strike would directly effect from 30,000 to 40,000 men, and would involve the stoppage of the Cleveland iron industry.

The report of the North Bloomfield mining company, which we received this week, is one of the most elaborately arranged, and contains more definite information, than any mining company's report we have seen for a long time. We shall give an abstract of the report in our next issue.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

The Bressa Prize for Scientific Work.

At the last meeting of the California Academy of Sciences a communication was received from the Academy of Sciences of Turin, Italy, giving the details concerning the "Bressa prize," a matter of some interest to scientists in all parts of the world. The communication contained the following information:

The last will and testament of Cesare Alessandro Bressa, doctor in medicine and surgery, signed the 4th of September, 1835, contains the following clause: "I leave all my property, present and future, after paying certain legacies, to the Royal Academy of Sciences, Turin. The Academy may be represented by its Secretary, or by any attorney elected for that purpose by its resident members. On the decease of Signora Claudia Amata Dupeche, who has a life interest in all my possessions, the Royal Academy of Sciences of Turin will immediately enter in possession of everything and may sell ground property, put capital out to interest in any and whatever way it may find most profitable, and with the interest of this property a biennial prize is to be established, which will be adjudged in the following manner, viz.: The net interest of the first two years to be given in premium to that person, of whatever nation or country he be, who shall have, during the previous four years, made the most important discovery or published the most valuable work on natural and experimental philosophy, natural history, mathematics, chemistry, physiology and pathology, as well as geology, history, geography and statistics. The net interest of the following two years to be given only to an Italian, who, by judgment of the above named Academy of Turin, shall have made the most important discovery, or have published the most important work, on any of the above mentioned sciences. The prizes will continue to be distributed in the same order."

While fully aware of the great responsibility which rests on it in being called to judge the productions of human intellect in a sphere so vast as to comprise nearly all the positive sciences, the Academy has accepted the task with the intention of fulfilling to the utmost the generous wishes of the testator with regard to the promotion and advancement of science. The Bressa legacy remained free from all claims in the month of July, 1876, consequently the first biennial term mentioned in the will, will include the years 1877-78. The first prize will be given in the year 1879 to the person, of whatever nation or country he be, who shall have, during the four previous years, made the most important and useful discovery, or published the most celebrated work on any of the above mentioned sciences. The value of the first prize amounts to 12,000 lire.

In accordance with the spirit of Dr. Bressa's will, the Academy will choose the best work of discovery, whether or not it be presented by the author. The prize, in no case, will be given to any of the national members of the Academy of Turin, resident or non-resident. In the year 1881, the second Bressa prize will be given for the preceding quadrennial term of 1877-80, according to the above rules, except that in obedience to the testator's wishes it can only be conferred on an Italian. And so on, every four years there will be a Bressa prize for competition among scientific men of any part of the world, and every four years a Bressa prize which can be competed for by Italians only.

METALS.

[WHOLESALE.]

THURSDAY, M., February 8, 1877.

IRON.—		
American Pig, ton.....	30	00
Scotch Pig, ton.....	29	00
White Pig, ton.....	29	00
Oregon Pig, ton.....	41	00
Refracted Bar.....	41	00
Boiler, 1 to 4.....	61	00
Plate, 5 to 9.....	51	00
Sheet, 10 to 14.....	—	—
Sheet, 16 to 20.....	51	00
Sheet, 22 to 24.....	51	00
Sheet, 26 to 28.....	61	00
Horse Shoes, keg.....	6	00
Nail Rod.....	94	00
Nail.....	81	00
Roller.....	71	00
COPPER.—		
Copper Tinned.....	37	40
Sheathing, lb.....	37	40
Sheathing, Yellow.....	21	22
Sheathing, Old Yellow.....	10	11
Composition Nails.....	21	—
Composition Bolts.....	24	—
STEEL.—		
English Cast, lb.....	14	25
Anderson & Woods, ordinary sizes.....	15	—
Drill.....	16	—
Flat Bar.....	15	20
Plow Steel.....	84	12
TIN PLATES.—		
14 1/2 Charcoal.....	10	50
Bacon Tin.....	24	—
Australian.....	18	18
ZINC.—		
By the Cask.....	11	—
Sheet, 7 1/2 to 10, lb.....	11	—
7 1/2 to 11, lb.....	11	—
8 1/2 to 10, lb.....	12	—
8 1/2 to 11, lb.....	12	—
NAILS.—		
Assorted sizes.....	3	50
QUICKSILVER.—		
By the lb.....	50	—

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, February 7, 3 P. M.

LEGAL TENDERS IN S. F., 11 A. M., 95@95 1/2, SILVER, 61@64	
Gold in New York 105 1/2	
GOLD BARS, 880@890, SILVER BARS, 70 1/2 @ cent. discount	
EXCHANGE ON NEW YORK, 50@55-100 cent. premium for gold; on London bankers, 49; Commercial, 49 1/2; Paris, five francs \$ dollar; Mexican dollars, 20@210	
LONDON CONSOLS, 96 1/2; Bonds, 102 1/2	
QUICKSILVER IN S. F., by the flask, 9 1/2 lb. 50c.	

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY M., February 7, 1877.

SAGS—Jobbing.		
Eng Standard Wheat, 8 1/2 @ 9 1/2		
Hard Served, 22 1/2 @ 23 1/2		
24 1/2 @ 25 1/2		
23 1/2 @ 24 1/2		
Machine Srd, 22 1/2 @ 23 1/2		
Four Sacks, 22 1/2 @ 23 1/2		
Quarters, 6 @ 7		
Eighths, 4 1/2 @ 5		
Messian, 60 inch, 11 @ 12		
40 inch, 8 @ 9		
Wool Sacks, 3 1/2 @ 4		
4 lb., 55 @ 56		
Standard Gunnies, 11 @ 12		
Bean Bags, 7 @ 8		
CANDLES.		
Grant's, 16 @ 17 1/2		
Mitchell's, 18 @ 20		
CANNED GOODS.		
Assorted Pic Fruits, 25 @ 30		
2 1/2 lb cans, 25 @ 30		
Table, 3 1/2 @ 4 1/2		
Jams and Jellies, 4 @ 5		
Pickles, 1 1/2 @ 2		
Sardines, 1 1/2 @ 2		
Hf Boxes, 3 @ 4		
COAL—Jobbing.		
Australian, 8 @ 9		
Coos Bay, 8 @ 9		
Bellingham Bay, 8 @ 9		
Seattle, 9 @ 10		
Canterland, 14 @ 15		
Mt Diablo, 22 @ 25		
Lehigh, 25 @ 28		
Liverpool, 8 @ 9		
West Hartley, 14 @ 15		
Scotch, 8 @ 9		
Scranton, 13 @ 15		
Vancouver Id., 10 @ 12		
Charcoal, sack, 75 @ 80		
Coke, blk, 6 @ 7		
COFFEE.		
Sandwich Id, lb, 21 @ 22		
Costa Rica, 23 @ 24		
Guatemala, 20 @ 21		
Java, 20 @ 21		
Manilla, 20 @ 21		
Ground, in sack, 25 @ 26		
FISH.		
Sac to Dry, 5 @ 7		
Bonellus, 8 @ 10		
Eastern Cod, 7 @ 8		
Salmon, blbls, 9 @ 10		
Hf blbls, 4 @ 5		
2 lb cans, 10 @ 12		
Pkld Cod, blbls, 22 @ 24		
Hf blbls, 11 @ 12		
Mackerel, No. 1, 9 @ 10		
Hf blbls, 12 @ 14		
Extra, 12 @ 14		
In Kits, 1 1/2 @ 2 1/2		
Ex Moss, 3 @ 4		
Pkld Herring, bx, 3 @ 4		
Boston Sled Hg, 40 @ 50		
LIME, Etc.		
Lime, Sta Cruz, 2 @ 2 1/2		
Cement, Rosendale, 2 1/2 @ 3		
Portland, 4 1/2 @ 5		
Plaster, Golden, 3 @ 3 1/2		
Nail Rod, 10 @ 12		
Land Plaster, 10 @ 12		
NAILS.		
Assorted sizes, keg 3 @ 4		
OILS.		
Pacific Glue Co's No. 1, 1 @ 1 1/2		
Castor, No. 1, 1 1/2 @ 1 3/4		
Baker's A, 1 1/2 @ 1 3/4		
Olive, Plagniol, 4 @ 5		
Palm, B, 4 @ 5		
Linseed, Raw, 80 @ 85		
Boiled, 85 @ 90		
Cocunut, 80 @ 85		
China nut, ca, 70 @ 75		
Sperm, 2 @ 2 1/2		
Coast Whales, 60 @ 65		
Polar, refined, 60 @ 65		
Lard, 20 @ 21 1/2		
Devos's Brilt, 44 @ 45		
Nonpareil, 50 @ 55		
Eureka, 32 @ 38		
Burrol kerosene, 32 @ 38		
Dowier Ker, 50 @ 52		
Elaine, 48 @ 50		
PAINTS.		
Pure White Lead, 9 @ 10 1/2		
Ward's, 14 @ 16		
Putty, 4 @ 5		
Chalk, 1 @ 1 1/2		
Paris White, 2 @ 2 1/2		
Chinese, 3 @ 3 1/2		
Venician Red, 3 @ 3 1/2		
Averil Chemical Paint, gal, 2 @ 2 1/2		
Green, 2 @ 2 1/2		
Ch Yellow, 3 @ 3 1/2		
Light Red, 3 @ 3 1/2		
Metallic Red, 1 @ 1 1/2		
China No. 1, lb, 5 @ 6		
Hawaiian, 6 @ 6 1/2		
Carroll's, 10 @ 11		
Cal Bay, ton, 18 @ 20		
Common, 5 @ 7		
Carmen Id., 18 @ 20		
Liverpool lng, 25 @ 26		
Castile, lb, 10 @ 10 1/2		
Common brands, 4 @ 6		
Fancy brands, 7 @ 8		
SPICES.		
Cloves, lb, 45 @ 50		
Cassia, 22 @ 25		
Nutmegs, 85 @ 90		
Peppercorn, 15 @ 16		
Mustard, Cal, 1 @ 1 1/2		
1 lb glass, 1 1/2 @ 2		
TEA, ETC.		
Cal Cut, 1 @ 1 1/2		
Circle A crushed, 1 @ 1 1/2		
Powdered, 1 @ 1 1/2		
Fine crushed, 1 @ 1 1/2		
Golden C, 1 @ 1 1/2		
Hawaiian, 10 @ 11		
Cal Syrup, lbs, 7 @ 8		
Hawaiian Molasses, 25 @ 27		
Young Hyson, 35 @ 40		
Moyune, etc., 35 @ 40		
Country pkd Gun powder & Imperial, 50 @ 60		
Fyoo, 30 @ 35		
Ho-Chow O, 35 @ 40		
Japan, 1st quality, 40 @ 50		
2d quality, 25 @ 35		

LUMBER.

WEDNESDAY M., February 7, 1877.

CARGO PRICES OFFPUCKET SOUND PINE.	
REDWOOD.	
Rough, M., 18 @ 20	
Refuse, 14 @ 16	
Clear, 20 @ 22	
Clear Refuse, 20 @ 22	
Rustic, 32 @ 34	
Refuse, 22 @ 24	
Surfaced, 30 @ 32	
Refuse, 20 @ 22	
Flooring, 28 @ 30	
Refuse, 18 @ 20	
Beaded Flooring, 30 @ 32	
Refuse, 20 @ 22	
Half-inch Siding, 20 @ 22	
Refuse, 16 @ 18	
Half-inch Surfaced, 30 @ 32	
Refuse, 20 @ 22	
Half-inch Beaded, 30 @ 32	
Refuse, 20 @ 22	
Pickets, Rough, 1 @ 1 1/2	
Rough, Pointed, 13 @ 15	
Pancy, Pointed, 26 @ 28	
Shingles, 35 @ 38	
REDWOOD.	
Rough, M., 22 @ 24	
Refuse, 18 @ 20	
Pickets, Rough, 18 @ 20	
Refuse, 20 @ 22	
Fancy, 20 @ 22	
Refuse, 16 @ 18	
Surfaced & Long Beaded, 37 @ 40	
Flooring, 30 @ 32	
Refuse, 20 @ 22	
Half-inch Surfaced, 32 @ 34	
Rustic, No. 1, 40 @ 42	
Battens, 1 @ 1 1/2	
Shingles, 35 @ 38	

Mining and Other Companies.

Aetna Tunnel Company.—Location of
principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice is hereby given that at a meeting of the Board of Directors, held on the 22nd day of January, A. D. 1877, an assessment (No. 1) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 420 California Street, San Francisco, Cal.

Any stock upon which the assessment shall remain unpaid on Monday, the 26th day of February, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 19th day of March, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JAMES M. HAYEN, Secretary.
Office, Room 6, No. 420 California Street, San Francisco, California.

Dolores Consolidated Mining Company.
Location of principal place of business, San Francisco, Cal. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 22nd day of January, A. D. 1877, an assessment (No. 1) of ten cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 418 California Street, San Francisco, Cal.

Any stock upon which the assessment shall remain unpaid on the 14th day of March, A. D. 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 11th day of April, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. CLARK, Secretary.
Office, Room No. 2, 418 California Street, San Francisco, California.

Great Blue Gravel Range Company.
Location of principal place of business, San Francisco, State of California. Location of works, Placer county, State of California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 7), levied on the 22d day of December, 1876, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Adams, A. S.....	480	85	42 50
Brown, R. C.....	517	150	75 00
Biddell, M. K.....	483	225	112 50
Bryant, W.....	554	200	100 00
Bryant, W.....	557	200	100 00

Names.	No. Certificate.	No. Shares.	Amount.
Bryant, W.	550	200	100 00
Bryant, W.	551	200	100 00
Bryant, W.	552	200	100 00
Bryant, W.	553	200	100 00
Bryant, W.	554	100	50 00
Bryant, W.	555	100	50 00
Bryant, W.	556	100	50 00
Bryant, W.	557	100	50 00
Bryant, W.	558	90	45 00
Breuer, J. H.	559	10	5 00
Carter, T. C.	530	200	100 00
Carter, T. C.	540	200	100 00
Carter, T. C.	541	200	100 00
Carter, T. C.	543	200	100 00
Carter, T. C.	544	200	100 00
Carter, T. C.	545	200	100 00
Carter, T. C.	553	90	45 00
Gordon, Wm.	574	044	322 00
Gordon, Wm.	575	144	72 00
Hastings, Mrs E. E.	534	300	150 00
Josselyn, L. M.	538	40	20 00
Kulley, Mrs E.	533	100	50 00
Lone, Peter	510	500	250 00
Lone, Peter	520	500	250 00
Lone, Peter	521	600	250 00
Lone, Peter	522	600	250 00
Lone, Peter	524	100	50 00
Lone, Peter	525	100	50 00
Lone, Peter	526	100	50 00
Lone, Peter	527	150	75 00
Lone, Peter	529	20	10 00
Lone, Peter	500	24	12 00
Lone, Peter	501	50	25 00
Moore, E. J.	528	750	375 00
McNulty, F. S.	577	200	100 00
McNulty, F. S.	573	200	100 00
McNulty, F. S.	570	100	50 00
McNulty, F. S.	580	100	50 00
McNulty, F. S.	581	100	50 00
McNulty, F. S.	582	200	100 00
McNulty, F. S.	583	200	100 00
McNulty, Frank	575	10	5 00
Mowry, N. B.	506	20	10 00
Mowry, N. B.	508	40	20 00
Plummer, M. D.	572	100	50 00
Prescott, Hattie.	584	100	50 00
Smith, Mrs M.	512	105	97 50
Clary, Wm H.	000	9000	4500 00
Wright, Jas O.	514	500	250 00
Wright, Jas O.	515	325	162 50
Watson, C. F. J. Jr.	533	337	337 50
Williams, A.	506	1200	600 00
Williams, A.	507	2400	1200 00
Wheelwright, Mrs S.	529	450	225 00
Watson, W. H. Jr.	507	700	350 00

And in accordance with law, and an order of the Board of Directors, made on the 22d day of December, 1876, so that all shares of each of these stocks as may be necessary, will be sold at public auction at the office of the undersigned, at Room No. 33, Merchants' Exchange, California street, San Francisco, California, on Wednesday, the 14th day of February, 1877, at the hour of two o'clock, p. m. of said day, to pay said delinquent assessments thereon, together with cost of advertising and expenses of the sale.

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PACIFIC ROLLING MILL COMPANY,
SAN FRANCISCO, CAL.

Established for the Manufacture of

RAILROAD AND OTHER IRON

—AND—

Every Variety of Shafting,

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

—ALSO—

HAMMERED IRON
OF EVERY DESCRIPTION AND SIZE.

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The highest-price paid for Scrap Iron.

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Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

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Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure), All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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Wm. Norris, Wm. H. Taylor, J. B. Haggin,
James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

THOS. PENDERGAST.....HENRY S. SMITH.

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IRON CASTINGS

and MACHINERY

OF ALL KINDS.

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AND

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Manufacturers of all kinds of

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ALL STYLES OF FANCY HEAD BOLTS.
HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.
Repairing promptly attended to at the lowest possible terms.

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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bolts and Gears of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch.
J. H. WEED, PRICES MODERATE.
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Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

FULTON

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Manufacturers of

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Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

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Practical Instructions on General Analysis.

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EXAMINER OF MINES, MINERAL ASSAYER &c.

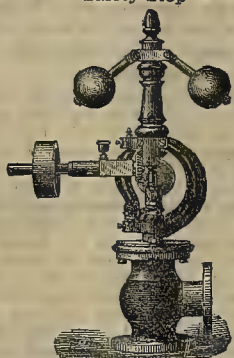
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Cost of Roasting and Chloridizing by this Process:

Two cords of wood at \$6.....\$12.00
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1,500 lbs of salt at 1¢.....22.50
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Cost for 15 tons.....\$44.00
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In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poc Consolidated Co.'s mines in the Peavine District. For further information, apply to

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TAKES THE PLACE OF ALL OTHERS,
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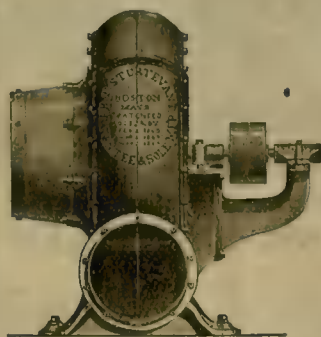
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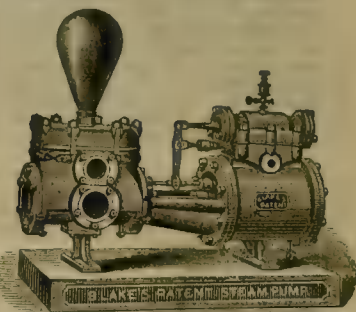
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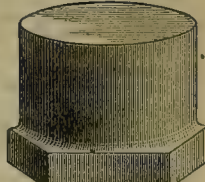
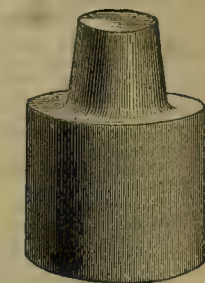
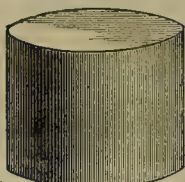
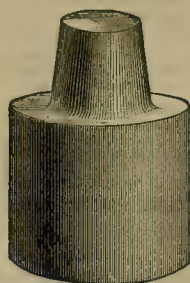
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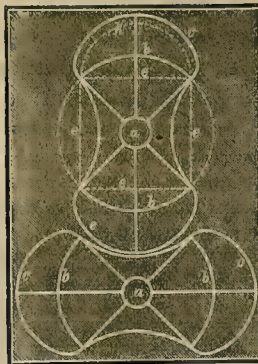
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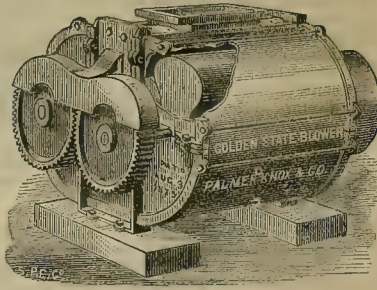
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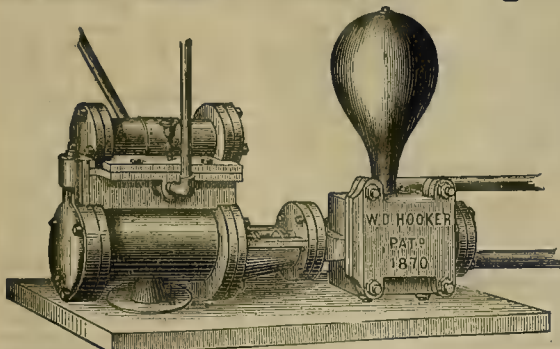
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Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and permanently established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than any other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of inventions discovered here than any other agents.

Situated so remote from the seat of government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars free.

Home Counsel.

Our long experience in obtaining patents for inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

Engravings.

We have superior artists in our own office, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

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F. MEYER, Manager.

PICKERING ENGINE GOVERNOR.

VALLEJO FOUNDRY, October 17th, 1876.

Messrs. NEYLAN & YOUNG, San Francisco,

Agents for "PICKERING GOVERNORS."



Gents:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this year for my patent Straw Burning Threshing Engines give splendid satisfaction. They far surpass for regularity of speed any Governor that I have ever seen, and I have seen all the best kinds; I have seen the main belt fly off the pulley several times this season while threshing, and the engineer did not discover it, so perfectly was the speed maintained, until he was told of it; this I consider something wonderful; I consider the Governor absolutely perfect, so far as speed is concerned. I bought and put on to one of my engines a Shive Governor, to see which was the best, and after one season's trial I have no hesitation in saying they are superior to any other Governor that I have seen or used. I wish you would send me the lowest price that you can furnish 25 Governors for next season's engines. Yours respectfully,

J. L. HEALD.

The only Governor that has received awards at each of the International Exhibitions. American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Baltimore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals; International Exposition, Paris, 1867, One Bronze and Two Special Medals; International Exposition, Vienna, 1873, Medal of Progress and Decoration; International Exhibition, Philadelphia, 1876, Medal and Diploma.

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UNITED STATES Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprises all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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This rare book on the treatment of gold and silver ores without quicksilver, is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and explains the why and wherefore. It contains 142 pages, embracing illustrations of furnaces, implements and working apparatus.

It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. Price, \$2.50 coin, or \$3 currency, postage free.

Concentration of Ores (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arseniurets, and Gold and Silver Ores generally, with 120 Lithographic Diagrams. 1867.

This work is unequalled by any other published, embracing the subjects treated. Its authority is highly esteemed and regarded by its readers; containing, as it does, much essential information to the Miner, Millman, Metallurgist, and other professional workers in ores and minerals, which cannot be found elsewhere in print. It also abounds throughout with facts and instructions rendered valuable by being clearly rendered together and in simple order. It contains 120 diagrams, illustrating machinery, etc., which alone are of the greatest value. PRICE REDUCED TO \$5.

Much Obligated, Etc.

PORTLAND, OREGON, June 26th, 1876.
Dewey & Co., Patent Solicitors, S. F.—Gents: I am much obliged to you for courtesy shown me, and am well pleased with the manner in which you have done my business, and assure you, will cheerfully recommend you to my acquaintances needing such services. Hope to have a case again before long, of my own. I have been an inventor all my life, but let others reap the benefit, or had work stolen from me. Please have the extra copies of my patents sent, etc., mailed to me direct, and oblige. Yours truly,
J. H. WOODRUM.

WOODLAND, CAL., Aug. 8th, 1876.
Messrs. DEWEY & CO.—Gents: Your letter containing the patent for my Centennial churn has come duly to hand, and you will please accept my many thanks for the prompt manner in which you attended to the business entrusted to your care, and I will take great pleasure in recommending you to any one having anything to attend to in your line. I am having a number of the churns put up, which will be ready for sale in a few weeks.
Yours truly,
JAMES ROOT.



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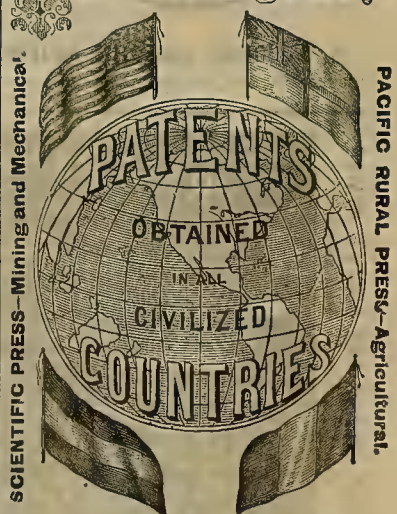
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Published by G. & C. MERRIAM, Springfield, Mass.

DEWEY & CO'S Scientific Press Patent Agency.



Publishers, Patent Agents and Engravers,
224 SANSOME STREET, SAN FRANCISCO.

Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroenke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improved retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners' and prospectors' use. Price, post free, (in leather,) \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome Street, San Francisco.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 17, 1877.

VOLUME XXXIV.
Number 7.

A Home for the Sailor.

Some 10 or 12 years since a number of philanthropic ladies of this city formed an association to secure a home for sailors, where they might be properly taken care of while in port and protected from the impositions and robberies of unscrupulous men. These ladies have worked long and earnestly, by holding fairs, soliciting personal contributions, etc., until they had accumulated a fund of some \$16,000 or \$18,000, with which they purchased a suitable lot about a year ago on which to erect a home.

Soon after that purchase, at the suggestion of several prominent citizens, they prepared a memorial and petition to Congress for the use of the old marine hospital building, corner of Harrison and Spear streets, for the purpose of a home. Through the exertions of our delegation in Congress, the petition was heard and granted, and some three months since the ladies were put in perpetual possession of that property for the uses specified—the same to revert to the government whenever its uses were diverted. This is better than owning the property, as while the title rests in the government the property is not liable to taxes of any kind.

The building is now in process of thorough renovation, at an expense of some \$15,000, including furnishing—the money thus far having been raised by selling the lot belonging to the society, for which they now have no further use. The home will be opened about the first of April, and will form one of the largest, most convenient and most complete institutions of the kind in the world, and capable of accommodating from 400 to 500 persons. It will be, indeed, a "Palace hotel" for poor Jack, which he will no doubt fully appreciate. It will be provided with a library, reading room, lecture room, etc., and will be a place where seamen can find good board and lodging at fair rates, and where they may pass their time while in port out of the way of the pernicious influences to which they are now subjected. We give annexed a view of the building, which is worth over \$100,000 as it stands. It is located on a slight elevation commanding a fine view of the city and harbor, and forms a most conspicuous object to the mariner as he enters the port.

The work of the ladies has been, for years, a most untiring and arduous one, and one which, by the liberality of the general government, has been finally crowned with most abundant success. These ladies deserve the gratitude of the whole community for this national work in behalf of our seamen. We know that it is most fully appreciated by the leading merchants and ship owners of this city.

The lady officers and managers of the society are: Mrs. C. D. Knight, President; Mrs. Capt. Henry Tucker, Recording Secretary; Mrs. P. S. Williamson, Corresponding Secretary; and Mrs. E. D. Cogswell, Treasurer. Their associates in management are Mrs. A. E. F. Baker, Jane Rowland, B. F. Lambert, R. Barclay, G. Burrows, W. B. Ewer, A. W. Loomis, J. Hughes, A. Kohler and W. Rielly. The President and Secretaries are Trustees.

Their Advisory Board are Capt. Oliver Eldridge, L. M. Kellogg, Hon. E. D. Sawyer and W. B. Ewer, all men having the confidence of the public.

A table prepared by Harry C. Hoyt, marine reporter to the Merchants' Exchange, shows that fifty vessels were built on the Pacific coast last year, at a total cost of \$1,021,100, divided as follows: Steamers, \$220,000; sailing vessels, \$631,100; two revenue cutters, \$175,000.

A MINERS' union is being formed at Darwin, Inyo county.

THE BLACK HILLS.—Not all the reports which come from the Black hills are rose-colored by any means. Some of the miners there have a very poor opinion of the country. One of these is Robert Evans, an old resident of Nevada, and now in the Black hills country. In a letter to the *Eureka Sentinel* he says: I think I know a little about placer mines, and I am convinced that this is about as poor a mining country as I ever struck. There are a few claims that have paid well, but they are very scarce. In Montana, in early days, you could see some fat

Scenery on the Columbia River.

The Pacific coast is rich in natural scenery from end to end. It has the grand elements of mountains and rivers to weave into its landscapes. The glaciers and rivers in many cases have been the sculptors and the mountain sides have been the marble. The result is a most wonderful variety of rock exposures, which command the silent admiration of the one who views them because of their grandeur and magnitude.



SAN FRANCISCO SAILORS' HOME.

sacks of gold-dust, but they are as scarce here as hens' teeth. I see by the Eastern papers that thousands are coming here in the spring from the States. They will be disappointed like myself and plenty of others, and wish themselves out of here again. I do not know what they will do for a living, unless they join Sitting Bull or General Crook's army. My advice to all old acquaintances is to stay where they are. Do not believe the big stories you read in the pa-

These remarks are especially true of the scenery of the Columbia river of the north. The little sketches which we present on this page this week represent scenes which are sublime in their proportions.

Only a short distance above Cape Horn, on the south, or Oregon side of the river, is situated a perpendicular rock of peculiar basaltic formation, "Rooster rock," and still another, which rises from the middle of the river for

tains of California, and are the central range. The eastern ridge is above the great falls of the Columbia. The western is along the shore of the Pacific ocean, called the Coast range.

The Columbia has three large falls in the distance of 700 miles: the Cascades, 130 miles from the ocean; the falls of the Columbia, 40 miles above the Cascades; and the Kettle falls, 530 miles above the Columbia. Besides these falls, there are many dangerous rapids. On the Southern Columbia, Lewis, or Snake river, as it is more commonly called, which unites with the main river a few miles above Old Fort Walla Walla—now Wallula—there are two great falls, known as the American and Shoshone, the latter being 362 feet perpendicular, with cliffs towering on each side 1,000 feet from the water's edge.

The Cascade range is the most important of the three ranges of mountains named, and derives its name originally from the great number of beautiful cascades which pour out of almost every ravine and crevice of the mountains, many times from the very summit, presenting in the sun's rays a grand constellation of glittering jewels.

For varied and remarkable scenery the Columbia, for 1,000 miles from its mouth, is certainly the most notable of any river in the world. The most magnificent views of earthly scenery are presented from different points. High mountain peaks, covered with perpetual snow, are to be seen in all directions. Among these peaks the most notable are Mt. Hood, Mt. Jefferson, Mt. Adams, Mt. St. Helen, Mt. Rainier, and the Three Sisters. The sight is grand beyond description. At places the country, as viewed from the river, looks barren and worthless, and the waters move sluggishly towards the sea. At others, the country presents the most beautiful appearance, with gardens, vineyards, crops and herds—a perfect Elysium. Again it is covered with thick forests of heavy timber—or the broad, rich bottom lands are awaiting the husbandman to yield a thousandfold the seed sown.

CORK OAK.—The Santa Barbara Press says: Commissioner Watts, of the National Agricultural Department, has asked for the results of a

distribution of cork acorns made by his office. In response we state that 15 years ago Mr. Hinchman, of San Diego, then resident here, received some acorns from Washington, and planted some and gave five (described as being 2½ inches long) to Captain Trussel. Those planted by Mr. Hinchman failed to live, and of the five planted by Captain Trussel four were destroyed by squirrels. One tree is now standing on the lot at the corner of Montecito and Castillo streets. It is an evergreen oak about 20 feet high and covers about as much area. At the foot it is 40 inches in circumference, and six feet from the ground, where it begins to branch, it is 30 inches in circumference. The leaf is very similar to the California live-oak, except that the under side is whitish. The tree, though carefully watched, has never been known to fruit. As Captain Trussel does not permit specimens to be cut we had to be satisfied with sticking a knife into the bark; it penetrated readily through a smooth, good quality of cork bark to a depth of an inch and a half. As all cork used in the United States is imported, and the wine interest of California is growing so fast, it may be well worth while for our enterprising agriculturists to plant the cork acorn, as this soil and climate are eminently well adapted for it.

THERE is a rumor from the English coal regions which is calculated to alarm English miners. It is to the effect that the proprietors of the mines have resolved to import cheap labor from China, and have already consulted the Chinese Ambassador on the subject. That official replied that he would undertake the management of the immigration, provided the immigrants were protected from insult and injury.



ROOSTER ROCK, COLUMBIA RIVER.
43 miles from Portland.



CASTLE ROCK, COLUMBIA RIVER.
57 miles from Portland.

pers, for there is nothing here to induce anybody to come. I shall leave as soon as possible and go back to old Nevada again, for it is a better country than this ever will be.

MORTGAGE ON THE SUTRO TUNNEL.—We see by the Nevada papers that a mortgage was placed on the Storey county records last week, executed by the Suto Tunnel Company to Robert and Hugh McCalmont and William Johnstone Newall, of London, England, covering all the property, franchises and improvements of the company, to secure a loan from the mortgagees to the company of \$124,321 already made, and further advances to be made in future.

some hundreds of feet, called "Lone rock," or "Castle rock." At another point a tiny stream of sparkling water pours over the cliff in one unbroken fall, 700 feet in height.

The Columbia river is navigable a distance of 130 miles, from the ocean to the Cascades, the head of tide water. At the Cascades, Dalles and several other places, railroads have been built around the falls and dangerous rapids, which connect with steamboats of light draft, which run up the Columbia and its numerous tributaries for 700 or 800 miles distant.

There are three general ranges of mountains west of the Rocky mountains, running in a northern and southern direction: the Cascades are a continuation of the Sierra Nevada moun-

CORRESPONDENCE.

Personal Suffrage in Mining Companies.

(Written for the MINING AND SCIENTIFIC PRESS.)

EDITORS PRESS:—Manhood suffrage is in this country the foundation of the political system (it being considered that the interests of non-suffragers are properly represented by their male protectors, individual cares of self-supporting females being looked upon as exceptional if not abnormal, and the injustice arising therefrom as illustration of the unavoidable imperfection of human institutions). The greatest good of the greatest number is regarded as the legitimate object of legislators, checked, however, by a due regard for the "inalienable rights" of the minority, or rather, perhaps, by a recognition of the fitness of things whereby the application of the principle is limited to cognate subjects of interest. Thus the property and feelings of the individual may be sacrificed to the material interests of the community, but life can only be taken in defence of life.

In accordance with these principles every male citizen (and vicariously, in theory at least, every female and minor) has a vote or a voice in the management of affairs; and if injustice is sometimes done to the minority the evil is reduced to a minimum by the check above referred to, and is submitted to as the inevitable result of human imperfection, being, in fact, regarded as a relative good, in view of the vastly greater evil which would result from a different course.

Why are these fundamental principles of republicanism ignored in the organization of our mining companies, where we seem rather to have borrowed a leaf of the history of the middle ages, where the power to do was confined to the favored few, and the many were permitted only to be and to suffer?

In politics there are many excellent reasons for thinking that the right or privilege of the suffrage should be permitted only to those who, by the accumulation of a certain amount of property, have proved their capacity, as well as desire to promote the public prosperity, and have, so to speak, given security for the proper use of the power which they desire to exercise, and so cogent are these reasons that in some very liberal governments this system is adapted in preference to ours (though to be perfectly consistent they ought to allow a man an increased number of votes in proportion to the increase of his "stake in the country," while we think it better to vest the right in, or grant the privilege to the man rather than his jackass or other possessions. But the arguments which are so potent in politics lose their force when applied to the government of a mining company, in which the greatest good of the greatest number will be best if not solely attainable by the principle of manhood, or more properly personal suffrage in its government, while the opposite principle makes the rights of the majority entirely dependent on the justice or magnanimity of the minority, and how slender a dependence this is, let the history of mining on the Pacific coast bear witness.

It may appear that the two cases are not parallel, since the possession of at least one share, which might be called a property qualification, is an essential condition of membership in a company, but the discrepancy is not material for our present purpose, and, indeed, disappears when it is considered that every member of society possesses at least his indivisible share in the national domain and all public property. The real difference lies in the fact that in the community the individual is enabled to segregate, to a certain extent, a greater or less quantity of property, which is, therefore, to a corresponding extent (not at all absolutely) under his own control, which is impossible in a mining company, but I think this difference is rather in favor of than against the view that the greatest good of the greatest number is best secured in the latter by the principle of personal suffrage.

I know it will be said that the interests of the wealthy investor must not be prejudiced nor his progress hampered by the necessities of his poorer partner, who, if he cannot "keep up his lick," must be content to lose his property in order that the great one may not be crossed in his wishes, or perhaps that the scripture may be fulfilled which says, "to him that hath much more shall be given, but from him that hath not (much) even that little that he hath shall be taken away," but I confess to a want of sympathy with the rich man in this case, who can certainly afford, at least as well as his weaker associate, to wait for his dividends, and to something more than a want of sympathy when, as is continually occurring here, he purposely increases the expenses or diminishes the product of a mine, being enabled so to do by the pernicious principle on which companies are organized, with the express object of "freezing out" his partners in the enterprise. The only legitimate agreement in favor of the present system is, that the interests of the community, to whom in the ultimate analysis it must be admitted the

mines belong, is furthered by their development, and consequently it is better that the privilege of working them should be granted in preference to those who are best able to prosecute that development; but, aside from the fact that there are other ways of attaining that object, as, for example, making the possession of a certain amount of capital a condition precedent to the occupation of a mine, as is done in some countries, I cannot, in view of the many wholesale frauds and robberies committed, of the widespread ruin, despair and devastation produced, and of the universal corruption of morals consequent upon the perversion of the spirit of enterprise to a reckless passion of gambling, all of which are the consequence of violent and unreasonable fluctuations in values, which again are largely traceable to rascally manipulations by or with the consent of "insiders," or are rendered possible by the constant uncertainty in the minds of the public as to the intentions of the said "insiders;" I cannot, I say, in view of these things, concede that the best interests of society are subserved by a system which thus sacrifices the best attributes of humanity to the supposed advancement of a purely material interest.

Under the system of personal suffrage in mining companies it would undoubtedly happen that individuals would occasionally suffer, but that is unavoidable and would happen much less often than under the present system, by which the advantage of the few is too often secured at the expense of the many, while it would undoubtedly result that the management of the mines would be purified, legitimate mining for profit would be encouraged, and stock gambling, by which I mean speculation in stocks without regard to the intrinsic merits of the mines, would no longer present such alluring inducements as now. The practice of "watering" stocks, ostensibly for the purpose of affording an opportunity to persons of moderate means to purchase, is in reality a part of the machinery by which the scattered dribbles of coin in the pockets of the million may be pumped up into the already plethoric coffers of the few, and is seldom resorted to by honest companies devoted to legitimate mining rather than to stock gambling; it should be discouraged, as should also the prevalent practice of forming companies with enormous fictitious capital, which can serve no other purpose than that of making the possible amount of assessments practically infinite. When a company is formed a reasonable and liberal estimate should be made of the amount of money required to accomplish its object, and to this sum the organic capital of the company should be limited, with a provision for its enlargement if found necessary, not by a clique of large owners, but by the votes of a considerable majority of the parties interested. In addition to the principle of personal suffrage, and to prevent evasion of its intent, it might be advisable to prohibit the practice of voting by proxy, and members at a distance might be permitted to send in their ballots by mail; nominations and candidacies would then be announced beforehand, and elections of directors would cease to be such a farce as they are. Also, it would not be difficult to devise some means by which minorities would be represented, to the great advantage of the company at large, since even minorities have rights, and occasionally good ideas.

I am aware that a majority of the present leading operators in mines would hold aloof from a company organized on the plan I propose, or on any plan which would prevent them from playing a "hogging game," and it is very possible that, for a time, mining stocks would be less eagerly sought after by the silly multitude who now throng "the slaughter house" on California street, sowing the seeds of the wind that they may hereafter reap the whirlwind. Be it so! With economy and honesty in the management of mines, and a genuine desire on the part of companies to make money by mining rather than by gambling, our mines would soon make a record which would offer inducement enough for legitimate investment, not only of our own, but of foreign capital also, while the inevitable fluctuations in values consequent on the vicissitudes of mining would afford abundant margin for legitimate speculation. As matters stand now with many of the "listed" stocks, the insiders are simply stealing and the outsiders are gambling.

I have no sympathy with the howlers in some of the daily papers who, because they have gambled and lost, choose to vituperate the management of the Bonanza mines, and clamor for restitution when it is clear that had they won they would have been the last to mention it, while some others must have lost to an equal amount. I think with you that it would better become such persons to grin and bear it, or, in more elegant phrase, to "suffer and be strong." Most of them knew that they were buying the mines at a most extravagant valuation, or else they never took the trouble to investigate that point; in either case were utterly indifferent to it, and simply hoped to be able to shift the burden and the loss on to other shoulders at some advantage to themselves. I would be ashamed to stand up before the public and cry "thieves!" as did one gentleman at a company meeting not long since, because, forsooth, having tried to cheat others I had cheated myself instead, or, which is the same, having speculated on a "point" I had found myself deceived. For what is a point? Simply a piece of surreptitious information touching the merits or finances of a mine, to the benefit of which all actual owners, or contemplating purchasers, have an equal right; or it is a glimpse of some intended rascality

on the part of insiders, and he who invests on the strength of it is virtually trying to steal; the only palliation of his conduct being found in the old saying that "there's no harm in stealing from a thief," for it is an undeniable, though a deplorable, fact that a very large proportion, perhaps all but you and I, dear reader, of those who are addicted to stock gambling, will not hesitate to avail themselves of a lie, either direct or constructive, or any other means practically within the pale of the law, by which they may obtain money, so that it is understood to be a game of diamond cut diamond all round, to the detriment of that private integrity which is the best bulwark of our liberties, and the decadence of which in the masses is the greatest danger to which those liberties are exposed.

But although individual sufferers are, perhaps, in most cases undeserving of sympathy, while those on whom so much obloquy is cast are doing no more than a majority of their victims would do had they the opportunity, it is none the less to be desired that a better state of things should be inaugurated, and as it is not safe to trust too much to human honesty under temptation, I hope to see some new system adopted in the organization of mining companies by which it will be rendered very difficult, if not impossible, for a few individuals to obtain absolute control over the property of many, and I think the first step in this direction is the adoption of personal suffrage in mining companies.

It is probably true that, as you say in a recent article on the subject, the managers of the Bonanza mines have done nothing contrary to the usual practice of persons in their position; yet, if it is also true, as generally believed, that the usual practice is not governed by strict integrity, that fact becomes their condemnation, and the statement is an admission that they are robbing their partners in the property day by day; and though I make no accusation against them, having no positive knowledge to justify my doing so, nor any direct interest in the matter, yet I may say that when parties, in control of the property of others, make a practice of letting contracts affecting that property to themselves, and profit enormously by so doing, the proceeding is at least open to suspicion, and, in common with most people who know anything of working ores, I am convinced that those of the mines on the Comstock can be worked to a much higher percentage than has been done (as a general rule) without greater expense to the company, if open competition was allowed and invited.

Not only do the mills engaged on these ores make a large profit on the price paid them for working, but the owners of the mills claim as their perquisite all the tailings, which, by the figures given in official reports, constitute, or will soon do so, a property of immense value in themselves. The highest average result of the milling that is claimed is 73 per cent. of the assay value of the ore. A large proportion of this value is gold, of which probably more than 73 per cent. is saved, so that the proportion of silver saved is less than 73 per cent. Granting, however, that 73 per cent. of both gold and silver is saved, such a result, with ore assaying \$120 per ton, would not be tolerated for any length of time in many of the outside districts; and when we consider that some 600 tons of ore are worked daily, that the tailings are the property of the mill owners, and that the mill owners manage the mines, and yet comprise but a small proportion of the owners of those mines, suspicion becomes almost certainty that a monstrous fraud is perpetrated. Six hundred tons of ore, containing over \$30 per ton, run down every day to the place prepared for it at an expense which is covered by ten days' run, will make a very nice little mine in the course of a few years—a mine which will need no miners to work it; no powder, nor drills, nor timbers, no pumps, nor hoisting machinery; a mine in which the ore will be shoveled up by Chinamen, already crushed, in which there will be no caves, nor horses, no heat, nor foul air; a mine of which the value will be accurately known, and which will therefore not be "listed," nor tossed from bull to bear, nor dealt out to "the street" at high prices, to be gathered in again, in the fullness of time, at low ones, but will be held fast in the loving embrace of a close corporation, who will work it with the greatest economy, and who will use the best obtainable process for the extraction of the precious metals; a mine that will furnish a great part if not all of the quicksilver required for its working, for those same mills are using and losing quicksilver at a very liberal rate, and are charging for it, too.

The millmen said, through their Superintendent, that they would sell these tailings—a fair proposition, doubtless, as far as it goes; they did not name the price, nor did they mention whose pockets would be the heavier for the sale. If the gentlemen alluded to really wish to clean their skirts of the imputations cast upon them, not without a show of reason, they will throw the working of the ores of mines under their control, open in good faith to public competition, and award the contract to whomever will do it for the least price, and guarantee the highest return. Dare they do this? I opine they will not; and their (defrauded?) partners are powerless.

Is it likely that this state of things would continue, or rather that such things could be done, if every stockholder had an equal voice in the election of directors?

It is idle to say that because these gentlemen own a very large interest in the mines, they have therefore a right to absolute control of the prop-

erty of their co-owners. There is no justice in such a system. Were they chosen to do so, as they would be if they showed themselves honest as well as capable, by a majority of the persons interested, there could be no objection; but they are not so chosen, they are elected by themselves with perhaps the aid of a few of their satraps and friends, and they work their imperial will with the property of a hundred times their number.

The present system of incorporations is, in its application to mining, pernicious. I know not if there is any value in my suggestions, but my purpose will be answered if should succeed in setting better heads than my own at work on a problem which is of great importance to this community, namely, how to protect the rights of share minorities (usually personal majorities) in mining companies. At present poor owners of mines are afraid to allow capital to come to their assistance, on the sole condition on which capitalists can generally be induced to take hold—that of acquiring a majority of the stock; and so the development of mines is retarded which under a better system would be made productive. ATOM.

Geology of Prospect Mountain.

EDITORS PRESS:—The elements that now form our oceans, lakes and rivers, and the gases that entered into the solid structure of our planet, once formed a dense atmosphere, impenetrable to light, enveloping the earth to a depth, not of 45 miles as is now estimated, but of thousands of miles. The best of authorities on geology inform us there was a time in the history of our planet when it was a fiery molten mass, without seas or oceans or a solid crust.

How was this thin crust formed? At this point of the investigation the geologist must appeal to the astronomer for the history of the origin and birth of our planet, for in this vague and nebulous border land, where the very rocks have no definite forms or substances and flow into each other, there the two sciences meet. Astronomy shows us our planet thrown off from the sun in a molten fiery state, to move in an independent orbit of its own. Hence arises the question, did that incandescent world contain, latent within itself, the elements of life. Structural forces lie latent in the molten mass, whether or not those forces reach to the extent of forming a planet or an animal.

Astronomy began with solid crystalline spheres. Look at the wonderful and beautiful architecture of a crystal! All the marvels of crystalline force, all those wonderful branching frost-ferns which cover our window panes on a winter morning, the exquisite molecular architecture of ice lies latent in water and comes into play when the water is sufficiently cooled. Gravitation and polarization, which blend in harmony in the working forces of the universe. Thus the teaching of science is that the world-constructing forces are latent in the mass, and that the formation of an inhabitable world is not less wonderful than the formation of a crystal. Crystallization performs an active part in the formation of the matrix, gangue or vein matter of a metallic lode. Without crystalline structure there would not be much of the precious metals in our mines, for gold and silver are crystalline.

The Geological Structure

Of Prospect mountain comprises the four great classes of rocks; the fossiliferous, volcanic, metamorphic and plutonic are all conspicuously displayed within a very small area and with their peculiar characters strongly contrasted.

The western slope contains fossiliferous limestone. On the flanks of the mountain are belts of quartzose rock and conglomerate, to which on the east side succeed belts of argillaceous shale, flanked by belts of quartzite, metamorphic limestone and other strata containing silicate of lime. The emergence of granite in the northwest spur of Prospect mountain at the surface until it has become exposed to view, is an intrusive rock of later date than the other, and bears from the Windsail shaft, (Eureka Consolidated Mining Co.) west-southwest 300 yards. This granite is underlying Ruby Hill and sends out dikes of porphyry or spurs of the granite mass itself; one of these is known to exist about one and a half miles north of the Richmond mine.

It is not difficult to form a true idea or a precise method of granitic uplift, whereby the fossiliferous limestone of Prospect mountain became shaped into a dome or arch of 12 or 14 miles long and an altitude of 7,000 or 8,000 feet above the sea level. This mountain, as seen from a distance east or west, has the dome or arch shape of the jurassic or cretaceous period, and by the testimony of a little fossil shell of the sea characteristic of the cretaceous period, the bivalve of the clam or cockle species, demonstrate the fact that Prospect mountain was at one time as low as the ocean. There are at least three

Well Defined Parallel Metallic Belts

Running nearly northwest and southeast, represented in the vein system of Prospect mountain, the lodes of Secret canyon, on the South Ruby hill, and Adams hill on the north yielding gold, silver and lead. The age or origin of the fissures of Ruby hill is precisely the same as the

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SCIENTIFIC PROGRESS.

On Mineral Veins.

We find in the proceedings of a late meeting of the London Geological Society, a discussion on mineral veins opened by W. Morgan:

He maintained that no one theory can be accepted in explanation of the formation of mineral veins, and that whilst in some cases their formation may be due to the presence of pre-existent fissures induced by shifting of the containing rock, in others any such explanation is insufficient, as he thought the means by which the sides of such fissures were kept apart could not be easily indicated. The point upon which he especially insisted in connection with this question was the presence of "horses" in many mineral veins. He advocated the view that the walls of veins were in close proximity in their earliest stage, and that the enlargement and infilling of the veins took place simultaneously, by the segregation of materials derived from the adjacent rock, supplemented, perhaps, by a tension, or tendency to separation, caused by slow contraction of the latter. Instead of a fissure he assumed the presence of an irregular surface of least resistance, or of electrical action, at which the vein matter might collect at first as a mere film. In this way, he thought, the vein might increase, and its walls might recede, simply by the aggregation of the vein matter itself, and in general proportion to the degree of mineral saturation of the adjacent rocks.

Professor Ramsay said he was startled, but not terrified, by this new view of the formation of mineral veins, and especially by the implied supposition that the rocks on either side of a mineral vein were in a less consolidated state when the vein was formed than at the present time; but at the same time, considering that so many veins are to be found in deposits, which had not only been consolidated, but had already undergone metamorphism, producing slaty cleavage (as, indeed, had been mentioned by the author), before the formation of the veins contained in them, he could not altogether accept the new notion. He remarked that joints in rocks, especially limestones, are always permeable by water, and by this means fissure joints may be easily widened. Hematite, as is well known, lies in great water-worn fissures and caverns in the carboniferous limestone of south Lancashire; but with slaty rock he thought the case may be very different. He referred to the arrangement of mineral in veins in support of the view that their deposition took place in open fissures; and considering the solidity of the rocks before the formation of mineral veins, it seemed to him difficult to imagine how these immense masses could be pushed aside, as they must be, by the formation of small veins in the manner suggested by the author.

Professor Hughes mentioned cases in which protuberances had held rock faces apart during movements, as *e. g.* on a small scale, where worm tracks on the face of a Cambrian rock had given rise to a kind of crag-and-tail during movements producing slickensides along the bed on which they occurred. On a large scale, as *e. g.* in the Via Mala in the Alps, wavy fissures might be seen running down the side of the precipice; and obviously, when displacement took place along such cracks, the two sides could not be in contact along their whole length, until the protuberances had all been ground down, forming what he called "fault breccia." He thought the manner of occurrence and alterations of various minerals showed that they had been formed by crystallization along successive layers on each wall of the fissure, the growth of the crystal being outwards from the walls, and each new layer having the impress of that on which it was thrown down.

THE NEW STAR.—Prof. C. A. Young, of Dartmouth college, describes the coming of a new star in the *Journal of Chemistry*. On the evening of November 24th, 1876, Prof. Schmidt, of Athens, distinguished for his researches upon variable stars, observed in the constellation Cygnus a new star of the third magnitude, which by midnight was well up toward the second. On the 20th, the last clear night preceding, no such star had been visible. He immediately telegraphed the discovery to Paris and Vienna, but the weather was very unfavorable, so that no observations could be made until December 2d, when the star had already fallen to the fifth magnitude; by the 12th it had become invisible to the eye,—of the seventh magnitude according to Hind,—and it is now (January 10th) not above the eighth. The position of the star is near L. Cygni, in right ascension 21h. 36m., 50.4s., and in north declination 42° 16' 38.5", where none of the catalogues indicate any star at all; so that hitherto it cannot well have been brighter than the eleventh or twelfth magnitude.

A POSSIBLE NEW METAL.—Prof. G. A. Koenig, of the University of Pennsylvania, announces that he has reason to suspect the existence of a new metallic element in a mineral resembling schorlamite, occurring at Magnet Cove, Arkansas. In an examination of this mineral, he obtained, instead of titanic acid, a white oxide which differed very decidedly from the former. He is disposed to regard this circumstance as pointing most probably to the existence of a new metal in the mineral in question.

The Oldest Plant.

At a recent meeting of the Academy of Natural Sciences of Philadelphia, Mr. Martindale exhibited some specimens of the sensitive fern (*Onclea sensibilis*) in the curious condition known as the variety *obtusilobata*. The matter is of great interest, from the fact that this fern is perhaps the oldest living floral organism on the globe. It is found in a fossil state, and some paleontologists believe it has been in existence for 500,000 years. On some of the prevailing theories of evolution it ought to have branched off, by "gradual modifications," into numerous descendants, and we ought to have allied species, if not allied genera. But not only are there no very closely allied genera, but only this one single species, and it shows no tendency to produce the slightest variation worth speaking about. If we could find a good substantial variation in this fern, it would be, therefore, a case of considerable interest. Dr. Asa Gray, in his "Manual of Botany," regards the so-called variety *obtusilobata* as no variety, but as a peculiar morphological condition of the same thing; and the specimens found by Mr. Martindale perfectly confirmed this view. The male frond of the *Onclea* is but the female frond contracted and rolled up, as is the case in all ferns having the female fronds of a different character to the male. In the variety *obtusilobata* the sporangia are borne on a flat frond, like as in *Aspidium*, the lobes of the frond not rolling completely up, as in the perfect form. It is the same thing, with only the frond not as perfectly transformed. The sensitive fern ("sensitive" from its withering so soon after gathering) is also of interest from its being as "highly organized," notwithstanding its great age, as any fern of a much more modern origin, geologically speaking. There is, doubtless, much to sustain the theory of a gradual progress from a simple to a complex structure through the course of ages, but the *Onclea* is surely not among these facts.

THE MAGNET IN SURGERY.—A curious experiment was tried recently on the son of Sir Benjamin Brodie. The lad had contrived to break a needle in the calf of his leg. He was taken to the Royal Institution, in London, and a powerful electro-magnet was used to detect the position of the needle, and the possibility of moving it. The exact position was indicated by the disturbance of a magnetized needle, but no change could be produced in its position. After the experiment, however, the limb could be moved about, the pain having ceased; and, finally, the broken needle having shifted to the other side of the leg, as was shown by the index attached to the magnet, it came sufficiently near to the surface to be extracted. The experiment, though giving a negative result so far as "drawing" the needle was concerned, was so far satisfactory that it enabled the lad to use his leg without pain.

LEVERRIER ON ULTRA-NEPTUNIAN PLANETS.—After a long-continued labor Leverrier has at length, with the theory of Neptune and Uranus, completed the study of all the members of the solar system. His chief object was to decide the question whether there is an ultra-Neptunian planet, which might be detected, as Neptune was, by the perturbations produced by it on planets already known. The conclusion is negative; there is nothing indicating the existence of a body outside of Neptune. Now that there is nothing to be hoped for in the way of discovery at the outer boundaries of the solar system, we presume Leverrier will devote himself to finding the intra-Mercurial planet or planets, in whose existence he still has unshaken belief.

THE LIEBIG MONUMENT.—The sum of 140,000 marks (about \$35,000) having been collected for the Liebig memorial, the committee has decided to close the subscription list. A discussion about the site of the projected monument has arisen between the rival committees of Giesen and Munich, the former claiming the statue on the ground that from their university Liebig's fame first issued to the world; the latter because their city was subsequently the scene of his labors. It has been resolved that both towns shall have a similar memorial, and that these shall be cast in bronze, the sum collected sufficing to cover the expense of both.

ELECTRIC LIGHTING.—*Dingler's Journal* says that a new electro-magnetic lighting instrument has recently been described by M. Hess. It consists of a chromic acid element, a small induction coil, and a vessel containing a mixture of alcohol and sulphuric ether. The pressure of a knob puts the zinc of the element in contact with the liquid, and the small induction sparks inflame instantaneously the vapors of ether liberated from a sponge, which has been dipped in the mixture of alcohol and ether. According to the inventor, this instrument has the advantage of lasting a long time without requiring any attention.

NEPTUNE THE MOST DISTANT PLANET.—After a long-continued labor, M. Leverrier has at length, with the theory of Neptune and Uranus, completed the study of all members of the solar system. The author's chief object was to decide the question whether there is an ultra-Neptunian planet, which might be detected, as Neptune was, by the perturbations produced by it on planets already known. The conclusion is negative; there is nothing indicating the existence of a body outside of Neptune.

MECHANICAL PROGRESS.

Boiler Shell Drilling.

We recently gave a description of a machine made in an Eastern State for bringing the steam drill to bear upon boiler shells, instead of making the rivet holes with the punch. We now read that the English have contrived a machine for the purpose, which is thus described by *Iron*: The boiler shell may be conveniently slung by chains in a vertical position between two pairs of headstocks, carrying horizontal drills, so that the transverse joints may be all drilled by rotating the shell as each hole comes in succession between the headstock drills. The two double headstocks are carried on a traversing horizontal bed to enable them to slide closer or apart as required to suit the varying diameters of boiler shells, by means of independent rack and pinion gear. Each headstock is supplied with two drills, one of which is for drilling the holes, viz., from the outside of the shell, and the other, from the inside, is for countersinking. The inner headstock also carries two crutches or prongs, against which the boiler shell presses when the drill is brought home to its work.

The drills are driven by bevel gearing from upright spindles in the hollow headstocks, which again are driven by the horizontal shaft running along the bed-plate. The piercing drill has a self-acting feed, but has also a hand-wheel by which it may be quickly withdrawn as soon as the plates are pierced.

After the piercing drills have completed their part of the work and are withdrawn, the countersinking drill is brought up to its work before the position of the shell is moved. The countersinking drill is kept there by the action of a hand-treadle lever, carried to the side of the machine and outside the boiler shell. This places them handily for the operation of the machine hand.

When the boiler has been duly slung and set for a ring of holes, which may easily set out by template, the drills may be attended to by two laborers, and the holes rapidly drilled and countersunk ready for riveting up. There is thus no drifting of the holes required. The work turned out by these machines, though cheaply done, should thus be of the very highest character for accuracy and strength. At the same time the simplicity and easy working of the tool will make it a favorite in the workshops, being within the skill of any laborer. This machine has already been tested and approved in one of the principal boiler-maker's shops in Lancashire.

Testing Tension on Iron Rods

A writer for the *Railroad Gazette* submits for the consideration of engineers having charge of the erection and maintenance of railroad bridges, the subjoined suggestion of a plan for enabling the bridge inspectors to determine whether or not each rod under tension in a bridge has been properly set up in the erection of the structure; and at any time afterward whether or not each such rod is doing its duty.

When a bridge is about to be set up, let one rod out of each lot of a certain length and diameter be suspended at one end and loaded at the other end with an actual weight equivalent to the strain that every rod of that length and diameter ought, according to the calculations of the designer of the bridge, to be subjected in the structure when ready for the imposition of its live load. Then put upon the rod, with white paint, a ring, at, say, five feet above the highest point at which the rods will be held in the angle-blocks, on the lower chord of the bridge. Then provide a steel hammer of a known weight, fitted with a handle of a known length, and as many tuning-forks as there are sizes of rods in the bridge. Then with his left hand, with his left arm fully extended, let the inspector hold a tuning-fork firmly against the rod at the painted ring, while with his right hand with the arm fully extended, he strikes the rod at the ring, a smart blow with the hammer. Then, immediately removing the tuning-fork, let him note the sound given out by the rod and the fork respectively, and by filing the fork bring the fork into tune with the rod. Then let a designating number be stamped upon both rod and tuning-fork; and repeat the operation for each set of rods in the bridge. Thereafter, when the bridge is set up, and still thereafter, when the inspector is to go through that bridge, he will take the hammer and set of tuning-forks belonging to that structure, and tune his rods. Thus he may guard against, or detect the condition too frequently existing in bridges, under which some rods are unduly strained and some others are doing almost no work.

AN ATMOSPHERIC LOCOMOTIVE ENGINE.—An atmospheric locomotive engine, designed by Major Beaumont, Royal Engineers, has been on trial at Woolwich arsenal for some time past, and appears likely to be attended with success. The apparatus consists of a large number of elongated cylinders—about 70 in all—piled together in an oblique stack, each cylinder being some four inches in diameter and about six feet in length. Mounted on an ordinary truck, and by the ordinary crank arrangement, the compressed air stored in the cylinders has been found to exercise power sufficient to draw a light load for a considerable distance, and to keep up speed for a long time before requiring to be replenished.

Portable Steam Engines.

The increase in the use of steam, and consequently in demand for mechanic's work, by the spread of portable engines, is great. There have been many valuable inventions to adapt these engines to the consumption of different kinds of fuels. We read in a book on the portable engine just published in England that the absence of fire-wood and heavy cost of coal on the steppes of Hungary and south Russia appears to have almost excluded the use of steam in those districts, until the application of straw and other vegetable substances as fuel became known. The want of steam power is equally felt in other agricultural districts besides those already mentioned. In India the dried leaves of fibrous plants, the scrub or brushwood, and the stalks of the cotton plant supply an excellent substitute for coal in boilers properly constructed. In Egypt the cotton plants are pulled up after having attained a certain growth, and the stalks, which are about one-half inch in diameter and four to five feet in length, contain all the calorific properties of good wood, and will burn perfectly well if properly inserted into the furnace. In the large wheat-growing districts of the Maremma and the Puglia, in the west and south of Italy, wood and coal are very scarce, and as the grain requires to be threshed very shortly after harvest, on account of the nature of the climate, the farmer would gladly avail himself of steam power provided he could use his straw, which he has always at hand and in superfluous abundance. In South America, New Zealand and the extensive prairies of the River Plate, Chile and Mexico, the universal demand of the farmers is for steam machinery which can be worked with indigenous fuel; and the time may come ere long when the land in these countries shall be plowed, the crops harvested and threshed, and the grain ground into flour by steam engines fed with straw, brushwood and vegetable refuse grown on the estate. But the great recommendation of some improved portable engines appears to be that with slight changes in the arrangements of the fire bars they will burn not only coal, wood and the various vegetable substances already enumerated, but also peat of all kinds, sawdust, chips and megass, the refuse of the sugar cane, and, in fact, almost any vegetable refuse within reach. There can be no question that the adoption of this class of engine would permit of the introduction of steam power in almost innumerable localities from which it has hitherto been excluded, and as all the fittings attached to it are of the best and most approved form, it may be hoped that its use will be widely extended.

Narrow-Gauge Progress.

The *Railway Age* has the following figures on the progress of narrow-gauge railroads, which is a matter of interest in many counties of this State: Narrow-gauge building on this continent may be said to have begun in 1871, only six years ago, and its progress may be noted as follows: 1871, miles of narrow-gauge built, 179; 1872, 450 miles; 1873, 555 miles; 1874, 819 miles; 1875, 585 miles; 1876, 569 miles. Total in operation in America, 3,157 miles. These figures are nearly correct, though, probably, not entirely complete. This shows an addition of 569 miles of narrow-gauge track in twenty-one States—more than one-fifth the total number of miles of railway constructed in the country during the year, according to most authorities. For a system practically of recent introduction and which is still considered by many of doubtful economy and efficiency, this certainly is a very encouraging showing, and indicates that, in spite of the assertions of some that narrow-gauge roads will not and must not be built, they have been and will continue to be built. The thirty-three roads whose extensions are noted above have now a total length of nearly 1,000 miles, and this is less than one-third of the total narrow-gauge mileage now in operation in America. The number of narrow-gauge roads in operation in America is over 100, besides an indefinite number projected.

ENGLISH FEAR.—The *Iron Age* says: English manufacturers look with little cordiality on the French exhibition of 1878. The London papers say "the world is tired of exhibitions." The fact is that they dread another competition with American manufacturers in the presence of the world. Their defeat at Philadelphia is well understood in Europe, and is hurting their foreign trade, and another such at Paris in 1878 would be likely to prove a serious blow to British industries.

ELECTRIC CLOCKS IN PARIS.—For making the four electric timekeepers which the city of Paris intends to erect, 15 names have already been entered. The competition will close on September 30th, 1877. The four clocks finally selected will be bought by the city of Paris at £200 each. Three prizes, £120, £80, and £40, will be allowed respectively in addition for the three best clocks.

PENSION TO AN INVENTOR.—The Societe d'Encouragement Nationale has been petitioned on behalf of the inventor of the pneumatic lever, Mr. Barker, who has resided in France for some time, and has made in that country the discovery of the above mentioned lever, and of the method of applying electricity in aid of organ playing. An international committee was formed for purchasing an annuity.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Jan. 25.	Week Ending Feb. 1.	Week Ending Feb. 8.	Week Ending Feb. 15.
Alpha.	23 17	23 20	21 19	21 19
Alta.	23 17	23 20	21 19	21 19
Andes.	23 17	23 20	21 19	21 19
Baltimore Con.	23 17	23 20	21 19	21 19
Belcher.	11 8	9 8	8 8	8 8
Best & Belcher.	43 22	22 22	22 22	22 22
Bullion.	19 10	19 10	17 13	17 13
Caledonia.	12 10	11 10	10 9	9 8
California.	55 40	45 41	50 45	50 45
Challenge.	31 3	31 3	31 3	31 3
Chollar.	80 65	70 60	70 60	70 60
Confidence.	11 7	10 9	10 8	9 9
Con Imperial.	2 70	1 20	2 20	2 20
Con Virginia.	55 42	43 43	48 43	53 50
Crown Point.	9 61	9 61	9 61	9 61
Coso Con.	12 10	12 10	12 10	12 10
Dayton.	12 11	11 11	11 11	11 11
Eureka Con.	21 20	22 19	20 19	22 19
Exchequer.	81 81	81 81	81 81	81 81
Golden & Belcher.	45 40	40 40	40 40	40 40
Grand Prize.	75 50	75 50	75 50	75 50
Globe.	75 50	75 50	75 50	75 50
Globe Chariot.	3 21	3 21	3 21	3 21
Gould & Curry.	14 11	12 11	13 11	13 12
Hale & Norcross.	50 43	49 41	51 41	51 41
Hussey.	60 25	56 30	56 30	56 30
Julia.	182 101	152 14	143 11	143 13
Justice.	182 101	152 14	143 11	143 13
Kentuck.	81 81	81 81	81 81	81 81
K K Con.	81 81	81 81	81 81	81 81
Knickerbocker.	80 50	80 50	80 50	80 50
Kosuth.	11 75	11 75	11 75	11 75
Lady Bryan.	40 11	24 21	75 50	75 50
Lady Wash.	4 3	4 3	4 3	4 3
Leopard.	4 3	4 3	4 3	4 3
Leviathan.	11 77	1 20	1 15	1 20
Leeds.	4 28	4 28	4 28	4 28
Modoc.	4 4	4 4	4 4	4 4
Manhattan.	15 11	12 11	11 11	10 8
Manfield.	15 11	12 11	11 11	10 8
Meadow Valley.	11 50	11 50	11 50	11 50
Mexican.	32 17	13 18	17 17	17 17
North Con Virginia.	32 17	13 18	17 17	17 17
New York.	87 64	50 50	50 50	50 50
Niagara.	25 24	29 26	27 24	26 26
Northern Belle.	25 24	29 26	27 24	26 26
New Coso.	4 4	4 4	4 4	4 4
Occidental.	26 21	24 23	23 23	23 23
Ophir.	105 86	102 94	101 90	96 93
Overman.	105 86	102 94	101 90	96 93
Pacific.	2 2	2 2	2 2	2 2
Phil Sheridan.	52 35	75 60	70 60	60 50
Pioneer.	10 16	10 16	10 16	10 16
Poorman.	40 35	30 25	30 25	45 40
Prospect.	40 35	30 25	30 25	45 40
Raymond & Ely.	75 50	60 50	60 50	75 50
Rock Island.	75 50	60 50	60 50	75 50
Sage.	71 60	65 60	65 60	60 57
Seg Belcher.	71 60	65 60	65 60	60 57
Sierra Nevada.	9 81	81 81	81 81	81 81
Silver Hill.	9 81	81 81	81 81	81 81
South Chariot.	9 81	81 81	81 81	81 81
Succor.	11 75	11 11	11 11	11 11
Trojan.	11 75	11 11	11 11	11 11
Union Con.	11 75	11 11	11 11	11 11
Union.	11 75	11 11	11 11	11 11
Wells-Fargo.	11 75	11 11	11 11	11 11
Woodville.	11 75	11 11	11 11	11 11
Yellow Jacket.	16 11	16 11	14 13	15 14

Sales at S. F. Stock Exchange.

FRIDAY, A. M., FEB. 9.	925 Exchequer	61 61
130 Alpha.	20 21	
150 Alta.	20 21	
170 Best & Belcher.	36 20	
45 Belcher.	81 81	
1090 Bullion.	15 15	
200 Baltimore Con.	22 22	
1270 Con Imperial.	24 22	
415 Crown Point.	81 81	
1045 California.	49 48	
235 Con Virginia.	52 43	
925 Confidence.	81 81	
45 Chollar.	6 6	
320 Caledonia.	91 91	
100 Dayton.	11 11	
100 Exchequer.	11 11	
390 Gould & Curry.	131 12	
111 Hale & Norcross.	51 51	
1175 Justice.	131 12	
1055 Julia.	51 51	
100 Kentuck.	7 7	
350 Lady Washington.	12 12	
50 Leviathan.	90 90	
450 Lady Bryan.	32 32	
50 Mexican.	17 17	
100 New York.	50 50	
195 North Con Vir.	85 85	
160 Ophir.	26 26	
215 Overman.	12 12	
50 Phil Sheridan.	12 12	
125 Prospect.	40 40	
400 Succor.	60 60	
125 Savage.	81 81	
125 Sierra Nevada.	81 81	
100 Silver Hill.	66 64	
50 Utah.	16 16	
40 Union.	9 9	
100 Wells-Fargo.	14 14	
100 Yellow Jacket.	14 14	
MONDAY, A. M., FEB. 10.		
150 Alpha.	20 21	
175 Andes.	70 70	
200 Alta.	21 21	
185 Best & Belcher.	34 33	
145 Belcher.	81 81	
70 Bullion.	13 13	
155 Baltimore Con.	21 21	
230 Caledonia.	91 91	
100 Con Imperial.	2 10 22	
70 California.	49 49	
150 Con Virginia.	51 50	
50 Chollar.	6 6	
50 Dayton.	11 11	
225 Exchequer.	61 61	
430 Gould & Curry.	131 12	
111 Hale & Norcross.	51 51	
85 Justice.	14 14	
610 Julia.	51 51	
1000 Kentuck.	7 7	
50 Leviathan.	90 90	
450 Lady Washington.	12 12	
130 Mexican.	17 17	
500 North Con Vir.	85 85	
100 Occidental.	12 12	
325 Ophir.	26 26	
215 Overman.	12 12	
240 Phil Sheridan.	12 12	
50 Silver Hill.	66 66	
125 Savage.	81 81	
45 Sierra Nevada.	81 81	
250 Trojan.	70 71	
245 Utah.	16 16	
50 Union Con.	9 9	
50 Wells-Fargo.	14 14	
100 Yellow Jacket.	14 14	
AFTERNOON SESSION.		
150 Alps.	90 90	
300 Andes.	70 70	

300 Poorman.	10 10
275 Raymond & Ely.	51 51
490 Rye Patch.	24 24
TUESDAY, A. M., FEB. 13.	
20 Alpha.	19 19
185 Andes.	70 70
90 Belcher.	81 81
160 Best & Belcher.	34 34
370 Bullion.	15 15
170 Baltimore Con.	21 21
925 Crown Point.	81 81
785 Con Virginia.	52 43
40 Con Imperial.	2 05
130 Caledonia.	91 91
35 Chollar.	6 6
390 Dayton.	11 11
355 Exchequer.	61 61
130 New York.	50 50
210 Hale & Norcross.	51 51
615 Julia.	51 51
855 Justice.	14 14
100 Kossuth.	75 75
50 Leviathan.	90 90
280 Lady Washington.	12 12
150 Lady Bryan.	32 32
320 Mexican.	17 17
40 Grand Prize.	50 50
935 North Con Vir.	85 85
70 Ophir.	26 26
135 Overman.	12 12
150 Occidental.	11 11
75 Rock Island.	25 25
95 Silver Hill.	81 81
145 Savage.	81 81
5 Seg Belcher.	31 31
100 Succor.	60 60
350 Sierra Nevada.	81 81
1550 Trojan.	11 11
110 Utah.	16 16
70 Yellow Jacket.	15 15
AFTERNOON SESSION.	
115 Best & Belcher.	35 35
200 Belmont.	21 21
110 Belcher.	81 81
130 Bullion.	15 15
775 Con Virginia.	53 43
1410 California.	49 48
100 Crown Point.	81 81
70 Chollar.	6 6
740 Con Imperial.	2 05
100 Coso Con.	14 14
315 Eureka Con.	19 19
90 Exchequer.	61 61
40 Grand Prize.	50 50
40 General Thomas.	25 25
800 Golden Chariot.	22 22
570 Justice.	14 14
500 Kossuth.	75 75
75 K K Con.	13 13
745 Leopold.	56 56
450 Leeds.	44 44
400 Leopold.	56 56
475 Modoc.	30 30
100 Northern Belle.	26 26
300 New Coso.	43 43
310 Manhattan.	30 30
60 Ophir.	26 26
300 Panther.	10 10
300 Poorman.	10 10
300 Rye Patch.	24 24
100 Succor.	60 60
10 Union Con.	9 9
730 Yellow Jacket.	15 15
WEDNESDAY, A. M., FEB. 14.	
100 Alpha.	19 19

THURSDAY, A. M., FEB. 15.	
90 Alpha.	20 20
520 Best & Belcher.	34 34
910 Bullion.	13 13
465 Belcher.	81 81
670 Crown Point.	81 81
2440 Con Imperial.	2 25
780 Caledonia.	91 91
3130 Con Virginia.	52 43
580 California.	48 48
25 Chollar.	6 6
300 Con Virginia.	51 51
880 Exchequer.	61 61
775 Gould & Curry.	121 12
585 Hale & Norcross.	51 51
1105 Justice.	14 14
720 Kentuck.	81 81
300 Kentuck.	81 81
150 Lady Bryan.	32 32
370 Mexican.	17 17
600 Modoc.	30 30
455 Overman.	12 12
455 Savage.	81 81
415 Sierra Nevada.	81 81
135 Succor.	60 60
45 Silver Hill.	81 81
155 Utah.	16 16
185 Union Con.	9 9
515 Yellow Jacket.	15 15

AFTERNOON SESSION.	
262 Alps.	70 75
670 Alta.	21 21
100 Andes.	70 70
90 Belcher.	81 81
375 Best & Belcher.	35 35
115 Crown Point.	81 81
175 Caledonia.	91 91
1615 Con Virginia.	53 43
840 Dayton.	11 11
235 Eureka Con.	19 19
470 Gila.	75 75
130 Golden Chariot.	22 22
170 General Thomas.	25 25
90 Jackson.	44 44
1305 Con Virginia.	51 51
110 Kossuth.	75 75
785 Leviathan.	90 90
325 Lady Washington.	12 12
1650 Leeds.	44 44
300 Leopold.	56 56
955 Leopold.	56 56
2455 Modoc.	30 30
300 Northern Belle.	26 26
305 North Con Vir.	85 85
35 New Coso.	43 43
50 Overman.	12 12
500 Orig Hidden Treasure.	25 25
210 Occidental.	11 11
90 Prospect.	40 40
500 Panther.	10 10
700 Poorman.	10 10
185 Phil Sheridan.	40 40
175 Silver Hill.	81 81
25 Succor.	60 60
200 Raymond & Ely.	51 51
200 Rock Island.	25 25
1800 Trojan.	11 11
50 Woodville.	16 16
1100 Wells-Fargo.	10 10

Pacific Board—Latest Sales.

WEDNESDAY, A. M., FEB. 14.	
50 Alpha.	20 20
450 Atlantic.	11 11
140 Alta.	21 21
400 Andes.	70 70
70 Belcher.	81 81
150 Best & Belcher.	35 35
160 Crown Point.	81 81
2215 Con Imperial.	2 30
200 Chollar.	6 6
300 City of Boston.	25 25
340 California.	50 50
60 Exchequer.	61 61
240 New York.	50 50
50 Hale & Norcross.	51 51

MINING SHAREHOLDERS' DIRECTORY.

(Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.)

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DEBIT'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
American Flag M & M Co	Ely District	9	25	Dec 19	Jan 29	G R Spinney	320 California st
Alta M & M Co	Washoe	5	50	Jan 1	Feb 23	W H Watson	302 Montgomery st
Arizona M Co	Washoe	1	50	Feb 6	Mar 13	W Willis	309 Montgomery st
Baltimore Con M Co	Washoe	14	50	Feb 7	Mar 13	C A Sankey	331 Montgomery st
Belmont M Co	Washoe	1	50	Feb 12	Mar 15	J W Pew	419 California st
Belcher & Belcher M Co	Washoe	10	100	Jan 25	Mar 12	J S Kennedy	419 California st
Bullion M Co	Washoe	2	100	Jan 15	Feb 19	J S Kennedy	419 California st
Caledonia M Co	Washoe	1	100	Jan 10	Mar 15	R Wegener	414 California st
Crown Point G & S M Co	Washoe	29	100	Jan 10	Feb 14	J Newlands	419 California st
Gold & Curry M Co	Washoe	29	100	Jan 10	Feb 14	J Newlands	419 California st
Hale & Norcross S M Co	Washoe	53	100	Jan 22	Feb 27	J F Lightner	309 Montgomery st
Julia Con M Co	Washoe	1	100	Jan 4	Feb 8	A Noel	419 Montgomery st
Mint Gold & S M Co	Washoe	16	100	Jan 31	Mar 6	D A Jennings	401 California st
New York M Co	Washoe	11	50	Jan 25	Mar 12	D L Thomas	419 California st
Niagara M Co	Washoe	5	50	Feb 7	Mar 12	W R Townsend	Nevada Block
Occidental M Co	Washoe	1	50	Feb 6	Mar 13	A K Durbin	309 Montgomery st
Original Comstock M Co	Washoe	1	50	Feb 5	Mar 5	T E Atkinson	330 Pine st
Prospect M Co	Washoe	2	50	Jan 8	Feb 9	J P Moore	426 California st
Robinson M Co	Washoe	6	50	Jan 16	Feb 13	W R Townsend	309 Montgomery st
Savage M Co	Washoe	26	100	Jan 27	Feb 28	E B Holmes	309 Montgomery st
South Comstock M Co	Washoe	5	25	Jan 30	Mar 27	J M Buffington	311 California st
Silver Hill M Co	Washoe	10	100	Feb 6	Mar 13	W E Dean	419 California st
Utah M Co	Washoe	15	100	Feb 6	Mar 13	G O Pratt	309 Montgomery st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Aurelia G & S M Co	Nev	3	10	Dec 29	Feb 5	Feb 28	T S Fitch	240 Montgomery st
American Nevada M Co	Nev	2	10	Jan 15	Feb 24	Mar 19	L Hermann	220 Sansome e
Atina Tunnel Co	Utah	1	3	Jan 2	Feb 26	Mar 19	J M Haven	420 California
Allison Ranch Franklin M Co	Cal	1	50	Jan 30	Mar 3	Mar 20	T M O Connor	505 Front st
Black Hawk Coal M Co	Cal	1	50	Nov 16	Jan 17	Feb 15	H A Powell	520 Montgomery
Chollar & Curry M Co	Washoe	2	5	Dec 11	Jan 16	Feb 15	J F Sterling	330 Pine st
Cherokee Flat Blue Gravel Co	Cal	37	5	Feb 5	Mar 15	Apr 5	O H Bogart	402 Montgomery
Chandler M Co	Cal	3	5	Jan 13	Feb 16	Mar 3	D H Williams	Grass Valley
Chico Boy Coal M Co	Washoe	4	25	Feb 16	Feb 16	Feb 16	T B Beach	309 Montgomery
Chico Boy Coal M Co	Oregon	5	50	Jan 25	Mar 2	Mar 24	T B Beach	Montgomery Blc
Dolores Con M Co	Nev	1	10	Feb 1	Mar 14	Apr 11	J W Clark	418 California
Enterprise Con M Co	Cal	11	1	Jan 29	Mar 6	Mar 28	F J Hermann	612 Commercial
Florida S M Co	Nev	8	50	Feb 14	Mar 24	Apr 14	L Hermann	220 Sansome e
Florida S M Co	Cal	1	50	Feb 14	Mar 24	Apr 14	L Hermann	Grass Valley
Howard Tunnel M Co	Utah	1	3	Jan 2	Feb 26	Mar 19	J M Haven	420 California
Kennedy M Co	Amador	13	100	Jan 31	Mar 19	Mar 19	A Wiesel	210 California
Lucky Rock G M Co	Cal	1	5	Jan 31	Mar 19	Apr 0	C S Healy	Merchants E
Lucky Rock G M Co	Cal	1	1	Feb 1	Mar 19	Apr 0	C S Healy	309 Montgomery
North Carson M Co	Nev	6	15	Jan 9	Feb 7	Mar 5	O H Bogart	402 Montgomery
Oceanic Quicksilver M Co	Cal	5	50	Jan 25	Mar 3	Mar 26	C G Funk	438 California
Oceanic Table Mt M Co	Cal	12	10	Feb 7	Mar 12	Apr 2	D Wilder	328 Montgomery
Orleans Table Mt M Co	Cal	13	10	Feb 7	Mar 12	Apr 2	J D Thompson	401 California
Silver Sprout M Co	Cal	20	10	Dec 19	Feb 15	April 14	P B Wingard	328 Montgomery
Taylor M & M Co	Cal	—	20	Dec 27	Jan 29	Feb 23	S M Murfey	607 Montgomery
Tuolumne Hydraulic M Co	Cal	—	5	Jan 19	Mar 16	Feb 28	I T Milken	523 California
Yulcan Coal M Co	Cal	2	10	Dec 19	Feb 5	Mar 1	J Greif	636 Washington
White Beecher Con M Co	White Pine	6	50	Dec 20	Jan 26	Feb 1	D A Jennings	401 California
Wheatfield M Co	Arizona	1	50	Jan 5	Feb 15	Mar 3	E F Foulds	535 Clay st

Continued from page 98.

series of Prospect mountain. The dynamical cause is the same for the reason that those parallel to each other were formed at the same time, and the age was that of axis of uplift. The Richmond mine, the first in present productiveness and among the first in richness of the argentiferous and plumbiferous deposits of the State of Nevada, is a contact vein (and not, as is erroneously called, a pipe vein). Contact veins are those whose walls are formed of dissimilar rocks. Situated on Ruby hill, a spur of Prospect mountain, the strike of the lode is nearly northwest and southeast magnetic, and dips northeast.

The Mines.

Next to the Richmond in point of present importance is the Eureka Con., being a part of the same lode, and has much the same strike and dip as the Richmond has. The K. K. is next, apparently on the same ore channel. The Jackson, a little south of the K. K.; the indications at the opening of this mine promised a bright future. It seems there are vicissitudes in the working life of a mine similar to that of a prospector, who, after battling a long time against the ebb tide of fate, suddenly becomes rich through the flood tide of fortune flowing in his favor, and again, after a short and reckless career, becomes suddenly poor. Such has been the experience of the Jackson company. Under the present efficient managers this mine will soon become one of the productive mines of Eureka county.

Prospect mountain is not complete, is not finished yet. Those remorseless and inexorable forces that made it what it is are still at work making it what it is yet to be. The winds and rains, the heat, frost and snow are doing their work in denudation and disintegration.

JOHN M. FOLEY.

Eureka, Eureka Co., Nev., Feb. 5th, 1877.

Globe District, Arizona.

EDITORS PRESS:—The following is the latest mining and metallurgical news about Globe district, Arizona:

The Garish smelting works, situated at the Wheatfields, started up last week. Up to the present time (January 26th) they have turned out considerable copper, which assays about 90% in fineness. The copper contains a large percentage of gold and silver. They estimate the crude bullion to be worth \$1,000 per ton. They will start smelting silver ores next week. The Wheatfield milling company have completed their ditch, and intend to have their mill running in 60 days. It is a complete California quartz mill. The Richmond mine, at Richmond basin, is looking splendid; shaft, 25 feet deep; vein, three feet wide. Ore milled at Morrill's mill \$2,700 per ton. Mr. Stiles has been offered \$30,000 for his half, but he would not sell. In the McCormick extension the shaft has obtained a depth of 76 feet, where the vein is four feet wide, well defined and average assays made go over 400 ounces per ton. They are getting out ore to have milled. In the Stockman mine sinking the shaft is going rapidly ahead. The shaft is being well timbered. At 30 feet they have got a six-foot vein, with an 18-inch streak of ore that assays high. In the Kentuck mine, at 35 feet, the vein is over four feet wide. The ore is what is known as copper silver glance. The ore worked over 3,000 ounces to the ton. There is four feet solid of that kind of ore. The Barney claim, owned by J. M. Barney, of Yuma, is turning out over \$1,000 a day. It is situated in Richmond basin, and the ore is found in a horizontal strata. Over \$15,000 has been taken out within these last couple of weeks. The Champion mine is looking better than ever before. The owners have let a contract to sink 100 feet. When the shaft is completed they will commence taking out ore. At present they are working up the dump piles. In sinking a shaft on the Munson mine, they struck a very rich body of ore that don't need to be assayed to tell what it contains. The vein in bottom of shaft of the Lazy Bob mine is looking good. The shaft is 40 feet deep; vein, two feet wide; character of ore, copper silver glance. The result of a working test shows the second-class ore to contain 580 ounces to the ton.

The following variety of silver ores are to be found in the Globe district: Native silver in cubic crystals, iodide of silver, bromide of silver, chloride of silver and selinite of silver, brittle silver ore, silver glance, polytasite, miargyrite, proustite and stromeyerite. T. P. G. Globe City, A. T.

SONOMA QUICKSILVER.—The productive quicksilver mines of Sonoma county are the Oakland, near Geyser peak, producing about 300 flasks a month; the Cloverdale, on Sulphur creek, producing 160 flasks; the Great Eastern, near Guerneville, producing 125 flasks; and the Mt. Jackson, near the Great Eastern, producing 100 flasks. Total production, 625 flasks per month. There are other mines that could be made productive with little work, but the owners do not care to work them at present prices.

HELIUM is a hypothetical solar element, indicated by certain spectrum lines that cannot be referred to any known terrestrial element.

Reed-Birds, or Bob-o-Link.

Our illustration shows members of the feathered tribe which comes from the Atlantic shore, both north and south, will recognize. It is known as the "meadow-bird" in Louisiana, the "reed-bird" in Pennsylvania, the "rice-bunting" in the Carolinas, the "bob-o-link" in New York and thence eastward; is always the same, and yet of very different characteristics in the different regions. Entering the southern portions of the United States, it proceeds northward in early spring, flying by night; but, returning in the autumn, it flies by day. It reaches New York by the middle of May, having inflicted much injury upon the corn-fields of the South in its journey, but is believed to do little injury in the North. At this season it becomes so plentiful all over the country as to be found in pairs in every corn-field and meadow, their varied plumage and joyous song everywhere attracting the desires of bird-catchers, who capture them in trap-cages, and sell them

nate between birds that are beneficial and birds that are injurious. In making up his estimates of the horticultural value of the different species of birds, he bases his calculations upon the following guiding principles:

First. Any bird of which it is only known that it feeds upon insects, is to be regarded as beneficial, until facts are discovered to the contrary.

Second. A bird feeding upon *Hymenoptera* (bees, wasps, ants, etc.) is to that extent probably injurious. A bird feeding on ants is to that extent neutral, neither beneficial nor injurious.

Third. A bird feeding upon *Lepidoptera* (butterflies and moths) is to that extent probably beneficial; if this is a twilight bird it is almost certainly so.

Fourth. A bird may be reckoned beneficial, in so far as it feeds upon caterpillars with two rows of abdominal prolegs.

Fifth. He can infer little or nothing, at present, from the presence of *Diptera* (flies, gnats, etc.) in a bird's stomach.



THE REED-BIRD, OR BOB-O-LINK.

for good prices in every city. They are sometimes taken to Europe, and, in such cases, the change in the hue and the cessation of the song of the male, by the time the journey is over, often disappoints the adventurous shipper. In captivity they are easily tamed, but appear cheerful only in spring and parts of the summer, though the song is never so glad as when the bird is free.

Our illustration calls to mind the somewhat vexed question of the value of birds to the agriculturist. It is well known that while there are birds which play havoc with crops of grain and fruit there are also birds which wage a valuable warfare upon noxious insects. There are also birds which divide their attention between fruit and insects and some which seem to be most fond of eating insects which are known to be beneficial. It is quite proper that scientific investigation should be brought to bear upon the actions of birds to ascertain their value or worthlessness. We learn from a Chicago exchange that Professor S. A. Forbes, of Normal, Ill., has been engaged in a work of this kind. He is examining the stomachs of the different species of birds (he has 1,000 stomachs already gathered and preserved in alcohol for this purpose), to ascertain the kinds of food on which they live, and to gather facts, so as to be able to discrimi-

Sixth. *Coleoptera* (beetles), considered in the mass, are to be reckoned injurious. *Cicindelidae* (tiger beetles), *Carabidae* (ground beetles), *Coccinellidae* (ladybirds), *Lampyridae* (fire flies), are beneficial. The *Cerambycidae* and some *Meloidae*, the tetramerous beetles, are especially injurious.

Seventh. *Orthoptera* (cockroaches, crickets, grasshoppers, etc.) may be set down as injurious. Many of those species which are not now especially beneficial would become so if their increase were unrestrained.

Eighth. A bird feeding upon small *Neuroptera* (dragon flies, lace wing flies, may flies, white ants, etc.) is of suspicious character.

Ninth. *Myriapoda* are on the whole beneficial. *Chilopoda* especially so, while *Chilognaths* are neutral.

Tenth. Spiders are beneficial, and birds eating them largely are to be watched. The *Phalangidae* (harvestmen) are especially to be protected.

Upon the above classification the stomachs of the birds are examined and their probable value or injury determined. It is also announced that Prof. Forbes, assisted by Prof. Cyrus Thomas, State Entomologist, contemplates the preparation of a bill, to be submitted to the legislature of Illinois, having in view the promotion

of economical science. The object is to secure a small appropriation, say \$2,000, for the investigation of the food and habits of birds, with reference to their relation to agriculture and horticulture, also to study the food and habits of fishes, with a view to ascertain the condition essential to the increase and propagation of the kinds most valuable for food, and also for the collection and preparation of specimens of the injurious and beneficial animals of the State, especially birds, fishes and insects, to be placed in the State House at Springfield, and also in the museums of the various State educational institutions. It is not proposed to pay any officers' salaries with the money, but only to pay the actual expenses of the work.

From the above movement in Illinois we may take a hint for useful scientific work, for with the rapid spread of noxious insects in this State it seems clear that early precautionary measures will be wise on the part of our legislators.

Reese River Mines.

In view of the wonderful success attending the operations of the Manhattan company, it seems almost beyond belief that fifty per cent. of the valuable quartz veins lying within a mile's distance of this office are not only allowed to remain idle, but are absolutely open to location. With the exception of the energetic, well-directed and successful efforts of the Manhattan company, and the operations now being conducted by the King Alfred company, and the persistent efforts of the Pacific company, of London, the work of developing our mines is now confined to the individual efforts of poor miners, whose operations are necessarily limited by the slender means possessed, and whose workings are frequently entirely suspended for long periods, during which day's pay is obtained from other sources in order to secure means with which to continue prospecting.

There is not a more extensive or inviting field for the investment of capital on the face of the globe than that presented by the idle quartz veins of Lander hill and vicinity. In Marshall canyon, to the south, there are numerous ledges of from one to ten feet in width open to location, which only require the performance of a moderate amount of work in order to be made immensely remunerative properties. It was in this canyon that the Whitchell Union company's ledge was situated, and which yielded fabulous wealth to its owners. Descending the northern hill forming this canyon, we reach Lander hill proper, upon which are situated the principal mines owned by the Manhattan company, which have yielded their millions in the past, and are now paying their owners magnificent profits, and, judging from present appearances, will continue to do so for all time to come.

Upon this hill, in addition to the Frost, Curtis, South America, Bowman, Oregon, North Star, Ogden, Mohawk, Dollarhide, Eclipse, Esther, Savage, Toiyabe and Sherman, all of which splendid mines, with their well appointed hoisting works, are owned and worked by the Manhattan company, are also situated many other valuable mines owned by other companies; among them may be mentioned the mines of the New Pacific mining company, limited, of London, which under the present efficient, economical and energetic management, promise to become very valuable properties. Within the past few months two splendid ore bodies have been developed, the exact location of which we have been unable to learn, but we are assured by the intelligent although reticent gentleman in charge, will more than reward the laborious efforts of past years and fully meet the expectations of his English employers, and that although unlooked-for difficulties have prevented the company from realizing from developments made up to the present time, yet the work of ore extraction is now in a fair way of commencement, ore shipments to the Manhattan mill will soon be made and regularly continued for a long time to come. The present manager of this company's affairs has had many difficulties to encounter, and it will please his numerous friends to learn that his perseverance has been attended by success. Of the ore developments mentioned we know only by hearsay, but the Superintendent smilingly told us in a very confident way, "that his friends had helped him and his company a great deal, but that his ore would help both a great deal more."

Adjoining the Pacific mine, on the west, is the Florida, and west of that is the Magnolia, owned by our esteemed fellow townsman and ex-mayor, Wm. H. Clark. A splendid ore body has been struck in this mine, and its lucky owner is more than ever convinced of the inexhaustible wealth of Lander hill.

It is our design to call the attention of capitalists and others to our undeveloped mineral wealth, and with this object in view we make this the introductory to a series of articles to be published from time to time, descriptive of mines and ledges in this vicinity. Our next article will contain the results of observations made in Emigrant canyon, and, if obtainable, an account of operations now being conducted in the King Alfred mine.—Reese River Revue.

A BIG BAROMETER.—A large barometer has been set up by M. Redier at the church of St. Eustache, Paris. The total diameter is exactly six feet, inclosing a dial five feet wide, lit at night by an inner corona of eight gas-jets. The hand measures three feet six inches in length, and is moved right or left by wheelwork, which follows the variations of a small aneroid barometer, which regulates the instrument.

The Pittsburgh Mine.

On visiting the Pittsburgh the other day we found a very satisfactory condition of affairs. The mine is under the superintendence of Capt. White, one of the oldest and most experienced miners of the State, and is owned by a San Francisco company, who purchased directly after the hoisting works were burned on its last year. The company have erected a new building since, and had moved into place an extra engine, which was formerly used for hoisting at the shaft near the mill. They have also made general repairs at the mill, have pumped out the mine which had filled up while lying idle, and have been running drifts and other underground work. About 115 tons of rock have been taken out since the drifts have been opened, most of which has been put through the mill. Judging by the amount of amalgam taken off from the plates, it was estimated by the superintendent that the average of the lot would not fall short of \$24 to the ton in free gold. The ledge in the north drift runs from eight to 24 inches in width. The rock is the best where it is the smallest. The mill has 10 stamps, and the usual appliances for saving gold and sulphurets. The sulphurets vary in value from \$113 to \$160 to the ton. There are employed at the mine and mill at the present time, 26 men. To thoroughly open the mine so that it can be worked to the best advantage, and to insure regular dividends, it is necessary that the incline should be sunk from the 700-foot level, and that considerable dead work should be performed. It is thought that \$10,000, with the proceeds of the rock taken out while the dead work is being done, would place the mine in a first-class working condition. A miner who worked in the Pittsburgh seven years under former proprietors, informs us that, in his opinion, it is the best mine in the county if properly opened and worked. We hope to see the necessary outlay made so we can be able to add the Pittsburgh to the list of regular dividend payers, and from all we can learn, we think such will be the case in the near future.—*Nevada Transcript*.

Expensive Tunnel Developments.

In order to secure an outlet and fall for the debris washed out in the process of working on hydraulic mining claims, long and expensive tunnels through hard rock have to be run. Several such enterprises have been completed in this county during the past two years, which show the magnitude of our mining operations. On the San Juan ridge, we find in a recent report the following memoranda concerning several such works, which we give to our readers: The Boston tunnel, on Woolsey's flat, is 1,600 feet in length, and cost \$40,000. The North Bloomfield tunnel, at Humboldt canyon, is 3,000 feet in length, and cost \$500,000. The one run into the American mine, at San Juan, is 3,900 feet long, and cost \$140,000. The one at Sweetland, which was run in to tap the Manzanita mine, is 1,740 feet long, and cost \$62,000. The Sweetland creek tunnel is 2,200 feet long and cost \$90,000. The French Corral mine has been tapped by a tunnel 3,500 feet long, which cost \$165,000. There is one being run at Badger Hill which will be 1,400 feet long, and one below Sweetland which will be 2,600 feet long, both of which are not yet completed. The ground owned by the Eureka Lake company, located at North Bloomfield, will before long be opened, and it will require a tunnel in the neighborhood of 3,000 or 4,000 feet in length. There are several bedrock tunnels being run in other parts of the county. Many claims on the old river channels are located so far from a proper outlet that they have to be worked by drifting. Inclines are being sunk in several places to get down to the bedrock on such claims. From the large number of such enterprises now on foot, in connection with the tunnels and shafts completed during the past two years, we feel justified in predicting that the gold yield of the county will soon begin to show a large increase over past years. While this gratifying state of affairs exists among gravel mines, the quartz interest is not lagging. Many new and valuable mines have been opened the past year, and developments are being made on a large number of new ledges, which promise first-rate. The county's prospects for the future were never better.—*Nevada Transcript*.

A RICH STRIKE.—In the Behm mine, Mountain lode, at a depth of about 50 feet, a rich shute of copper ore—probably the richest that has ever been found in the camp—was met with a few days ago while sinking down the shaft. The vein matter at this point is about three feet wide, consisting of copper glance, red and black oxide. Of the latter a streak of from 12 to 18 inches wide runs through the vein, and is of a very high grade, assaying nearly 75 per cent. copper. About two tons of this ore has already been taken out, and as work is steadily progressing upon the shaft, the out-put will continue steadily to increase. A specimen of the ore mentioned can be seen at our office, and as its richness is so great as to make it a very desirable commodity for shipment, this find should stimulate all those owning claims upon this lode to push forward the work of development in hope of coming upon a similar deposit. The owners of the Behm mine are to be congratulated on their success, for they have had much to contend with and many discouragements to face while prosecuting work upon their claim to its present development, and we trust that they may reap the full reward of their labor.—*Butte (Montana) Miner*.

USEFUL INFORMATION.

TO TAKE OUT GLASS STOPPERS FROM BOTTLES.—Amateurs are often troubled to do this in obstinate cases, and will be grateful for the following practical hints on the subject, condensed from the *Druggists' Circular*: When only water has been in the bottle, the best way is to apply heat to the neck of the bottle. To do this successfully, without breaking the bottle, the wick of a spirit lamp is trimmed so as to give a flame of about the size of the neck of the vial. The bottle is held in the flame with the two hands and turned as rapidly as possible, while its neck is immersed in the middle of the flame. From time to time the vial is taken out of the fire, and the stopper tried. If it holds fast, the bottle is heated again, without loss of time, until the stopper comes out; then bottle and stopper are allowed to cool separately. The whole operation takes generally from four to ten seconds. In skillful hands it is invariably successful in less time than it takes to explain the manipulation; but beginners, through injudicious heating, generally break the first bottles which they try to open. When the bottle contains other liquids than water, it is necessary, before applying heat, to dissolve out any substance that may have dried between the stopper and the neck of the bottle. To effect this, the bottle is inverted in a small graduate containing the appropriate solvent, that is, water for sugary liquids or other soluble substances, alcohol for resinous bodies, etc. After six or eight hours, the stopper is frequently found unloosened without the use of other means. By the way, the heat is applied as rapidly as possible, because it is important that the neck of the bottle should become warmed, and thereby dilated, before the stopper has had time to expand also. In some cases it is impossible to open the bottle at all without breaking it. This happens when it contains or has contained alkalies, their carbonates, etc., which completely solder the glass together. It is almost unnecessary to add that alcoholic and ethereal liquids require the exercise of the utmost caution, to avoid accidents.

TIN-FOIL.—It may not be generally known that tin-foil, as now so widely used in the trade, is not a foil made of tin alone, but composed mainly of lead with but a slight alloy of tin. The manifold appliance of tin-foil to articles of consumption and medicine is not regulated with us by any law such as exists in European countries, forbidding the use of lead or composition, or otherwise impure tin-foil in all cases where it may, through oxidation or contact with the goods, become poisonous and injurious to the health of the consumers—as is the case in some instances. Too little attention has been paid to this subject so far. It is to be hoped that ignorance, and not wilful oversight of the facts, has led many manufacturers and dealers to use an article accompanied with such risks, for the sake of saving a trifle in the cost. Besides this saving is, in most instances, imaginary, as the German pure tin-foil combines such a fineness and large yield, with relatively great softness and strength, that it will practically answer most purposes, and not cost more than an equal surface of the lightest composition foil, while all heavier grades of the latter will be much more expensive to use. The yield of the regular German pure tin-foil is 72 square feet, or 10,368 square inches per pound; a heavier grade yields 66 square feet. The sheets are large-sized and waste in cutting is consequently small.—*New Remedies*.

MUMMIES CONVERTED INTO PAINT.—Few persons are aware that veritable Egyptian mummies are ground up into paints. But in this country and in Europe mummies are used for this purpose—the asphaltum with which they are impregnated being of a quality superior to that which can elsewhere be attained, and producing a popular brownish tint when made into paint, which is prized by distinguished artists both of this and other countries. The ancient Egyptians, when they put away their dead, wrapped in clothes saturated with asphaltum, builded, as it were, better than they knew, and could never have realized the fact that ages after they had been laid in the tombs and pyramids along the Nile, their dust would be used in painting pictures in a world then undiscovered, and by artists whose languages were to them unknown. That a portion of one of the Pharaohs, or a Potiphar, or even of the historic Mrs. Potiphar, may even now be on the canvass of a Veruet, a Millais, or a Church, who may question?—*Washington Gazette*.

SUNDAY TRAINS IN CANADA.—Railway trains are not to be permitted for the future to run on Sundays in Canada. The Dominion government has issued orders that no trains are to be run on Sundays, excepting in cases of great emergency. Of this emergency the authorities are to be the judge, no Sunday train being permitted except on direct government order.

ANILINE colors, according to Mr. Joseph Seidebotham, are being extensively employed for tinting photographs, and likewise in paintings and water color drawings. He calls attention to the well known instability of these beautiful tints, and warns artists who desire the permanency of their work to avoid employing them.

UTILIZATION OF SEA-WEED.—The *Quarterly Journal of Science* says: At the chemical works at Aalborg, in Jutland, Denmark, where about 30 tons of alkali are made per week by the ammonia process for obtaining alkali from sea-weed, Mr. Thowald Schmidt, the director of the manufactory, proposes to work, in conjunction with this process, a method devised by himself of treating sea-weed so as to obtain iodine, potash salts, and other marketable products therefrom. In Denmark a very heavy duty is levied on the importation of common salt, whilst enormous quantities of sea-weed, rich in iodine and potash, can be obtained at small cost in the neighborhood of the works. Mr. Schmidt's process is as follows: After the sea-weed is dried and burnt, a concentrated solution of the ash is made and added to the liquor containing chlorides of sodium and calcium, left after the ammonia has been recovered in the ammonia-soda process by boiling with lime. The sulphates of potash, soda and magnesia contained in the ash of the sea-weed are thereby decomposed, and hydrated sulphide of lime and hydrated magnesia are precipitated in a form which may be available for paper-making as "pearl-hardening." The last traces of sulphates are got rid of by adding a small quantity of solution of chloride of barium. To the clear solution nitrate of lead is now added until all the iodine is precipitated as iodide of lead, which is then separated by filtration and treated for the production of iodine or iodides. After filtration the liquid is boiled, nitrate of soda is added to convert the chloride of potassium present into nitrate of potash. The latter is separated by crystallization. There remains a solution of common salt containing traces of ammonia from the previous soda operation and a trace of chloride of potassium. This solution is again treated by the ordinary ammonia-soda process for the production of bicarbonate of soda and white alkali.

LOAD FOR A MAN.—A curious set of experiments made in France developed some interesting facts in regard to the greatest average load for a man of great strength to carry a short distance. This was found to be 319 pounds; all a man can carry habitually, as for example, a soldier his knapsack, walking on level ground, is 132 pounds, (an extreme load it would seem,) or he can carry an aggregate of 1,518 pounds over 3,200 feet as a day's work, under like circumstances. If he ascend ladders or stairs, as do hod-carriers, then he can carry but 121 pounds continuously, and his day's work cannot exceed 1,232 pounds raised 3,300 feet high. With regard to the effort and the velocity with which a man can produce by pulling or pushing with his arms, it has been found by these experiments that, under the most favorable circumstances, and for continuous work, an effect cannot be gained exceeding from 26.4 to 33 pounds raised from 1.8 to 1.2 feet per second, or about one-eighth-horse power.

ARTIFICIAL BEESWAX.—A mixture of paraffine and common resin has found its way into the market as a substitute for beeswax. It resembles the genuine article very closely in color, fracture and adhesiveness. The cakes are generally covered with a thin coat of genuine beeswax.

GOOD HEALTH.

Poisonous India-Rubber Toys.

A. F. Taylor, Ph. D., of Andover, Mass., sends the following note to the *Journal of Chemistry*: Prof. B. Tollens, in the *Journal of the Berlin Chemical Society*, of November 13th, 1876, calls attention to the injuriousness of many of the articles manufactured from caoutchouc, which, among other impurities, contain a very large per cent. of zinc oxide. In the rubber nipples of milk bottles for children, this has often been found to be the case, and so much attention has been called to this fact that the manufacture of these nipples containing zinc oxide has to a great extent ceased.

But more recently suspicions have been aroused concerning the quality of children's toys, dolls, animals, etc., made from rubber. One case, in which a child, having one of these dolls, had had it for some time in its mouth, grew sick, and the doll, laid in vinegar, became covered with an incrustation (without doubt zinc acetate), led to direct investigation. In 0.7325 gramme of such a doll, 0.4445 gramme zinc oxide was found, or 60.58%. Another portion gave, after being subjected to a red heat, 62.64 gramme of ash, yellow while hot, white on cooling. In the ash besides the zinc were traces of lime, iron and phosphoric acid. From another doll which had been warranted "harmless," 57.68% of ash were obtained, consisting almost wholly of zinc oxide.

It is not at all improbable that the sickness of the child, particularly the severe vomiting, was caused by the zinc oxide, and it is to be wished that the manufacture and sale of such articles containing zinc oxide could be prohibited.

PAIN.—"Pain" is an ache, or abnormal feeling, produced from an unnatural condition of the nerve or nerves afflicted, and in most cases it is induced by pressure, derangement, disintegration, or the imperfect circulation of the blood in or near them. Proof of the first and last: Rubbing over and near the sensitive nerves by increasing the circulation mechanically, will remove the annoyance.

Sleeplessness.

It is a familiar fact to medical men, says the *Journal of Chemistry*, that thousands suffer from wakefulness who are otherwise in good health. With some of them this becomes a habit, and too often a growing one. Not a few resort to soporific drugs, and the taste for opium is thus often initiated. Others find alcoholic liquors occasionally effectual, and there can be no doubt that in this way the foundation of intemperate indulgence in these liquors has been laid. Many people, however, have found a way of going to sleep without resort to such dangerous measures. For instance, looking at a fixed point steadily will often succeed in inducing sleep; or, if it is too dark to do this, closing the eyes and in imagination watching attentively the stream of air entering and leaving the nostrils. Another plan has recently been proposed by Dr. Cooke, who tells us that in many cases of sleeplessness it is only necessary to breathe very slowly and quietly for a few minutes to secure refreshing sleep. He thinks that most cases depend on hyperemia of the brain, and that in this slow breathing the blood supply is lessened sufficiently to make an impression. Certainly, when the mind is uncontrollably active, and so prevents sleep, persons whose observation was worth trusting have testified that the breathing was quick and short, and they have found they became more disposed to sleep by breathing slowly. This supports Dr. Cooke's practice, but at other times his plan quite failed. It is certainly worth any one's while who is occasionally sleepless to give it a trial. In doing so they should breathe very quietly, rather deeply, and at long intervals, but not long enough to cause the least feeling of uneasiness. In fine, they should imitate a person sleeping, and do it steadily for several minutes.

In no case should opiates or other drugs be resorted to for sleeplessness except under the direction of a physician. The other methods mentioned above may be safely tried by anybody; but if they fail, and the case becomes at all serious, medical advice should be promptly taken.

THE MORAL VALUE OF PHYSICAL STRENGTH.—The American scholar and thinker is by rule a dyspeptic. He is a razor-faced, lantern-jawed, thin, nervous man. This is partly the effect of climate, and partly that of diet and regimen. In the old days of bran bread, and prayers before daylight in the colleges, and long morning walks before breakfast, and suicidal, consumptive habits, it required a pretty tough man to live through his studies at all. We are now doing this thing better, but we have not reached the highest outcome of the change, and shall not reach it, probably, for several generations. But we have come to the recognition of the fact that it does not toughen a man to reduce his diet, to cut short his sleep, to take long walks on an empty stomach, and to indulge in cold baths when there is no well-supported vitality to respond to them. We have come to the conviction that, for a useful public life, brains are of very little account if there are no muscles to do their bidding. In short, we have learned that without physical vitality the profoundest learning, the most charming talents, and the best accomplishments are of little use to a public man in whatever field of professional life he may be engaged.—*Scribner's Monthly*.

BLUE GLASS FOR WEAK EYES.—Noted oculists in Europe recommend either blue, blueish-gray or smoke-colored glasses as a protection for weak eyes, against the unpleasant effects of red, orange and yellow light. On the same principle the trying reddish-yellow light of candles, lamps and gas on normal eyes as well as weak ones, can be pleasantly modified by the use of blue chimneys or globes, or at least of shades for the reflection of the light, colored a light ultramarine blue. A near approach to daylight is said to be produced by a petroleum lamp with a round wick and a light blue chimney of twice the usual length, the latter causing so great a draft that the petroleum burns with nearly a pure white flame.

LADY DOCTORS IN EUROPE.—The *London Medical Record* says that 40 lady medical students are pursuing their studies in the schools of the faculty, and in the hospitals of Paris, of whom fourteen are English. Of the rest the majority are Russian, and the remaining number are American, German and French ladies. Several ladies have already graduated M. D. of the University of Paris, including Mrs. Garrett Anderson, Mrs. Putnam Jacobi, Madame Bres and Madame Riband; the last three all graduated with great distinction, their theses being honorably noted by the faculty. Three lady graduates of Zurich are now practicing in England, Mrs. Hogan and Mrs. Atkinson, in London, and Mrs. Walker Dunbar in Bristol.

A CORRESPONDENT of the *English Mechanic*, in answer to a question as to the best means of keeping the feet dry in winter, says: "A simple plan would be, on having a pair of shoes made, to order the maker to put between the soles a piece of gutta percha as thick as a sixpence. No wet or damp will ever get through. I have adopted this plan for some years. Formerly I had both wet and cold feet continually, which even worn stockings failed to keep warm; now I wear cotton all the winter, and never have cold feet."

MINING AND SCIENTIFIC PRESS.

W. B. EWER, SENIOR EDITOR.

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, Feb. 17, 1877.

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A NEW WORK ON ASSAYING.—Prof. Pierre de Peyster Ricketts, of the School of Mines, Columbia College, New York, is the author of a new and valuable publication, entitled "Notes on Assaying and Assay Schemes," designed originally for use in the laboratories of that school, but which equally commends itself as a book of reference to the general assayer. The chief merit of the work is the system of classification of tests adopted, subjects being arranged in an especially handy manner, thus greatly facilitating practice. There is a great deal of tabulated information, and some convenient forms for reports are added. The branches of assaying most frequently required on this coast are naturally given prominence, while the methods of determining copper, iron, zinc, manganese, sulphur, etc., are also fully described. A. L. Bancroft & Co. are publishers' agents in this city.

ANALYSIS OF MINE WATER.—A sample of the water in the Hale & Norcross mine (on the Comstock), containing 54.219 grains of solid matter per gallon of 231 cubic inches, was recently analyzed, with the following results:

	Grains.
Chloride of sodium.....	1.327
Sulphate of lime.....	3.500
Sulphate of soda.....	22.582
Sulphate of potassa.....	8.342
Magnesia.....	18.518
Iron.....	Trace
	None

The iron mill in process of construction at Laramie, Wyoming, has a contract to supply 80,000 tons of rails to the Utah Northern narrow-gauge road, in addition to a large amount of work for the Union Pacific.

An Automatic Amalgam Saving Machine.

We examined, this week, at Steen's machine shop, 226 Beale street, a new device for saving gold, quicksilver and amalgam, the invention of Mr. A. I. Frick, of Oakland, Alameda county. The machine is quite simple in construction, and its operation warrants the inventor in styling it the "automatic amalgam saving machine." The principle of saving the precious metals by this device consists in having a large area of amalgamating surface in a comparatively small space, and in keeping this surface continually supplied with fresh quicksilver, so that no oxidation shall take place and the plates are always in condition to do their work properly.

To accomplish this object, a wheel with iron frame and copper buckets, similar in form to an ordinary overshot wheel, is mounted in a case about five feet long and two feet wide. Under this wheel, in the bottom of the case, is a depression corresponding to the circle of the wheel, in which is placed a quantity of quicksilver. The edges of the buckets of the wheel are turned slightly, at right angles to the buckets, so that when the wheel revolves and the buckets pass through the quicksilver, the turned-down edges will collect a small quantity and carry it up with them. As the rotation of the wheel continues, and each bucket passes the horizontal line, the quicksilver slides down the surface of the bucket. Then, as the wheel revolves, it slides over the coppered surface between each two buckets, and then over the back part of the next bucket, falling from there into the quicksilver well again. By this means all the buckets and the spaces between, at each revolution, receive a new and fresh coating of quicksilver. The edges of the buckets are turned at right angles in the direction in which they enter the quicksilver in the receptacle, and after the bucket gets at the proper position the mercury of course slides off the side easily, and the front and back of each bucket get a fresh coating. The motion of the wheel is slow and the edges of the buckets sharp, so that they slide easily through the quicksilver without cutting it up or splashing it about. A sheet of copper corresponding to the periphery of the wheel is placed in front, so that, in case any mercury should fall off the buckets, it would be run smoothly back into the receptacle without a sudden drop. A similar plate is placed behind the wheel, where the quicksilver leaves the buckets, and conducts it back to the place smoothly. All of the plates, of course, form additional amalgamating surface.

After the tailings, etc., are passed over the wheel, as described, on their way out of the machine, they pass over another depression or receptacle, for a riffle. This latter receptacle also answers the purpose of catching any particles which may have been washed over past the wheel. A revolving iron rake, which receives its motion by means of a belt attached to the shaft of the main wheel (on the outside of the box), keeps the material constantly stirred, so that the sulphurets or tailings will not cake.

The main wheel has its motion imparted to it by the water and tailings from the batteries and plates, or settlers, and consequently no extra power is required to run the machine. The arrangement is intended to be placed at the end of an ordinary row of plates, etc., or behind the settlers, in order to save any quicksilver, amalgam or gold which may pass over. It is not intended to catch sulphurets. It is automatic, as it requires no attendance whatever. A small brake with set-screws is arranged so as to regulate the speed of the wheel to conform to the flow of the water, and thus, once set, the machine will work right along without attention. Outside the box on one side is a small cup-shaped iron receptacle to draw off the surplus quicksilver which may accumulate. The cleaning up is very easily done. Each copper bucket is so arranged in a slot as to be drawn out if it is required to replace it. In ordinary cleaning up, however, the top of the box opens and plenty of space is given for the operator to clean each plate separately. The space between the buckets is wide enough to be easily reached. When the depression on the bottom is to be cleaned up the wheel may be lifted out entirely. At other times a padlock secures the whole apparatus so that it cannot be examined or touched except by the proper person. We should have stated previously that the water and tailings enter the box on the top and strike the wheel in the opposite direction to which they flow over ordinary plates, but the direction can be changed by the interposition of a sluice to lead the water to this apparatus.

Only one of these machines has thus far been made, but it seems as if there would be a good demand for them should they work as favorably as expected. The machine is very inexpensive, and as it requires no power or attention, if it only saves 50 cents a ton at a mill it would pay for itself very soon. At some places it might save a dollar or two a ton catching quicksilver and amalgam. The machine sits on four legs and requires no preparation to be set at work.

The main wheel is about three feet in diameter, and has sixteen buckets, each six inches deep and 15 inches wide. These buckets, with the amalgamating space between them and the plates in front and rear, before referred to, give an amalgamating surface of about 40 square

feet, not counting the reservoir of quicksilver described. The main feature is the fact that the whole surface receives a new coating of mercury at every revolution of the wheel, and no oxidation ensues. The machine can run night and day, and the only places to be oiled are the four journal boxes, which are outside of the main box. The machine which we examined is shortly to be taken to Virginia City, where it will be practically tried for a few months. Those interested in gold or quicksilver saving devices would do well to examine this one, which seems a very progressive step in the right direction.

Expenditures on Claims.

Keep up your annual expenditures on your mining claim, as required by law, and you will have no trouble. This is our advice to half a dozen inquirers about a construction of the United States mining law to get over this difficulty. The trouble is that the law is capable of several constructions as it stands, and, of course, those interested make the most favorable construction for themselves. Some miners have even made up their minds not to do the work required, but simply to be on hand when the year is up, and re-locate, and continue to do so. Even if this could be done, however, it would probably not conform to the local regulations, so that the claim might be jumped any day; and therefore miners pursuing these tactics stand a very good chance of losing their property.

The conditions to be complied with are simply these: "On each location prior to May 10th, 1872, ten dollars' worth of work must be performed or improvements made on each one hundred feet each year after the 1st of January, 1875. On each claim located after May 10th, 1872, not less than one hundred dollars' worth of work must be performed or improvements made each year, beginning January 1st, 1875, and thereafter until a patent has been issued therefor."

It must be borne in mind, however, that the Commissioner of the Land Office has decided that the year shall commence from the date of the location of the claim. This is not generally understood, but it is a fact.

The expenditures must, moreover, be kept up continually until a patent is issued. Failure to make the expenditures or do the full amount of work, renders the ground vacant. It will not do for the owners simply to go there on the beginning of the year and be in possession. If no one has taken the ground they must formally re-locate, record and comply with the local regulations concerning boundaries, etc., all over again, just as if it was a new claim. If this is not done the title will be faulty and one may be liable at any moment to lose his ground. A case in point has recently proven this, as the following paragraph from the Nevada Transcript will show:

"Under this law J. L. Holland and others relocated 1,500 feet of the ground known as the Mt. Auburn. The ledge had been in the continued possession of the defendants for a long time, and large expenditures had been made upon it at different times. It appears, however, that the requisite amount of work was not done on it during the year 1875—the owners doing as has been the general custom here—letting it lay idle with the hope of sometime being able to obtain means to put up machinery and work it. After a lengthy trial of the case, the jury returned a verdict for the plaintiff, and the question of hereafter holding ground in this section without a rigid compliance with the congressional enactments was thereby definitely settled. Those who now have claims on lodes, if they desire to allow them to remain idle, must obtain a Government patent, or they will wake up some morning and find themselves minus a title, and no hopes of getting one by going into the courts to do so. While we sympathize with those who are deprived of property by their ignorance of the change of the law, we yet think the general prosperity of the whole community will be increased thereby, for it establishes a rule that will result in increased activity in mining operations, and will be the means of allowing many good claims to be opened that have heretofore been idle and unproductive."

We have heard of other instances where ground in the same condition as that referred to by our cotemporary has been jumped, and under the law the re-locators will be very likely to hold their own. In some cases the mines had mills, etc., on the ground. These, of course, would not become the property of the re-locators, but the ground would.

We feel pretty certain that the law as it stands will be beneficial in the end, although it may work hardship in a few instances. If men have mines and will not work them, but wait for their neighbors to develop the camp, they ought to be made to work the claims or give a chance to some one who will. Many camps have suffered heretofore from this cause, but now the lazy ones will have to work. It will be better for the country to have these claims developed. If any one thinks he has a good claim, let him have it patented, and annual expenditure will cease. He will have a clear title, and his property will be in a condition to leave, work, or sell, as he thinks best. By all means, patent your claims as soon as you can afford to do so.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

The last weekly letter from the Eureka Consolidated mine says: The mine continues to improve from day to day, as work is driven forward in the various drifts, etc. The ore bodies are developing largely, and the character of the ore is such as to warrant the most flattering results for the future, and holds out the best encouragement for the permanency and lasting qualities of the mine; 10th level west drift made 19 feet, and now in 53 feet from main drift. Drift looking well, with good prospects in view. Have found some high-grade ore, which improves in quality as the drift is advanced; 9th level north cross-cut now in 118 feet. Second upraise, to case 54-foot, is completed. The ore body presents a fine appearance, and is opening out largely. The ore is of high grade and of a character easy for reduction.

Car samples of ore from the Chollar assay \$25.20 per ton.

The ore-producing stopes throughout the 400, 500, 600 and 700-foot levels of the Justice have very much improved in the general quality of the ore produced. No. 2 east cross-cut, 600-foot level, bids fair, from present indications, to make a valuable development in due course of time.

News from the Golden Chariot (Idaho) is encouraging. The 1300-foot level has attained a distance of 129 feet on vein. The character of the ore has greatly improved. A slight increase in the flow of water is noted as the drift approaches the cross-course. Sixth level winze is 31 feet in depth, with ore all the distance.

Owing to the heavy flow of water in the winze from the 1050-foot level of the Baltimore Consolidated, but little progress has been made therein. The ledge in the winze is widening and looking very encouraging.

The cross-cut east from main north drift in the Andes looks well, and indicates close proximity to a good body of ore. Assays give from \$58.30 to \$73.47. They have found a considerable deposit of ruby silver in the ore-producing stopes above the 400-foot level. The deposit is found at a height of 65 feet, close to the overhanging wall of the main fissure. The principal portion of the milling ore is produced at or near the west foot-wall of the vein.

Sinking the shaft of the Grand Prize has been resumed and no further trouble from water is anticipated.

The heat in the Hale & Norcross mine is now very great. After cleaning out 70 feet further in the drift connecting with the Savage mine, on the 1900-foot level, a winze will be reached connecting with the upper levels and securing a good ventilation.

Progress in the west drift on the 1650-foot level of the Consolidated Virginia, has been slow on account of having considerable water and hot air to contend with. The ore vein is looking well. Nothing has been done on the 1700-foot level, nor has any sinking been done in the C. & C. shaft since last report.

A Burleigh drift is to be put at work in the south cross-cut on the 1700-foot level of the Best & Belcher.

The last clean-up of the Eureka (G. V.) mine was 280 ounces of amalgam.

Some very good assays are obtained from the quartz recently encountered in the Dayton mine.

EUREKA VS. RICHMOND.—The great mining suit which has been going on in Eureka for some time past has been decided. The application of the Eureka Consolidated mining company for an injunction against the Richmond Consolidated company has been denied by Judge Cole, and the restraining order has been ordered vacated. The following is the decision: "I do not think the defendant in this case is the proper defendant. The Nevada company is not a myth. We are not here on a writ of *quo warranto* to dissolve the Richmond mining company of Nevada. The only question is that of entry and ouster. I do not think that the English company is in possession, nor that Mr. Rickard took possession in the name of the English company. All the evidence goes to show that the Nevada company are the real defendants in this suit, and in possession of the ground in dispute. The mere fact that the Richmond Consolidated mining company (limited) controls the Nevada corporation is no legal objection. I think that the testimony shows that at the time of commencing this suit, and at the present time, that company was, and is in possession of the ground in dispute. The motion for injunction is denied, and the restraining order set aside."

THE BUSINESS DIRECTORY for 1877 has just been issued by L. M. McKenney, 525 Commercial street, in this city. It is, as its name implies, a business directory of San Francisco and principal towns of California and Nevada, containing names, business and address of merchants, manufacturers and professional men in the places referred to. It is alphabetically arranged and classified under headings of business. The book is a very convenient one for everybody.

"Short Cut" Method for Describing Gear Teeth.

The rattling so common to cast gearing is due to two causes; first, the actual errors in the shape of the teeth, and second, inaccuracy of construction. The latter, being a matter of workmanship and skill alone, will not be considered here; but the former is due, to so great an extent, to want of familiarity with proper method for laying out teeth, or the tendency, when familiar, to avoid the trouble of correct delineation by guessing at the curves, that the following "short cut" plan, by means of a new *templet odontograph*, has been devised, by Professor S. W. Robinson, of the School of Mechanical Engineering of the Illinois Industrial University.

This instrument possesses the novelty of being, in itself, a ready-made and universal scribe templet, equally serviceable to the draftsman and pattern maker for laying out, with great accuracy, all kinds of gearing, and without aid from drawing instruments or elaborate books on the theory of gearing.

The instrument is founded upon theory, as elaborately demonstrated in an article which appeared in *Van Nostrand's Engineering Magazine* for July, '76; and though a considerable portion of higher analysis is required to prove its applicability, the practice is reduced to such a simple operation that the most untutored cannot fail to apply it correctly.

The full size of the instrument is shown in Fig. 1, of the engravings. It consists of a piece of flat brass about a sixteenth of an inch thick, finished and graduated on both sides alike. The two curved edges are the important elements, and each is formed from one and the same logarithmic spiral, whose "obliquity" is 2. The applicability of this curve depends upon two properties of it; first, that the involute of the logarithmic spiral is another like spiral with poles in common; and second, that the obliquity, or angle between a normal and radius vector, is constant; the latter being possessed by this curve alone. By the first property it is known that a line lying tangent to the curve *CFH* will be normal, or perpendicular to the curve *CDB*; so that when the line *DEF* is a tangent to the pitch line, the curve *ADB* will be in very close osculation with the epicycloid. By the second property all sectors of the spiral, with given angle at the pole, are similar figures, which admits of the same degree of osculation with all similar epicycloids, whether great or small, and nearly the same for epicycloids in general, thus extending the application of instrument to epicycloidal gearing in general.

These properties are found sufficient to admit of the instrument being placed, in the same manner, on an epicycloid, and in close contact with it, by aid of a number obtained from the pitch circle, the generating circle, and the number of teeth in the wheel for which the teeth are sought. These numbers, which have been styled index numbers, because they serve as an index to the scale of the odontograph, are computed with care from formulas, deduced and given in the magazine article above mentioned. The numbers, divided by the pitch, were also given tabular form in the magazine, but have since been put in much more suitable shape for practice in No. 24, of "Van Nostrand's Science Series" which contains the odontograph article, and also an article from the magazine on the forms of the teeth of wheels and from which are taken the first two cuts illustrating this description. The tables in the magazine apply for radical flanks only, but those in No. 24, "Science Series" are more complete, and extend to all gearing, such as are required for "sets" or interchangeable gears; and for teeth with flanks braced or strengthened to any desired extent.

Many of our readers will doubtless desire to learn something of the connection of this odontograph with the theory of tooth curves, without the trouble of following the line of mathematical reasoning given as above mentioned. To this end the following description of the steps is taken from the *Polytechnic Review*. But before proceeding to this, it is desirable to point out just what are the conditions of the tooth-curves the instrument is to give.

In the article on forms of teeth above mentioned, it is shown that any pair of pitch lines, circular or non-circular, may have correct working teeth described for them by taking any kind of curve whatever for a describing curve, and rolling it on the outside of one, and the inside of the other pitch line in the same direction, for generating a face and flank, which will work correctly. This operation is exhibited in Fig. 2. These tooth curves will each be wholly on one side of their respective pitch lines, one within

and the other without. The next pair of faces and flanks may be described with the same, or any other describing curve. To describe the other halves of the teeth, or the curves for the other sides of the pitch lines into which these curves are to be extended for completing the teeth, describing curves are to be similarly rolled upon the other sides of the pitch lines.

These few words really comprehend the whole general theory of gearing, which, however, is much more elaborately set forth and illustrated in the "Science Series" above mentioned. Epicycloidal gearing is therefore only a special case in which the pitch lines and describing curves are circles. Therefore, for this particular form roll any circle on the outside of one, and inside of the other pitch circles for a face and flank, and for the flank and face of same teeth, roll this, or any other circle, inside and outside respectively. We thus obtain one side entire of a tooth of each wheel, and they may be used as patterns for the rest. When the diameters of these rolling circles are equal to the radii of the pitch circles within which they roll respectively, the hypocycloids will be simply diameters of the pitch circles, and hence the tooth flanks radial. Smaller rolling circles give flaring flanks. If a given rolling circle be used for a number of different pitch circles, inside and outside, the wheels will work correctly together in any interchangeable manner, as in "sets."

Involute teeth also form a special case of the

first two gave expressions for the index numbers in terms of the diameter of the generating circle and of the radius and number of teeth of the wheel for which the teeth are sought.

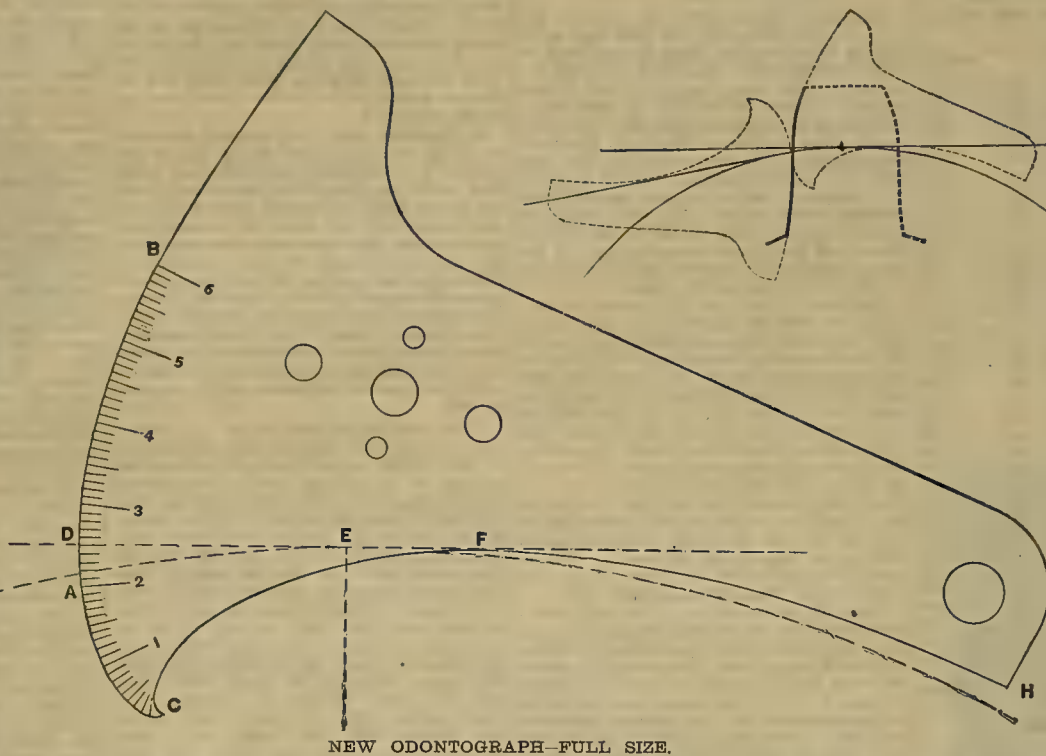
For the rack and pinion the faces of the tooth of the rack are cycloidal, and the index numbers for this are given by themselves. The faces of the pinion are involutes, and hence the same table applies as for involute teeth.

The formula which give these tabular values require that the odontograph be set to a tangent, *DE*, to the pitch line *E*, being taken for the middle of a tooth. Also the index number must fall on tangent line, *DE*, the index number being 2.5 for the setting down in Fig. 1. The point of tangency, *E*, must be the middle of a tooth. The dotted circle, *A E H*, is the pitch line. When the instrument is once set, the pencil, pen or scribe is to trace the curve, *A D B*, for the face of a tooth.

The instrument has countersunk holes, shown in the cut, so that it can be mounted upon a radius rod, by wood screws, and swung around a center pin to the wheel to lay out all the teeth, in the same manner as in any other templet. The instrument can then be reversed to position for the opposite face of tooth, and treated likewise.

When the generating circle chosen has its diameter equal to the radius of the opposite pitch circle, the flanks of the teeth will be radial, and very conveniently drawn. But when

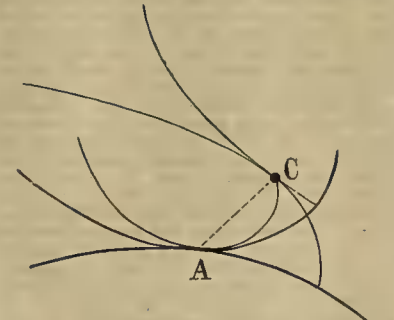
Fig. I.



NEW ODONTOGRAPH—FULL SIZE.

general theory in which the describing curves are logarithmic spirals rolled on the pitch lines. The same curves are, however, more conveniently described by unwinding a thread from a cylinder of certain size with pencil attached. The odontograph curve will represent all these curves, as far as required for the teeth of wheels, and with a wonderful degree of precision. This known, it only remains to discover a mode of

Fig. II.



setting the instrument, and of procuring the tabular values.

It is first necessary to decide on a particular logarithmic spiral, because it may have an indefinite number of obliquities. If circle arcs will give a reasonable approximation to form of tooth, as contended by some makers, then a logarithmic spiral, very carelessly chosen, even, will do far better, for it is a curve some portion of which very much resembles such initial part of an epicycloid as required for a tooth. But it is evident that some form is best, and this is found, by a method partly graphical and partly analytical, to be one whose obliquity is 2, and is the one adopted for the instrument with great confidence as to close coincidences.

An equation of the odontograph curve was next obtained, which was combined with the equations of the epicycloid, the hypocycloid, and the involute. The combinations with the

relation is otherwise, the flank will be curved, and the second part of the table is given for setting for them. The formulas, however, require that the instrument be set by aid of a different line than *DE*, for the flanks. The tangent must be drawn to the pitch line from the side of the tooth instead of middle, as from *A*, in Fig. 1. Also, the instrument should have its back toward instead of from the center of wheel. Therefore, for the flank, the end, *H*, should be wheeled around nearly 180°, and set to a tangent drawn from *A*. A similar tangent and setting is required for the opposite flank.

Fig. 3 shows at a glance how the odontograph is placed for drawing the faces and flanks.

In the case of involute teeth the settings are made in the same way as for above case of radial flanks; except the tangent, *DE*, must be drawn from the base circle of the involute instead of the pitch line. But the tooth-thickness should still be laid off on the pitch line. For all these cases the radius rod may be brought into requisition, whether the drawing is to be done on the drawing board or wooden pattern.

These instruments are manufactured at the laboratory of the School of Mechanical Engineering of the Illinois Industrial University, Champaign, Illinois.

ADVICES from Ottawa state that the Canadian government has sent to England advertisements for propositions from capitalists to build the remaining portion of the Pacific railway from the Red river to the Pacific ocean. Accompanying them is also sent a large number of copies of a book, compiled by Carroll Ryan, giving a roseate description of the soil, climate and productions of the country along the proposed line of the route.

MESSRS. BAKER & HAMILTON, as will be seen by our advertising columns, keep on hand all styles of the "Ames portable engine," such as we have described at various times in this journal. These engines have an enviable reputation for strength and simplicity of construction. They are made in different sizes and styles, to suit various kinds of works, and are furnished all ready to fire up in and run.

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Mechanical Ore Concentration and Separation—No. 22.

(Written for the Press by FRANCIS M. F. CAZIN, M. E. Santa Fe, New Mexico.)

Slimes and Their Treatment.

It may contribute to more perfect information to my readers if in this place I repeat briefly what the leading features of mineral dressing are, so as to assign to the treatment of "slimes" (fine particles of less than one-half millimeter size), its proper place. After the mineral (ore) is broken into particles of such sizes as its nature will require, the material resulting from the breaking machinery (crushers, rollers, stamps or pulverizers) will practically never consist of particles of uniform sizes. The apparatus applied may control the size to such an extent as to permit no particle exceeding a specified size to collect with the broken material, but no apparatus in use or imaginable will prevent smaller sizes than those determined upon as the common result to collect with the larger sizes.

The coarser sizes—grains, coarse sand and fine sand—offer but little difficulty in classification according to size, or in separation according to quality, and it may be fairly said that the difficulty begins only with the finer sizes—those less than one-half millimeter in diameter—as well for classification as for separation. The treatment of slimes should therefore not only form an independent and special department in all concentration works, but to this department should all slimes be conducted. The slimes (dust when dry) consist of particles from one-half millimeter (1-50 inch) diameter down to particles not discernible, except under the microscope. They not only result in pulverizers or stamps, but their appearance begins in the crushers, augments in rollers and prevails in stamps and pulverizers. Even during the action of separating the coarser sizes, new quantities of slimes are the result.

It therefore is not sufficient to wash the ore before classifying so as to assort therefrom the slimes before classifying the grains and sands, but in separating grains and sands provision be made to free them from all slimes as preliminary action for their separation.

On continuous jigs with row of sieves this is done by an upper or first sieve with cloth or plate of one-half millimeter perforations, which sieve then is called the "suction sieve," because it acts as a suction-pump, drawing all slimes through and leaving grains and sands above, which grains and sands respectively form a fit object for jigs.

As stated before, all slimes, resulting from whatever part of the general operation, should be collected together and should be submitted to a special and careful treatment, because it is the nature of almost all ores that the most valuable parts break into the finest sizes, and predominantly so in ores from mines working near the surface.

In general a preliminary washing and a suction sieve will be sufficient in order to free the grains and sands from slimes, but where the ore is so soft that grains and sands, by friction during the act of separation, will produce new slimes, the then muddy water, overflowing from the jigs with the tailings, should be made to escape by itself and should pass through an apparatus called "spitz-kasten," which will be described hereafter, and which apparatus has the designation not to separate, but only to collect the slimes out of the muddy water. The water from the jigs can be made to carry all slimes contained therein away from the grain or sand tailings, if the latter are elevated out of the water, either by a perforated "Raff wheel," or by an inclined Archimedeian screw, as the late Ritter Von Rittinger, the great authority on mineral dressing in Europe, suggested in a letter to the author, and as was successfully applied afterwards.

In elevating the grains and sands, a supplementary stream of fresh water during the act of elevation secures a complete recovering of all slimes.

BULLION SHIPMENTS.—Since our last report shipments from the prominent mines have been as follows: Northern Belle, Feb. 4th, \$18,005.99; Con. Virginia, 8th, \$64,763.37; California, 8th, \$300,639.89—total for January, \$1,613,707.39; Comanche, Feb. 6th, \$9,640.85; Northern Belle, 6th, \$12,015.83; Manhattan, 13th, \$12,200; Leopard, 12th, \$6,800; Con. Virginia, 13th, \$59,090.52—total to date, \$122,853.89; California, 13th, \$266,612.19; Tybo Con., 8th, \$8,508.04; Northern Belle, 11th, \$18,008.93.

Our Railroads.

Railroad Construction in 1876.

The last number of the *Railroad Gazette* contains a full review of the railroad construction of 1876. It appears from the exhibit that, though the construction of new roads has been small as compared with those years in which building was most extensively carried on, the progress was material and healthy. The time has gone by when railroads could be built on speculation and prove profitable enterprises for those who first took the project in hand, and whatever the effect might be upon those who had to bear the brunt of the undertaking.

Texas, California and Colorado exhibited the most marked railroad progress in 1876. The first named State built nearly as much railroad during the year as it ever did in any preceding year, and increased its mileage more than one-fifth. Both California and Colorado constructed more railroad than in any previous year. Ohio led Colorado in the number of miles, but not in the proportion of mileage to the existing length of road.

There are three States which have over 5,000 miles of road; six States which have over 3,000 and less than 5,000; 16 States with more than 1,000 and less than 3,000 miles; 18 States and Territories with over 100 miles of road and less than 1,000; and five Territories in which not a single mile has been constructed.

The following summary shows the mileage of new railroad constructed in each State and Territory for the year 1876, and the total mileage at the end of 1876:

	Construction in 1876.	Total Mileage.
Alabama.....	0	1,722
Arkansas.....	49	787
California.....	350 1/2	1,854
Colorado.....	154 1/2	950
Connecticut.....	7	925
Delaware.....	0	285
Florida.....	0	484
Georgia.....	44	2,308
Illinois.....	49	6,980
Indiana.....	72 1/2	4,072
Indian Territory.....	0	281
Iowa.....	80 1/2	3,987
Kansas.....	76	3,226
Kentucky.....	138	1,404
Louisiana.....	0	539
Maine.....	20	987
Maryland.....	15	1,992
Massachusetts.....	0	1,825
Michigan.....	46	3,437
Minnesota.....	34	2,024
Mississippi.....	10	1,023
Missouri.....	100 1/2	3,016
Nebraska.....	52	1,181
Nevada.....	0	711
New Hampshire.....	0	942
New Jersey.....	84	1,594
New York.....	69 1/2	6,520
North Carolina.....	43	1,371
Ohio.....	270	4,680
Oregon.....	0	251
Pennsylvania.....	90 1/2	5,896
Rhode Island.....	9	182
South Carolina.....	17	1,352
Tennessee.....	72 1/2	1,638
Texas.....	387 1/2	2,071
Utah.....	0	483
Vermont.....	0	210
Virginia.....	10	1,643
Washington Territory.....	0	110
West Virginia.....	9	516
Wisconsin.....	123 1/2	2,575
Wyoming.....	0	450
Total.....	2,442	78,640

Smelting Furnaces.

In a recent number of the *Coso Mining News* there was an article relative to smelting, in which the Eureka smelters were advised to take a trip to Coso in order to learn their business. In answer the Eureka *Sentinel* called for a few facts relative to the capacity of the Coso furnaces, their bullion production, cost of running, etc. The next issue of the *News* supplied that information, and, says the *Sentinel*, we have taken pains to gather some statistics in relation to our own furnaces. The following is a tabulated statement of the working expenses and amount produced over in Coso:

NEW COSO EXPENSES FOR ONE DAY.	
One Foreman.....	\$ 10 00
Two Assistant Foremen.....	10 00
Two Engineers.....	10 00
One Machinist.....	6 00
One Blacksmith.....	5 50
One Helper.....	4 50
One Carpenter.....	5 50
Three Changers.....	15 00
Three Smelters.....	15 00
Three Helpers.....	12 00
Two Coal-passers.....	9 00
Five Laborers (ore men).....	20 00
One Cartman, horse and cart.....	6 50
One Night Watchman.....	5 00
Iron ore, 6 tons per day used at \$16.50 per ton.....	99 00
Lime rock, 14 tons per day used.....	50 00
Charcoal per day.....	395 00
Wood, 6 cords per day.....	60 00
Water, per day, 3,000 gallons.....	30 00
Sundries, oil, etc.....	00 00
Total expenses per day.....	\$780 00
Total expenses for 17 days.....	\$13,260 00

The furnace is of 50 tons capacity, and when running well, smelts an average of 20 tons of ore per day.

DEFIANCE EXPENSES FOR 17 DAYS' RUN.	
Coal, 14,800 bushels, at 32 cents.....	\$4,736 00
Labor.....	1,564 00
Wood, 34 cords, at \$11.....	374 00
Iron ore, 30 tons, at \$16.50.....	495 00
Water, at \$22 per day.....	374 00
Sundries, at \$5 per day.....	85 00
Total.....	\$7,628 00

The furnace is of 30 tons capacity, and has smelted in the 17 days' run 550 tons of ore, at an average cost per ton of \$12.05.

By these figures, which are very nearly correct, it will be seen that the Defiance has smelted its ores at an average expense of \$12.05

per ton, whereas, the New Coso Co. has smelted its ores at a cost of \$39 per ton.

The following is the daily workings of a Eureka furnace—the number of men employed, cost, etc.:

EUREKA EXPENSES FOR ONE DAY.	
Two Foremen.....	\$ 12 00
Three Smelters.....	15 00
Six Slag-wheelers.....	24 00
Six Ore-feeders.....	24 00
Four Ore-wheelers.....	16 00
Two Charcoal-tenders.....	8 00
Two Engineers.....	10 00
One Cartman.....	4 00
Charcoal, 1,650 bushels.....	495 00
Wood, two cords per day.....	12 00
Sundries, oil, etc.....	10 00
Total.....	\$630 00

The furnace was built in 1872, has been running a greater portion of the time up to the present date, and was calculated for a capacity of 50 tons, but has averaged 70 tons of ore reduced daily, and run as high as 90. The average cost of reduction is \$9 per ton, and bullion produced will reach from eight to nine tons per day. With the figures given by the *News*, we fail to see how, on the most favorable showing, he gets the cost per ton at \$12.05; but granting such to be the case, it will be seen that our furnaces double the production and reduce the cost one-quarter. Better have those Coso smelters do a little "barring out," or else take a trip over to Eureka and learn the business.

Miners' Water Rights.

The case of Osgood versus the E. D. W. and D. G. M. Co., which has just been tried in the District Court, excited much interest and involved several points of great and general importance. Both sides were represented by able counsel: Messrs. McFarland, of Sacramento, and Virgin, of Nevada, for plaintiff; Creed Haymond, Judge Garber and George G. Blanchard for defendant. The case went to the jury, and after brief deliberation they returned a verdict for defendant. As a complete and felicitous summary of the points of the case, we append Judge Wheeler's verbal charge to the jury, as transcribed from the short-hand notes of S. Osburne, stenographic reporter, and published in the *Mountain Democrat*, El Dorado county:

Gentlemen of the jury: It appears in evidence in this case that the plaintiff settled and located upon his quarter section of land in Lake valley, El Dorado county, as early as 1863; that he made an application to the proper land office and entered the land through which the stream runs; that on the 11th day of June, 1870, he proved up his claim and paid the purchase price to the United States Government. On making that payment he became the equitable owner of the land, and all that remained then to be done was the mere ministerial act, upon the part of the subordinate officers of the Government, of making out and delivering to him a patent. But for the purposes of this case he will be deemed to have become the owner of the land upon that day—the 11th day of June, 1870.

I instruct you as matter of law, and such I consider clearly the weight of the authorities in the United States as well as England, that the owner of a piece of land through which a stream of water runs is entitled to have that stream continue to run in its natural course, with its flow undiminished and its volume of water unpolluted. That is unquestionably what is called the "riparian doctrine of the common law;" and while I have listened with great attention, and I might say with instruction, to the argument of counsel for defendant upon that point, undertaking to establish that that law has been changed, I must instruct you that the weight of authorities is the other way; that the law stands to-day in California, concerning riparian rights, precisely as it stood one hundred years ago in England, and as it exists in most if not all of the States of the Union. If, then, this defendant, this corporation, had had no existence, or had never taken any steps to claim the waters of this creek, the plaintiff in this case, by virtue of his purchase of the land from the U. S. Government, would be entitled to the unobstructed flow through his land of the whole stream. Having shown this payment to the Government, he has established a *prima facie* case, and shown that he is entitled to the relief he here demands. But I will remark here that it is not necessary, in order to maintain his action, that he should go into proof of the particular use to which he proposes to apply this water. That with him is a matter of taste; a matter of choice; a matter of right; and as well might a stranger question the owner of a shade-tree growing upon the lawn as to what use he proposed to put it to, as for the defendant to question the plaintiff as to the special use he proposes to make of this stream.

In answer to the plaintiff's showing, the defendant sets up, as a reason why the plaintiff should not prevail, that the corporation defendant has acquired rights from and through the General Government which have become, by virtue of the acts that it, the defendant and its grantors, have performed, paramount to the rights of the plaintiff. It is in evidence and beyond dispute that in 1867 the grantors of the corporation posted at the outlet of Echo lake a notice claiming the waters of that stream for certain purposes. It is also claimed by them that subsequent to the posting of that notice, and down to the time in which they actually turned the water into their flumes, they acted with reasonable and proper diligence; that they surveyed their lines for the flume and ditch; that they worked upon the ditch below Cedar rock, and that in all things they followed up the

object that the notice announced to the world, with diligence and with good faith, with as much rapidity as it was practical to do under the circumstances of the case, locality and climate, and the condition of the country considered.

It is admitted in this case that down to 1867 the U. S. Government was the owner, not only of the land upon which Osgood settled but also of the land at and immediately surrounding Echo lake, and being thus the owner, being the paramount proprietor, it was perfectly competent for the American Government, in the exercise of its constitutional rights and of its discretion, to make such disposition of the land or the water as it saw fit. In the year 1866, in the exercise of that discretion, and with a view to the peculiar condition of things upon this coast, it passed an act the 9th section of which it is claimed by defendant conferred rights which they are now seeking to enforce in this case. That section reads as follows: "That whenever by priority of possession, right to use of water for mining, agriculture, manufacturing or other purposes, have vested and accrued and the same are recognized and acknowledged by the local customs, laws and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same, and the right of way for the construction of ditches and canals for the purpose aforesaid is hereby acknowledged and confirmed."

The first question that is made upon this section is whether priority of possession meant an actual possession, an actual diversion of the water of the stream, or whether it meant the taking of such initiatory steps as under the decisions of our courts here constitute what the court calls possession of a water right, and before the flumes, ditches, reservoirs and dams are finally completed.

In the review that I have taken of the decision of our Supreme Court defining what is possession, I am constrained to believe, and therefore charge you, that if the parties had posted the proper notice, had blazed trees, had made their surveys and had done the necessary and usual amount of work evincing their good faith, and had been diligent in the prosecution of the work as far as it was in their power to be under all the circumstances of the case, I charge you that that, in the sense of the law, constitutes possession, and if their work was afterwards pursued with due diligence on to completion, that their right related back to the date on which they posted their notice, which would be in 1867.

I also instruct you that this act of Congress was intended to operate upon future acquisitions of water rights, as also that it was not confined strictly to the mineral belt. The argument made by counsel is apparently a forcible one, that this statute was dealing with all the mineral lands on the Pacific coast, and therefore it could not have any application outside of what is called the mineral belt. To that the reply is, that Congress must have taken notice of the fact that the streams running through the mineral belt of this slope have their rise high up in the mountains, and beyond the actual mineral belt, and therefore it must have been contemplated by Congress that while the water would probably be used mostly for mining, yet that parties could go above and beyond the mineral belt and make their locations and appropriate the waters that were gathered in those high mountain lakes as natural reservoirs. You will observe then, this being the law, and it is your duty as sworn jurors to accept the law from the court as the law of the case, whether it be right or wrong—you will observe that this case then turns upon the question of the diligence of the locators, who are the grantors of defendant.

Now, it certainly would be a great injustice, and one that the law denounces, that any man would have the right to monopolize the waters of a vast extent of country by putting notices at different lakes, or at different points on rivers and streams, and then to subside into idleness and inactivity waiting merely for an opportunity to make a speculation by effecting the sale of the water thus claimed. Hence he must follow up the notice by a diligent endeavor to utilize the waters and turn them from the stream and to apply them to some useful and beneficial purpose. Again, the question has been raised, whether a man can offer as a plea for his dilatory conduct the fact that he was poor. The instruction that was read from one of the cases seems to have received the approval of our Supreme Court, that want of pecuniary ability is not an excuse for a neglect to diligently prosecute the work; that if a man has no means he cannot appropriate a large amount of water and lie idly by, waiting for an opportunity to sell it and neglecting to perform the necessary work to effect an actual diversion. If a man were permitted to do that, he could keep large and valuable industries lying idle, and might prevent men who had means, and who had the energy and the will, from going on and diverting and utilizing large and useful streams. Therefore, that plea of itself, that these gentlemen had not capital, will not and does not constitute a legal excuse for neglecting to prosecute the work, if you should find that they have been negligent in the matter.

There is one other point upon which I have been asked to instruct you; that is, that work done with a view solely to appropriate the waters of Silver lake or Clear lake will not inure or aid in effecting an appropriation of the waters of Echo lake. In looking at the diagram that was furnished by the engineer of the

defendant, it seems that Silver lake and Clear lake lie far to the south of Echo lake; that the streams flowing from those two lakes unite and form Alpine creek, which empties into the American river at or near Cedar rock, and that one of the branches of the American river, distinct from Alpine creek, and some distance from it, is the one that approaches nearest to the waters of Echo lake. I therefore instruct you that any work done between Cedar rock and Silver lake or Clear lake, with a view to appropriating the waters of those lakes, would not inure to the enterprise so far as to count in favor of the projectors in taking the waters of Echo lake; but if you are satisfied that the main ditch running from Cedar rock to Sportsman's hall was constructed with the view not only to take the waters of Clear lake and Silver lake, but also of Echo lake, then any work done upon the main trunk of the ditch, anywhere between Cedar rock and Sportsman's hall would be work tending to a final consummation of the plan of appropriating the waters of Echo lake, and it would not be necessary to do the work immediately at the lake itself. But you will remember further, that in claiming credit for work done at a remote point, to make the appropriation of Echo lake good, you must be satisfied that they gave a proper and reasonable publicity to the claim that they were making, by notice and other indications upon the ground, so that a man in the exercise of his ordinary faculties might have readily discovered that the waters had been so claimed, and that the claimants intended on the completion of the work to appropriate them.

I will say further that this question of diligence of the law seems to have reposed in the hands of the jury; it seems to have been left to you to say, as sensible business men, acting without prejudice and without fear or favor, under your oaths, whether, all the circumstances considered, there has been ordinary and proper diligence used by the locators. This depends generally upon the evidence, upon the shape of the country, upon the condition of the mountains, upon the character of the climate and upon the circumstances that might naturally arise in the course of the prosecution of the work. You are the judges, the sole judges, as the law says, of the facts. You are the judges of the credibility and the truthfulness of witnesses, and where there is any conflict it is for you to determine upon which side lies the truth. There has been something said in argument touching the fact that an individual is upon one side and a corporation upon the other. I will simply say that it is the pride and glory of our Anglo-Saxon civilization that perfect and exact justice is meted out, not only to combinations of men—corporations—but to individuals standing singly and alone in our courts of justice. You will, therefore, have no prejudice against this corporation because it is a corporation, nor should you stand in any fear of it by reason of its wealth and power, and upon the other hand you should not allow any undue sympathy for the individual to swerve you from the exact line of duty, nor should you forget the rights of the individual on account of the plea that the public would be benefited by his property being taken. The humblest individual has a right to the full protection of the law and to a fair and full recognition in our courts of all his rights.

If at any period after the posting of the notice at Echo lake the work of the defendant or its grantor was not prosecuted with due diligence, yet if, before the plaintiff's right intervened, the prosecution of the defendant or its grantor's work had been recommenced, and after such recommencement carried on with due diligence, the plaintiff cannot take advantage of the prior neglect of the defendant or its grantors.

Believing, gentlemen, that with these remarks, the testimony being fresh in your minds, as well as the very able argument of counsel, you are prepared to render an intelligent verdict, the case is submitted for your consideration. If you shall find for the defendant, your verdict will simply be, "for the defendant." If you find for the plaintiff, the verdict will be, "for the plaintiff," or with such damages as you may find that he has sustained. I apprehend, however, under the evidence, that the damage could not be anything more than nominal, which is generally fixed at \$1.

Fighting Hot Water.

The struggle with the water in the Savage and Hale & Norcross still goes on. On the 28th ultimo, and when the broken rod at the Savage was repaired, the water had risen 24 feet above the 1900-foot level in the Hale & Norcross. One set of pumps, although 14 plungers of 8 feet stroke, cannot well hold the water that flows into these mines. It requires about 12 strokes per minute of these monstrous pumps to do this. The engines are more than capable of that motion, and were the shaft perpendicular might hold the water; but the rods on the incline running at that rate would hardly stand the pressure; they would be apt to jump the rollers; but when both pumps are at work, they lower the water over six inches an hour.

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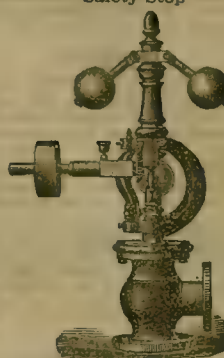
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Continued from page 101.

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Oregon.

GOOD CLEAN-UP.—*Badrock Democrat*, Feb. 7. A company of miners, consisting of Messrs. Jack Chapman, Wm. Reynolds, Captain Jinks and Joseph Daws, who have been getting out rock on their own responsibility at the Virtue mine for a month or two past, made a handsome clean-up last Saturday. The amount derived was about \$1,800. Messrs. Borman and Co. commenced crushing rock last Saturday, at the same time, and we are promised the result of their clean-up as soon as it is ascertained. The men comprising both companies are hard workers and deserve success.

SOLD.—The Monumental mine, at Granite creek, has been sold to some San Francisco capitalists for \$50,000. Twenty thousand dollars was paid down, and the balance will be paid in six and twelve months. This is a bona fide sale and no humbug. One of the conditions of the sale was that the mine should be erected on the mine immediately, which will improve the value of mines in that vicinity 10%.

Utah.

DRY CANYON MINES.—*Cor. Salt Lake Tribune*, Feb. 6: At present there is considerable excitement here owing to the recent rich strikes in several of our mines. The Hidden Treasure mine still continues to yield large quantities of the rich ore of which you made mention in your columns a few days since. This mine is working a force of 20 men. The Mono mine has recently made a shipment of 15 tons of ore that will average about \$150 to the ton. It is rumored around town that there was a large body of high grade ore struck in this mine last week on the 600-ft level. The Queen of the Hills still keeps the ore teams busy hauling away large quantities of ore to the Chicago smelter. This mine employs between 40 and 50 men. The Deseret mine has made a rich strike, and has been shipping large quantities of ore that will average \$400 to the ton. This mine is working about 20 men. The Utah Queen is shipping considerable low grade ore. The Sky-Gazer lode is showing a three-foot vein of free milling ore, averaging 25 ounces silver to the ton. The Hidden Treasure mine still continues to ship from 20 to 30 tons of ore per day. Their new tramway is nearing completion. This will carry the ore down to Porcupine gap, from which place it will be conveyed down the canyon by ore teams, doing away with the Gibborn toll-road. At present it employs in the neighborhood of 125 men. The Chicago mine continues to take out and ship ore right along, employing 10 men. The Fourth of July has been leased by Wm. Davis and P. J. Sullivan for three months. These parties have made a rich strike, showing a vein of ore three feet wide, which will sample 40 ounces silver to the ton and 50% lead. The Rattler mine is working 10 men. They are taking out ore and the prospects look favorable. There are several other prospects in this camp which it is impossible for me to name and give a description of at this time. At all events, there are plenty of mines here, if properly developed, that would rank with the Kearns, Mono, Queen, Treasure and other noted mines. All that the camp needs to help it out is men with capital, and that is what we expect to have here this coming summer.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

IDA LIVINGSTON & G. M. Co.—February 12th. Location, El Dorado Co. Capital stock, \$60,000. Directors—F. P. Latson, and M. Rosekrans, E. A. Sawyer, M. H. Colley and A. Y. Fanner.

CAMDEN M. & Co.—February 14th. Location, California. Capital stock, \$400,000. Directors—E. B. Pond, J. H. Suydam, Joseph Evans, John McAllister and W. B. Maddox.

LUCKY JACK M. Co.—February 14th. Location, Mono Co. Capital stock, \$5,000,000. Directors—Wm. M. Lent, J. Miller, Chas. W. Tozer, Geo. S. Dodge and A. W. Rose, Jr.

MONROE M. & M. Co.—February 14th. Location, Yuba Co. Capital stock, \$5,000,000. Directors—H. P. Mosher, John Springer, W. Applegarth, J. T. Vineyard and L. W. Gitchell.

ESSER M. Co.—February 14th. Location, Arizona. Capital stock, \$10,000,000. Trustees—A. W. Blair, W. H. Boothe, W. H. Stanley, G. W. Hopkins and D. J. Edgars.

THE EMMA MINE.—Counsel for defence in the Emma mine suit made a motion in the United States Court of New York to dismiss the complaint, or for the Court to instruct the jury to find a verdict for the defendants on the ground that plaintiffs had produced no evidence to show any false representations in connection with the sale of the mine in England, or to impeach the truth of the statements of Professor Silliman regarding the richness of the mine. Judge Wallace, in the United States Court at New York, denied the motion to dismiss the complaint, on the grounds that plaintiffs had not produced evidence to sustain their case. Counsel for the defence continued his opening, sketching the history of the mine and manner in which the defendants became the owners of it. He said they would show that the mine was all that it had been represented to be; that \$3,000,000 worth of ore had been taken out of it since it was claimed that the mine was worked out; that the mine was closed and represented to be worked out so as to make a basis for this suit, and that there were millions of dollars in it yet.

PRACTICAL WORKS.—John Wiley & Sons advertise in another column, text books and practical works for schools, institutes, engineers, architects, etc. We have called at their store and are well impressed with the apparent first-class manner in which they are conducting their specialty. We are pleased to call attention to their advertisement and invite our readers to open correspondence with them for any works in their line, of which only a few are enumerated.

BEST BOOK FOR EVERYBODY.—The new illustrated edition of Webster's Dictionary, containing 3,000 engravings, is the best book for everybody that the press has produced in the present century, and should be regarded as indispensable to the well-regulated home, reading-room, library and place of business.—*Golden Era*.

The cost of the new building of the San Francisco Stock and Exchange Board will be \$400,000.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

FOR WEEK ENDING FEBRUARY 6TH, 1877.

ROCK DRILLING EXCHANGES.—Prescott S. Buckminster, S. F. **HENKERS FOR SEWING MACHINES.**—Charles L. Goethals, Los Angeles, Cal.

OVERSEAMING SEWING MACHINES.—John S. Hall, Monterey, Cal.

HARROWS.—Charles Keehner, Roseville, Cal. **GOPHER GANO PLOWS.**—Morgan S. McMahon, San Jose, Cal.

GALVANIC SOLES.—Erastus H. Craw, Vallejo, Cal. **CARPENTER'S GAGE.**—Charles O. Farciot, S. F.

CHURNS.—Elias Groat, Napa, Cal. **SOFA BEDSTEPS.**—August Hansen, S. F.

BARREL TAPS.—Henry Saunders, S. F. **AUTOMATIC SEWER TRAPS.**—John P. Schmitz, S. F.

PLUMBERS' TRAPS.—Louis Schonberg, S. F. **TELEGRAPH INSULATORS.**—Paul Sells, S. F.

SLAG POTS.—Henry Zottman, Eureka, Nev. The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

IMPROVEMENT IN CHURNS.—Elias Groat, Napa. This invention relates to certain improvements on a churn, for which several patents have been granted to the same inventor. The churn described in these other patents consisted essentially of a box, case or vessel having two parallel horizontal shafts extending longitudinally across it near its top. Each of these shafts is provided with two or more depending beaters, which were so arranged that the beaters of one shaft alternated with those of the other. A rocking motion was then imparted to the two shafts, so as to cause the beaters to be reciprocated alternately past each other inside of the box, case or other vessel, thus producing the necessary agitation. Experience has demonstrated that the device for communicating this alternate rocking motion to the horizontal shafts must not be connected with the framework or case of the churn, as the working strain which results from the short up and down strokes of the operating lever is too severe on the points of the framework. The inventor has therefore devised a cheap and simple mechanism for operating these shafts directly from their projecting ends, so that the strain will not be communicated to the case or framework. He has also invented an improved manner of constructing the end of the box from which the journals or shafts project, the object of which improvement is to allow the shafts and beaters to be easily removed when it is desired to clean the box.

SOFA AND BED.—August Hansen, S. F. This patent covers an invention which relates to a novel construction of that class of household furniture known as sofa-beds, and it consists in the formation of a double sofa bottom so hinged as to open outward to secure a proper width for a bed, and in combination with this, a sofa back so hinged as to swing across the head of the converted bed where it is inclined, and held in position by a locking device. A mid-leg may support the front of the bed, and the upholstered arms of the sofa are hinged so as to be turned back before opening out the hinged bottoms, thus protecting them from wear upon the floor or carpet. In combination with this sofa is employed a double detachable head-piece, composed of two parts, which, when not in use, may be shut up together, but are separable for use. The hinges by which the parts of the bed are connected, are so made as to brace and resist the separation of the parts.

ELECTRO-MAGNETIC SOLES.—E. H. Craw, Vallejo. This is a novel sole for boots and shoes, which is intended to create a feeble magneto-electric current through the lower limbs of the wearer, thereby relieving or curing rheumatic attacks. These soles are made of a positive and the other of a negative metal, suitably covered to prevent wear and breakage, the covering being also perforated if desired. For neatness and convenience the soles are covered with any suitable fabric. The plates are made preferably in three parts, and are loosely connected together by the covering fabric, so that as the foot and shoe bends at the ball in the movement of walking, the plates will give easily without breaking. The effect of these plates, the inventor says, has been to completely cure rheumatic affections of the lower limbs in all cases where the soles have been worn; and they require no special attention or adjustment from the wearer.

BARREL TAP.—Henry Saunders, S. F. This invention relates to certain improvements in that class of barrel taps which are fixed in the barrel and provided with a valve which is opened upon the introduction of the faucet so that by use of the faucet the contained liquid may be drawn at will. The invention consists in the employment of a double tap consisting of an outer gland, which is screwed permanently into the cask; and an inner one, which contains

the valve and receives the faucet, said inner gland being removable from the outer one so as to allow free access to the cask for cleaning, without interfering with the valve or removing the gland which screws into the cask, which would in a short time cause it to leak. It also consists in a novel construction and arrangement of the valve.

PLUMBERS' TRAP.—Louis Schonberg, S. F. This is an improvement in waste-pipe traps for plumbers' use, and it consists in enlarging the pipe on one side of the "S" bend and reducing it on the opposite side. The object of this construction is, first, to prevent siphoning, and secondly, to avoid the formation of shoulders or projections on the inside of the pipe. This is another step in advance toward preventing the access of sewer gas into dwellings, and we shall shortly give an engraving of the device, so that it will be better understood than by a mere verbal description.

An Important Decision to Miners.

Judge Sawyer, of the United States Circuit Court, in this city, has rendered a decision in the case of Trafton vs. Nougues, which will be of interest to all mining litigants. This action was brought in the State Court, in Placer county, to recover the trespass upon a gravel gold mining claim, and seeking an injunction restraining the working of the claim by the defendant, and decision was given upon a petition to have it transferred to the United States Circuit Court. Judge Sawyer, having stated that he had found considerable difficulty in construing the Congressional act of March 3d, 1875, defining the rights of citizens who lay claim to public property, gave an elaborate review of the questions involved in the case. After a lengthy introduction he said: With reference to mining claims, the act of Congress grants certain rights to those who discover, take up and work mining claims. But it refers the parties to the local laws of the States and Territories, and to the regulations of miners of the district where the claims are situated, for the measure of their rights. If a dispute arises, the act of Congress refers the parties to the ordinary tribunals to determine it by the local laws and customs, and not by the act of Congress. Clearly, the great mass of these cases cannot involve the discussion of any dispute as to the construction of any act of Congress; and when they do not, under the decisions cited, this Court is without jurisdiction, so far as this provision of the act is concerned. No controversy can possibly arise under the Constitution or an act of Congress, when all parties agree as to its construction. There may be a contest as to other matters, but not as to the Constitution or laws in such cases. Under the fifth section of the act, it is made the imperative duty of the Court, at any stage of the proceedings, when it appears that "such suit does not really and substantially involve a dispute or controversy properly within its jurisdiction," to stop the proceeding and remand the case. The location of the mine involved in the case is more than 150 miles from San Francisco, where the court is held, and many other cases may arise in this State, Nevada and Oregon, in regard to claims lying from 300 to 500 miles distant from the places where the national courts are held, and between which places the means of communication are by no means easy or cheap. Generally, in this class of cases, the testimony rests mainly in parol, and there is a multitude of witnesses. The expense of prosecuting or defending such suits, at a large distance from the location of the mines, would be enormous. If the Court should accept a petition containing a bare statement of the opinion of the petitioner that the rights of the parties are derived under an act of Congress, as in this case, the result in most cases would be that the Court would not be able to determine whether the case "really and substantially involves a dispute or controversy properly within the jurisdiction of the court," until the close of the testimony, when it would be necessary to remand the case at last. Such results would largely obstruct the administration of justice, and work an inconvenience to honest suitors. Besides, it would encourage transfers of cases over which the court had no jurisdiction, by unscrupulous parties, for the very purpose of deterring the adverse party from pursuing his rights by reason of the delays, inconvenience and enormous expense of prosecuting an action of this class at a great distance from home. These difficulties would be especially onerous in cases relating to mining rights, where time is often as important as the right, in the several large States of the Pacific coast and interior of the continent, and where a court is held at but one point.

In view of these, in my judgment, weighty considerations, therefore, I think it of the highest importance to the rights of honest litigants, and to the due and speedy administration of justice, that a petition for transfer should state the exact facts, and distinctly point out what the question is, and how and where it will arise, which gives jurisdiction to the court, so that the court can determine for itself from the facts, whether the suit does really and substantially involve a dispute or controversy properly within its jurisdiction.

The Court ordered that the ease be returned to the State Court from whence it came, with costs against the petitioner, but said that as it was of the utmost importance that a final decision of the question be had as soon as possible, he would, if counsel so desired, order the Clerk to delay returning the case till they have an opportunity to sue out and perfect a writ of error.

General News Items.

The Panama Star and Herald says guerrilla skirmishes and wholesale assassinations continue in the interior.

The Treasury Department at Washington has prohibited the importation of cattle and hides from Germany until further orders, in consequence of the rinderpest.

The general freight agents have fixed temporary rates on freights through from Chicago to Liverpool, which are an advance of five cents over those heretofore prevalent. They are on the basis of 52 cents for wheat per 100 lbs. and 53 for corn.

EARL RUSSELL has given notice to the House of Lords that he will move that England shall cease all diplomatic intercourse with Turkey, on the ground that that nation is still barbarous and unworthy of rank among the enlightened people of Europe.

The Times dispatch from Calcutta says: In the week ending February 2d, the number of persons engaged in relief works decreased 34,000 in Bombay and 39,300 in Madras, as compared with the numbers employed in previous weeks. This decrease is attributed to a reduction of wages and the exclusion of persons not really destitute. But there has been no rain and no improvement in the condition of the crops. The health of the population in both presidencies is bad. There are many cases of cholera in the distressed districts of Madras.

GRAND CENTRAL HOTEL, N. Y.—This hotel, in accord with its title, is most desirably situated for business men and pleasure seekers in the great metropolis of the United States. Like the Palace hotel west of the Rockies, it is the largest house east of the Alleghenies. It is conveniently arranged, and rendered very comfortable in each department by the successful management of the proprietor, Mr. H. L. Powers, and his associates. The interests of guests, for safety and security, are especially provided for. Its prices (from \$2.50 to \$4.00 per day, according to location of rooms and suites) are popular in these times, and we find it the liveliest house of so high a class in New York.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

METALS.

(WHOLESALE.)

THURSDAY, M., February 15, 1877.

IRON.		
American Pig, ton.	30	@
Scotch Pig, ton.	29	@ 30 00
White Pig, ton.	30	@ 30 00
Oregon Pig, ton.	30	@ 30 00
Round Bar, 4 in.	4	@ 30 00
Round Bar, 5 in.	5	@ 30 00
Plate, 5 to 9.	5	@ 30 00
Sheet, 10 to 14.	5	@ 30 00
Sheet, 15 to 20.	5	@ 30 00
Sheet, 22 to 24.	5	@ 30 00
Sheet, 25 to 28.	5	@ 30 00
Horse Shoes, keg.	6	@ 00 00
Nail Rod.	9	@ 30 00
Norway.	8	@ 30 00
Roller.	7	@ 30 00
COPPER.		
Copper Tinned.	37	@ 40
Sheathing, lb.	37	@ 40
Sheathing, Yellow.	21	@ 22
Sheathing, Old Yellow.	10	@ 11
Composition Nails.	21	@
Composition Bolts.	24	@
STEEL.		
English Cast, lb.	14	@ 25
Anderson & Woods, ordinary sizes.	16	@
Drill.	16	@
Flat Bar.	15	@ 20
Flat Plate.	8	@ 12 1/2
TIN PLATES.		
10x14 1/2 C Charcoal.	10	@ 50
Banca Tin.	24	@
Australian.	18	@ 18 1/2
ZINC.		
By the Cask.	11	@
Zinc Sheet 7x3 ft, 7 to 10, lb.	11	@
7x3 ft, 11 to 14.	11	@
8x4 ft, 5 to 10.	12	@
8x4 ft, 11 to 10.	12	@
NAILS.		
Assorted sizes.	3	@ 50
QUICKSILVER.		
By the lb.	45	@

LEATHER.

(WHOLESALE.)

WEDNESDAY M., February 14, 1877.

Sole Leather, heavy, lb.	25	@ 23
Light.	22	@ 23
Jobbed 8 Kil, doz.	48	@ 75 00
11 to 13 Kil.	58	@ 75 00
14 to 19 Kil.	82	@ 75 00
Second Choice, 11 to 16 Kil.	57	@ 74 00
Cornellian, 12 to 16 Kil.	57	@ 75 00
Females, 12 to 13 Kil.	63	@ 76 00
14 to 16 Kil.	71	@ 76 50
Simon Ullimo, Females, 12 to 13 Kil.	58	@ 76 00
14 to 15 Kil.	56	@ 77 00
11 to 17 Kil.	72	@ 77 00
Simon, 18 Kil.	61	@ 76 00
20 Kil.	65	@ 76 00
24 Kil.	72	@ 77 00
Robert Calf, 7 and 9 Kil.	35	@ 74 00
Kips, French, lb.	1	@ 1 35
Cal. doz.	40	@ 60 00
French Sheep, all colors.	8	@ 21 00
Extern Calf for Backs, lb.	1	@ 1 25
Sheep Rins for Topping, all colors, doz.	9	@ 13 00
For Linings.	5	@ 10 50
Cal. Russet Sheep Linings.	1	@ 4 50
Book Lega, French Calf, pair.	4	@ 4 75
Good French Calf.	4	@ 4 75
Best Jodot Calf.	5	@ 5 25
Leather, Harness, lb.	35	@ 38
Fair Bridle, doz.	48	@ 72 00
Stirrup, lb.	33	@ 37
Welt, doz.	30	@ 50 00
Buff, ft.	18	@ 20
Wax Side.	17	@ 18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, February 14, 3 P. M.

LEGAL TENDERS IN S. F., 11 A. M., 95@96. SILVER 6@6 1/2.

GOLD IN NEW YORK, 105 1/2.

GOLD BARS, 800@830. SILVER BARS, 7@10 1/2 cent. discount.

EXCHANGE on New York, 90@95-100 1/2 cent. premium for gold; on London bankers, 49 1/2; Commercial, 49 1/2; Paris, 4 francs 50 cent; Mexican dollars, 99@100.

LONDON CONSOLS, 96 1/2; Bonds, 102 1/2.

QUICKSILVER IN S. F., by the flask, 1 lb, 45c.

MINING MACHINERY DEPOT,

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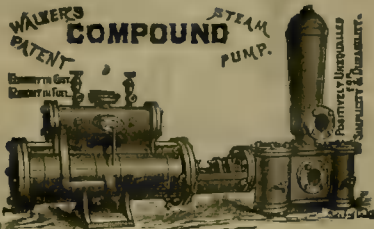
Burleigh's Air Compressors, Putnam's Machinists' Tools,
ROCK DRILLS and PLANERS & MATCHERS.
TUNNELING MACHINERY. HASKIN'S VERTICAL STEAM ENGINES

WALKER'S
Compound Steam Pumps.

COPE & MAXWELL'S
PLUNGER STEAM PUMPS.

WRIGHT'S
Bucket Plunger Pumps.

HEALD & SISCO'S
Centrifugal Pumps.



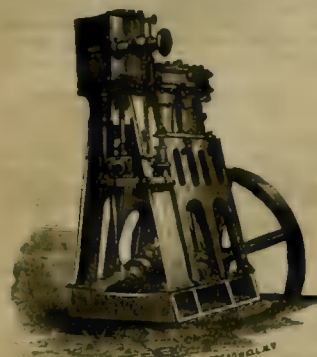
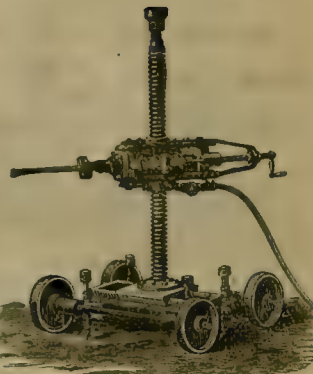
All Sizes.

Cosmopolitan Emery Wheels;

MORSE'S TWIST DRILLS.

Farmer's Battery for
Blasting.

HILL'S EXPLODERS.

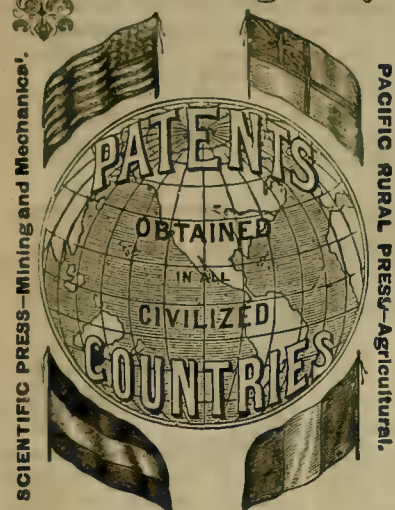


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MINING AND SCIENTIFIC PRESS.—This is the best journal of its class in the United States. It is published in San Francisco, by Dewey & Co., at \$4 a year, and is now in its 34th volume. Nothing that can be of interest to miners escapes its notice. Its contents are varied, and of great interest to all readers who are curious in regard to general science or specific detail. The proprietors have just given it a new dress of clear, sharp-cut type, which gives it a very handsome appearance. It is an exchange we value highly. —Colorado Miner.

WOODLAND, CAL., Aug. 8th, 1876.

Messrs. Dewey & Co.—Gents: Your letter containing the patent for my Centennial churn has come duly to hand, and you will please accept my many thanks for the prompt manner in which you attended to the business entrusted to your care, and I will take great pleasure in recommending you to any one having anything to attend to in your line. I am having a number of the churns put up, which will be ready for sale in a few weeks.

Yours truly, JAMES ROOT.

THE MINING AND SCIENTIFIC PRESS is the leading journal in America. New processes and mechanical inventions are illustrated and discussed in its weekly issues. It is a 16-page sheet, handsomely printed, for \$4 per year. Dewey & Co., publishers, San Francisco.—Mt. Lincoln News, Alma, Colorado.

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It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. Price, \$2.50 coin, or \$3 currency, postage free.

Concentration of Ores (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arseniurets, and Gold and Silver Ores generally, with 120 Lithographic Diagrams. 1867.

This work is unequalled by any other published, embracing the subjects treated. Its authority is highly esteemed and regarded by its readers; containing, as it does, much essential information to the Miner, Metallurgist, and other professional workers in ores and minerals, which cannot be found elsewhere in print. It also abounds throughout with facts and instructions rendered valuable by being clearly rendered together and in simple order. It contains 120 diagrams, illustrating machinery, etc., which alone are of the greatest value. PRICE, \$7.50.

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OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
B. W. ROWELL—Colusa, Butte and Sutter counties.
G. W. MCGREW—Santa Clara county.
A. C. KNOX—Nevada, Montana and Utah Territories.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMPION—Tulare, Kern and Fresno counties.
A. W. STRONG—Lake, Napa and Solano counties.
G. KUTNOW—Santa Barbara, San Luis Obispo and Ventura counties.
W. D. WITZ—San Bernardino and Los Angeles counties.

A COMPLIMENT.

PLAINSBURG, MERCED Co., CAL., June 22d, 1874.
DEWEY & Co.—Gentlemen: I herewith tender my grateful acknowledgments for the energy, promptness and efficiency which you have displayed in procuring my patent.

Although you were entire strangers to me when I first communicated with you, I soon felt satisfied you were gentlemen of integrity, and shall always be happy to represent you as such. Very truly yours,

H. W. RUCKER, M. D.

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ON VENTILATION,

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Location of principal place of business, San Francisco, Cal. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the first day of February, A. D. 1877, an assessment, No. 1, of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 418 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 14th day of March, A. D. 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 11th day of April, A. D. 1877, to pay the delinquent assessment, together with cost of advertising and expenses of sale. By order of the Board of Directors.

J. W. CLARK, Secretary.

Office, Room No. 2, 418 California street, San Francisco, California.

Mariposa Land and Mining Company of California—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the sixteenth day of January, 1877, an assessment (No. 9), of one dollar per share was levied upon the capital stock of the corporation, payable immediately in United States currency, to the Secretary, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California, or to the Assistant Secretary, at the office, No. 9 Nassau Street, New York, N. Y. Any stock upon which this assessment shall remain unpaid on the seventeenth day of February, 1877, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Monday, the nineteenth day of March, 1877, to pay delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

LEANDER LEAVITT, Secretary.

Office, Room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California.

Tuolumne Hydraulic Mining Company.—Principal place of business, city and county of San Francisco, State of California. Location of works, Tuolumne county, State of California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 19th day of January, 1877, an assessment of Five (5) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, Room 2, 528 California street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid, on the 12th day of March, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 20th day of April, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

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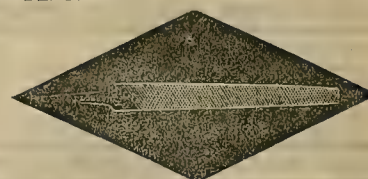


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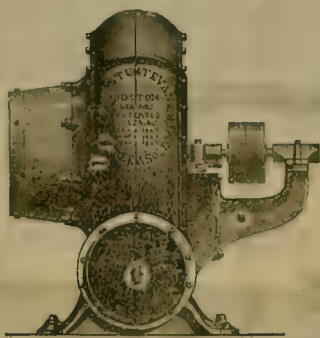
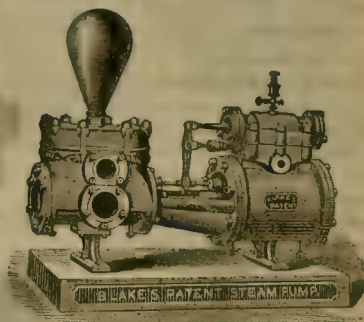
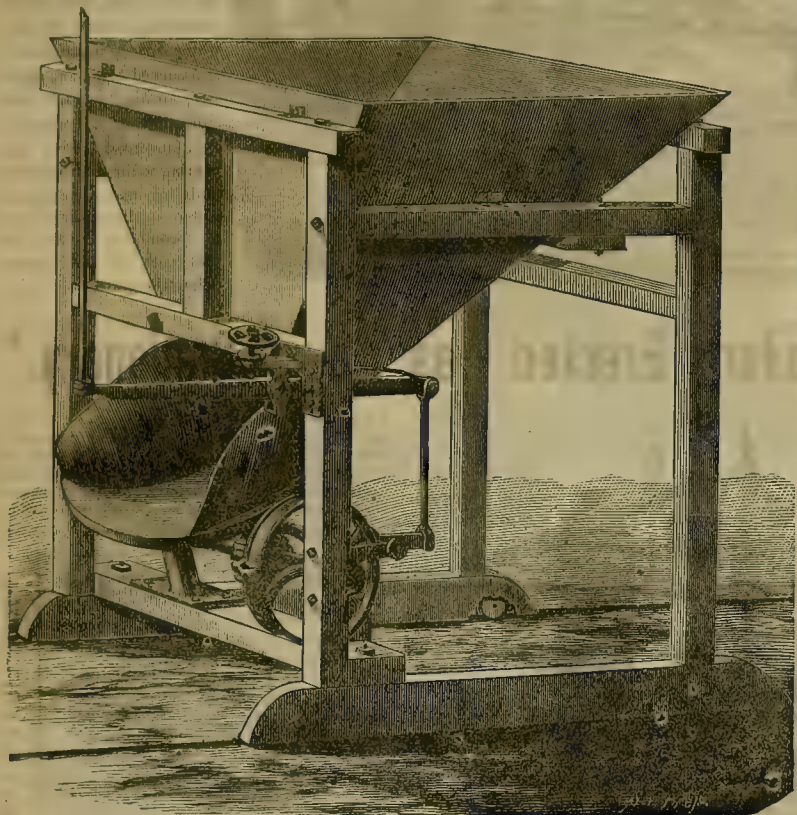
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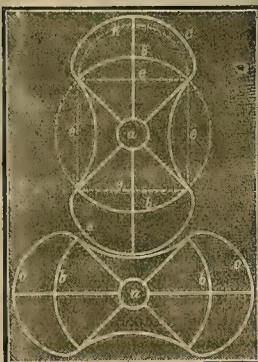
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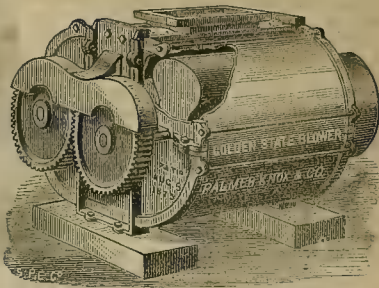
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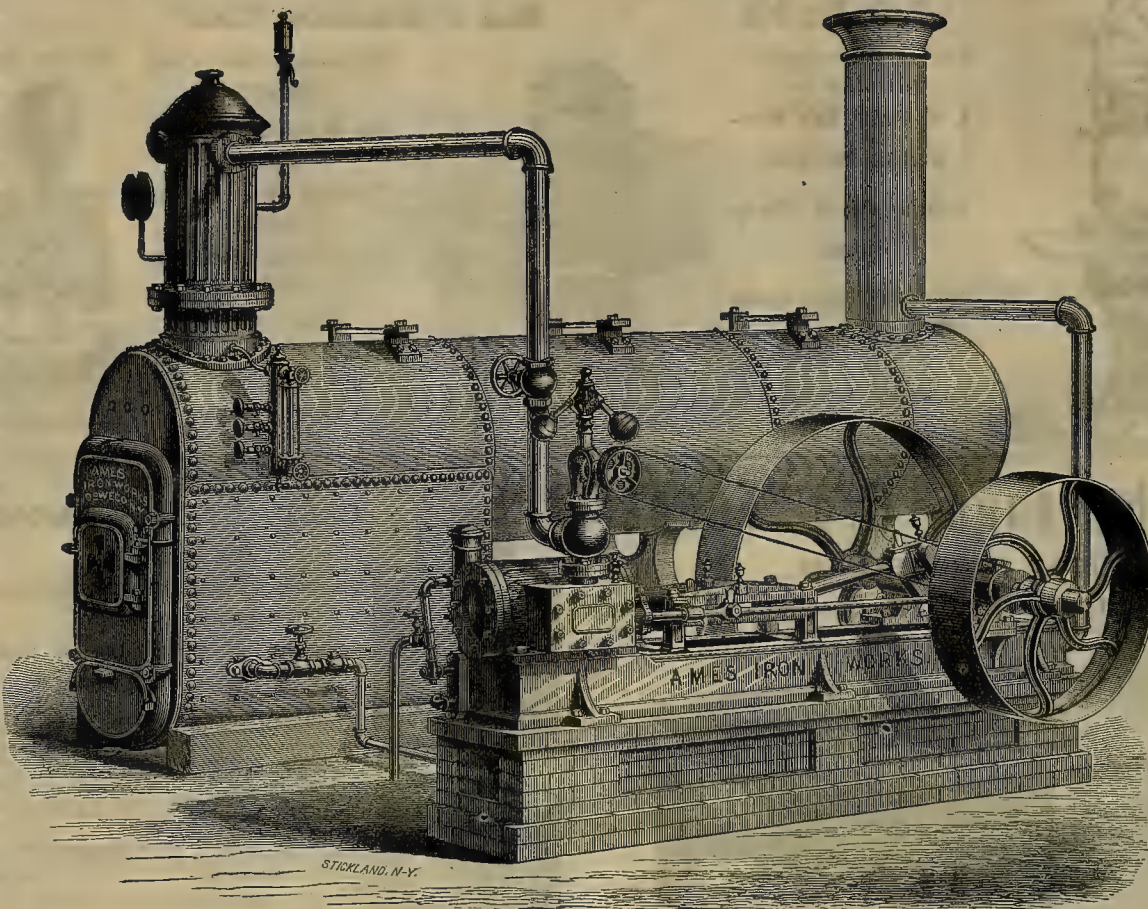
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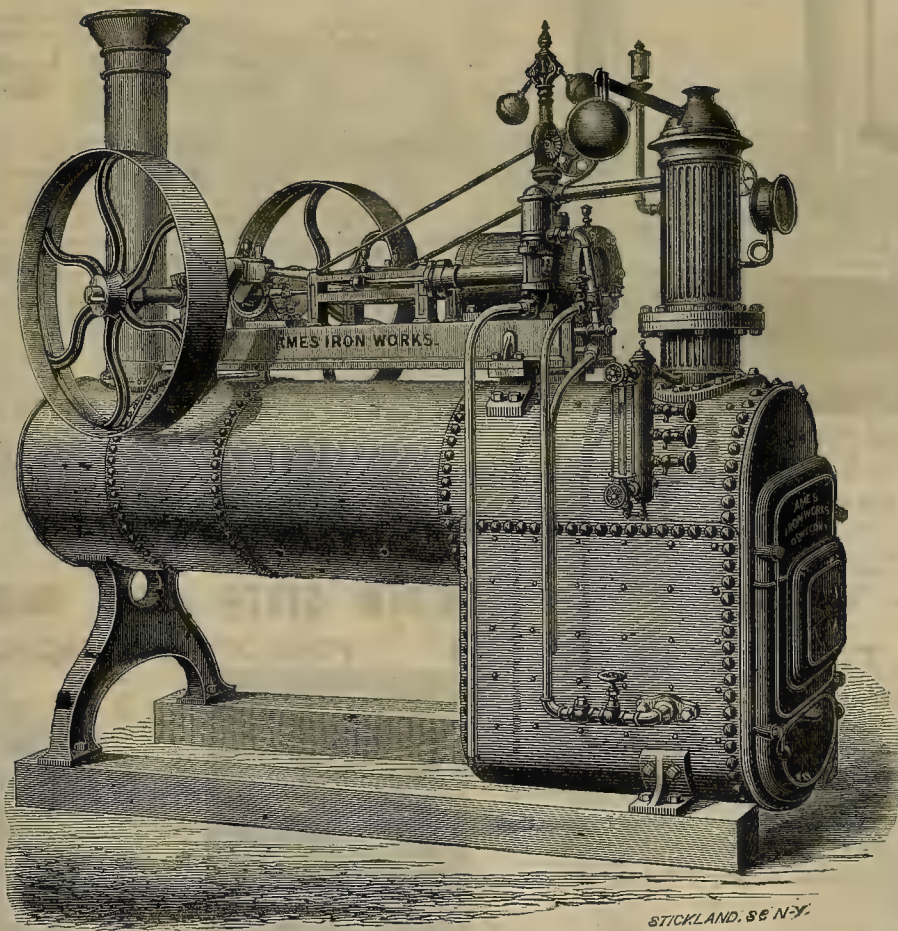
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The Engine is of the horizontal style, and is made with a bed plate, from entirely new and improved patterns, designed with a view to elegance, simplicity, convenience and strength. It is built entirely separate from and independent of the boiler, and can at any time be used as a stationary by obtaining the necessary additional length of steam and exhaust pipes. In our portables it is placed on the saddles on the top of the boiler, and secured with bolts.

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for less money than those who do not confine themselves to any particular article of manufacture. We will not attempt in this space to enumerate the uses to which our engines have been applied, but assert that no engine surpasses them in adaptability to any work or location.

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We are also Agents for Ames "Hero" Vertical Engine and Boiler, a new style of Semi-Portable, which we feel confident will meet a want long unsupplied, viz: An Engine and Boiler both efficient and durable, economical in fuel as well as in space occupied, and a thorough, serviceable and well constructed Engine and Boiler at a very low price. The Boilers are made from the best material, and subjected to a test of 150 lbs. pressure to the square inch, besides a careful and satisfactory steam trial with the Engine erected thereon. Price, for six-horse power, \$600. Address,

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Hoe's Printing Press.

We present on this page an engraving of the large web perfecting press exhibited at the late exhibition by R. Hoe & Co. of New York. The history of this type of press begins in 1835, when Sir Rowland Hill, who became famous for his advocacy of penny postage in Great Britain, obtained letters-patent for a web perfecting press; that is, a press capable of printing a roll of paper on both sides, and cutting and piling the sheets. The difficulties experienced in this machine were owing partly to the use of conical type, and partly to the difficulty of disposing of the printed sheets. In 1853, Victor Beaumont, of New York, patented the serrated cutting

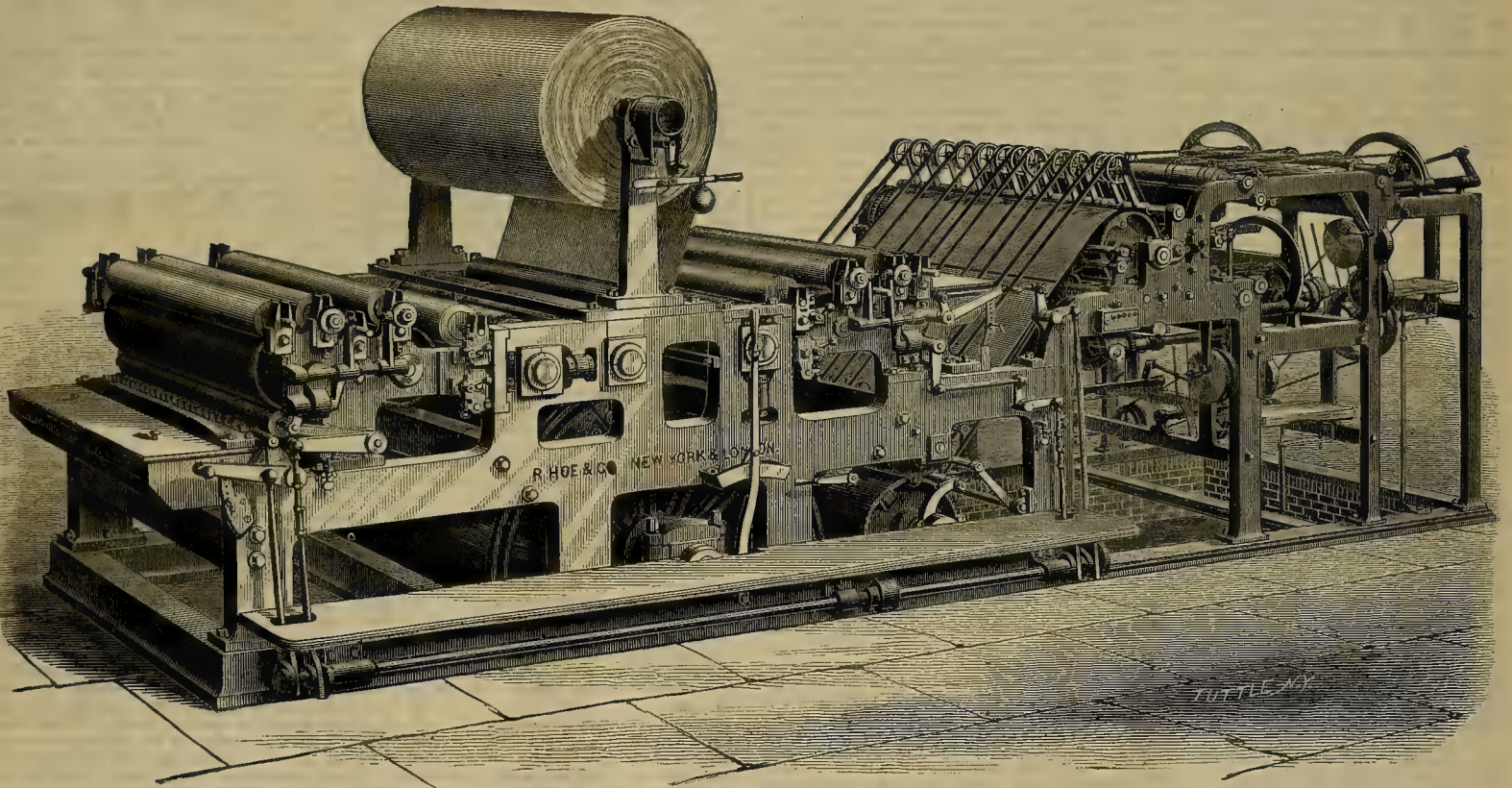
speed. The first pair of cylinders, over which hangs the roll of paper, consist of one type and one impression cylinder. Here the first side of the paper is printed. The second pair, printing the second side, consist likewise of one type and one impression cylinder; but the latter is below the former, and is of much greater size, so that the set-off from the fresh ink shall not fall continually on the same surface of the blanket. In point of fact, there is only every fourth sheet which touches the same part of the blanket, which has, therefore, time to dry. The tympan is movable, so that, should it get too black or become defective, it can be changed as follows: It is put up on the off-set cylinder in sections, each section having a roll at each end. At the beginning, the tympan of each section is all on one roller of each pair; and hence by unrolling that one, and rolling up the other, the change of tympan is effected in a very short

whole pushed rapidly across. These form-inking rollers are held in a small bracket operated by a small hand lever which locks the roller bearing in position, or releases it, as the case may be. The journal boxes of the large cylinders are of cast-iron, with composition bushings. The distributing rollers are operated laterally by a triple thread-worm movement. The ink is taken from the distributing rollers by two 6-inch form rollers. The first type roller is adjustable for the impression by a horizontal movement of the bearings, regulated by a screw and check nuts, while the second one is adjustable vertically by a similar device. A register or counter is fixed to the frame, and is operated from the cutting cylinder by bevel gearing and a worm movement. The whole machine stands so low upon the floor that every part of it is under the pressman's eye, presenting quite a contrast to the Walter press in this respect. An-

Home Industries.

The Pacific Chain Works.

By invitation of the proprietor we drove out to the Pacific Chain Works last week, and were highly pleased with our visit. The works are located on the corner of Iowa and Yuba streets, in the immediate vicinity of the rolling mills, rope-walk and other flourishing factories. The chain factory being the first and only one of the kind on the coast, it has had to contend with great difficulties in gaining a foothold, the proprietor having expended several thousand dollars in the enterprise, and so far without any returns. By strict attention to the wants of the trade, however, and care in working up only the best quality of iron, the business is fast de-



THE NEW HOE PRINTING PRESS.

blade set lengthwise in one of a pair of cutting cylinders, having elastic surfaces inserted to hold the paper on each side of the cutting blade when the sheet is cut from the web. To this device is largely due the success of all web perfecting presses. To France, however, belongs the credit of the invention which made such presses of practical value. A French inventor, in about 1850, devised the process of stereotyping with flexible papier-mache matrices, rendering it practicable to cast the type plates to fit the cylinders, and leaving but little to accomplish save the sufficiently rapid disposal of the printed sheets.

The press illustrated is a double machine, printing two complete papers at once, side by side. Moreover, it delivers the sheets not flat but folded. Its capacity ranges from 15,000 double to 28,000 or 30,000 single sheets per hour, according to the quality of the paper. The roll of paper is 52 inches wide.

The design of the press may be described as consisting of pairs of cylinders set in a massive framework four inches thick, compact and plain, having no oblique angles, but running either vertically or horizontally, as the case may be. To this construction, no doubt, is due the absence of jar, noise or vibration, which is a feature of this press even when running at high

space of time. The tympan-sheet is composed of muslin, there being ten yards in each section. From the second pair of cylinders the sheet passes to the third pair, which act as the cutting cylinders, the lower of which has inserted rubber jaws to receive the edge of the knife, which is provided in the upper roller, and operated by a cam movement so as to project the blade to perform its cutting duty and recede for the rest of the revolution. The sheet is not entirely cut in two, there being left small uncut sections about one-quarter of an inch wide, which have just sufficient strength to hold the paper together until the tapes take hold of it and conduct it to the first folding cylinder, which folds each paper lengthwise. During the passage of the paper from the first to the second folding rollers, it is, for single sheets, cut across the width of the newspaper. After leaving the first folding rollers, the sheets are, by a simple spear-shaped switch, divided alternately between the upper and lower rollers, two papers to the lower and two to the upper alternately; and by this means the folder runs at but half the speed of the press, which gives to the folding machine a capacity equal to that of the press.

For putting the lower form-inking rollers in place in the press, there is provided a small traveling carriage, upon which the bearing of one end of the roller may be placed, and the

other and notable feature is that the plates, rollers and smaller parts can be taken from the press at the sides and without ascending any steps. This is a great advantage to the printer. The workmanship throughout is of the first quality; the bearing marks show good fitting. The junction of collars, etc., with the faces show the truth of the work. The cut gears, which are covered to avoid accidents, work smoothly and show even contacts. The shafts of the impression rollers, type rollers and folding cylinders are of steel; and all the links and connections are case-hardened, so that durability is assured.

MAP OF THE BLACK HILLS.—We have received from A. L. Bancroft & Co., 721 Market street, a map of the Black hills, showing the mining districts and the seat of the Indian war. The map is a small pocket one and was drawn by A. C. Bierce from surveys ordered by the War Department. It is especially valuable as giving the location and direction of all the streams, large and small; the trails from and to different points. Those intending to make a trip to the Black hill regions would do well to provide themselves with one of these maps. They are sold for 50 cents.

THE amount of import duties paid at this port last week was \$113,367.

developing into what promises to be one of the leading industries of the city.

The recent reduction in the price of iron in the market, together with the enhanced value of currency, enable the works to compete in price with the East, which heretofore they have not been able to do. They are now engaged on an endless chain made of one and one-half inch iron, which, when completed, will weigh over 10,000 pounds. It is designed for a milling company on Puget sound, and intended to fit in a wheel.

In another part of the works, a lot of three-quarter inch coil chain was being made for one of our local iron dealers, while at the entrance some 8,000 pounds of cable chain was being delivered to one of our leading ship chandlers. The Pacific Chain Works were established and are still owned by James E. Gordon, wholesale dealer in hardware, 254 and 256 Market street and 8 and 10 Front street, to whom all orders or correspondence should be addressed.

THE papers state that there are more men out of employment in Virginia City at the present time than there have been at any time within the past 12 years.

A CORRESPONDENT at Pera telegraphs that peace with the Principalities is considered certain.

CORRESPONDENCE.

Mining vs. Speculative Robbery.

[Written for the Press by ALMARIN B. PAUL.]

As all the readers of the PRESS well know, I have persistently advocated legitimate mining. I cannot understand how or why it is that so much capital will be put up for speculative robbery, and so little comparatively for honest development of our mines. The time was in California when all regarded mining as a business to be pursued for its legitimate reward; but at this stage of our industry, there seems to be more money for running holes in the ground and a chance to "speculate" than for honest work. The time was even in Nevada, on the Comstock, when investments were made for development and its merited gain. Then general prosperity pervaded all the communities; then, however, there were fewer very rich men. The business of mining, legally considered, wants a good overhauling, and to build up the mining localities of our State the legislative members of the mining counties must do it.

Our incorporation laws as they stand to-day are made to protect inside thieves from punishment, and to form an impregnable wall around "rings," and not as laws to protect the great body of stockholders. This "ring" business and speculative mining is carried on by too many of our mining operators of San Francisco, who make it a game of heads I win and tails you lose. Mining is one thing, gambling another; and to stop both gambling and robbery is what our next Legislature must start in strongly for, and then all our mining localities will loom up into importance, as capital will not all be absorbed in "California street" mining.

From our original system of "honest" mining, where men chose their partners and worked and thrived on honor and received their just dividends, incorporations were inaugurated and deservedly became popular. Trustees were then men in trust, they accepted the responsibilities and acted accordingly; but soon trusteeship is wielded by capital and becomes a business, and they become too often the agents of the few, and not the protector of the many.

Later in the day, to clothe this authority with more gullible dignity, the title of Director is introduced, and with it a new code which for deficiency is unequalled, and which operates as a brazen swindle on the unsuspecting stockholders. In addition, as an important feature of too many Boards of Directors, in the back office sits "Simon," the dictator, who jingles his little bell and send his orders to "manipulate," and the Directors, as obedient servants, or worse, sycophantic slaves, manipulate the coin out of the pockets of the outsiders into Simon's and their own, by the many ways of accomplishing this end. Sometimes by assessing, and taking the stock in at a trifle, then, by secrecy and deceptive accounts, elevate it, and if it pays they go out; and now and then by absolute swindling. What is this, honest jugglery or legalized robbery? Some people smile at it and call it smart, others wonder at it and call it theft. Some say Simon, if not his dummy Directors, should be sent to the United States Senate; others think they would better grace the workshops of San Quentin. Which is right?

The effect of such operations is, the people are robbed, and the country in honest development gets no benefit from all this outside capital, and as our laws are, Simon and his cohorts soon become capitalists and are law-proof, join possibly the Christian Association, build fine mansions, and are too often the associates of the honorable. Men are sent to the penitentiary for stealing trifles, while Simon and his cohorts steal thousands, yes, millions, rob poor men, women and orphans and yet go scot free. Should there not be better laws to regulate this business? If laws are made only for punishing the poorer and less gifted, then the prison gates had better be opened and society left to regulate itself, as we regulated it in 1849-50.

This is our advancement, and it is to be wondered at that our miners are adverse to corporations? Still the corporation system is correct, honestly conducted, as by it more capital can be aggregated and individual liability avoided, and no other system is as good; but we must have laws which are a protection to the investor of a small amount of capital as well as larger—laws that make criminals of swindlers in stock operations, and laws that will summarily punish all such. Then the miner with his mine can throw himself into the hands of capital with some safety and be benefited as well. This done, there would be more legitimate and honest mining, and every mining district have equal chance with the cities for prosperous advancement by this industry.

If the mining counties want to enhance their prosperity, this mining question must receive their earnest attention, and not merely comment on it and forget all when the Legislature meets; for this system of legalized robbery, carried on so long, has ruined thousands, and brought more tears into suffering households than would extinguish the Palace hotel were it all in flames. It has blasted character and sent more than one unfortunate to an untimely grave; besides, if all the capital that has been

squandered in the past ten years in speculative mining and ring robberies had been properly invested and honestly administered, the product of the precious metals would have been 50% more than they are to-day. I do not wish to be understood as thinking there are no incorporated companies honestly conducted; far from it; but there are too many dishonestly conducted, and one swindle does more damage than a dozen good operations can do good by way of inspiring confidence and influencing capital. There are many companies whose directors have a laudable regard for their stockholders, but they "don't amount to much;" they can't put stock up when it ought to go down, or down when it ought to go up; they are not "smart," but honest. The lines want to be drawn in such a way that companies honestly conducted have some credit for so managing the business, and not that they are to be besmeared and damaged by the rascality which now has too much sway and too little punishment.

Quartz Interests of Amador.

EDITORS PRESS:—I have been a constant reader of the PRESS for the last 10 years, and of late see but little published about the quartz interests of Amador county. It is evident from the present outlook that the county, this present year, is going to surpass in the production of bullion all its previous yields for the same length of time. The Phenix mine, at Plymouth, with its 80-stamp mill running at present to its full capacity, crushing about 140 tons per day. The quartz being of low grade, yields but a very small profit per ton. The ore body is of immense size and likely to last for some length of time. The Bonanza mine, at Drytown, never looked better. The last clean-up made the hearts of Belding & Manon feel good, and the next is to be still an improvement on the last. Crown Point is looking better, with great hopes of realizing some \$10 to \$15 per ton as a result of their first crushing. I think \$8 per ton would pay stockholders handsome dividends, if the mine is properly worked with economy and skill. The ore body in sight is sufficient to keep a 20-stamp mill running for some years. The Gover mine, with its new 20-stamp mill, ought to pay dividends soon, if the ore body is as rich and as extensive as reported. We think that this mine is put up at too high a figure, \$35 to \$40 per share, and why is it that one of the principal officials and stockholders should offer all of his stock for \$30 or less? (Have they struck a horse in their lower levels or what?) I trust all is right at the Gover. It looks, however, a great deal as if the mine was managed for the interest of a few stockholders. Amador county has enough of good mines, if judiciously managed, to make it one of the very largest gold producing counties in the State. The Bunker Hill mine does not look very flattering. The Little Amador is beginning to look better, and, if the present developments continue to improve, will yet make a good mine. The Keystone mine, one of the very best mines in the State (a close corporation, no stock for sale), turns out, with its splendid mill of 40 stamps, its regular \$40,000 per month, leaving a large margin for dividends. The Lincoln mine, at Sutter Creek, is shut down, with but little hopes of it starting up again. The Mahoney mine is running, extracting some ore on and near the surface, with what result I do not know. The Amador Consolidated keeps paying its regular monthly dividends, and will most likely keep doing so for some months longer. The quartz extracted from the mine at present comes from the old reserves above the 800-foot level and near the surface. The Oneida mine, with its mill of 60 stamps, keeps pounding away on a low grade of quartz, but an improvement is looked for in the new strike made north of the hoisting shaft. The quartz, of an average grade, carries a fair per cent. of sulphurets, and it seems strange that the management of some of these large mines, with mills of 40 to 80 stamps, such as the Keystone, Oneida and Phenix, do not go to work and erect their own reduction works (as I understand they concentrate from 45 to 50 tons each, per month, of sulphurets, that will assay from \$100 upwards). While visiting the Providence mine, in Nevada county, I learned they were reducing their own sulphurets, at a cost not to exceed \$15 per ton, and at the Washington mine, Mariposa, it did not cost them over \$10 per ton, while here a monopoly charges \$25, with no special guarantee of returns. A splendid opening for a party who is skilled in the reduction of gold-bearing sulphurets is offered in this district. AMALGAM.

NEST-BUILDING EXTRAORDINARY.—During a recent visit to Anstey, near Leicester, I saw in a box tree (about eight feet from the ground) the nest of a long-tailed titmouse, with a nest of song thrush resting immediately on the top thereof, both of this year's construction. My host could not tell me for certain which species was first in the field, but fancied that the titmouse commenced building operations. The nests of two species of such different character thus joined together presented a most curious appearance, and the sight was so novel to me that I thought an account of the same might interest some of the numerous lovers of natural history who read your paper. I may add that there was no bough or twig between the two nests to form a support, the upper one being literally built on the lower.—Exchange.

The Lady Bryan Machinery.

In an article on the Lady Bryan mine, the Gold Hill News speaks as follows of the new works:

These are eligibly located at the most advantageous point possible for sinking the shaft and working the mine to a depth of 2,000 feet or more, and the machinery will be of amply sufficient power to do this. The pumping engine is already in position, and the completion of the details and connections is being pushed forward as fast as possible. It is a new style of engine, now being adopted by the principal companies of the Comstock, and the same as that at the Belcher air shaft, the Overman, and also at the Chollar-Norcross-Savage combination shaft. Technically speaking, it is a vertical compound condensing engine, direct-acting, with inverted beam, and controlled by Davy's differential valve gear and cataraet motion. The initial cylinder is 26 inches in diameter, with eight feet stroke, and the expansion cylinder is 38 inches in diameter, with ten feet three inches stroke. The engine, however, can be controlled to any lesser length of stroke, and a greater degree of speed given if required. A condenser and air pump for creating the required vacuum in the expansion cylinder are conveniently connected, and the whole forms a very substantial and highly effective arrangement. The engine is 400-horse power, nominally speaking, yet it can be speeded up to 500-horse power if required. It was designed and built at the Risdon Iron Works, San Francisco, and put in position under the supervision of I. F. Thompson, the well known constructing engineer, who has the contract for placing the machinery of these new works. Robert Moore, son of Joseph Moore, of the Risdon Iron Works, and a master mechanic, is employed by Mr. Thompson as foreman of the job. The foundations are of solid granite, and as massive and substantial as any in this section. The pit beneath this engine, for the pump-bob or beam, is 25 feet deep, and the beam itself is 32 feet long and weighs 23 tons. It is of iron, constructed after an improved style, which gives it the strength of others which weigh double as much. The pump column, which is already in place, is 12 inches in diameter, and the pumps are of the Cornish style, two plungers and one lift, with eight feet stroke. The boilers have arrived and are now being set, and the engine will be started into operation probably in about two weeks, pumping the water out of the shaft and mine. The hoisting engine, which is of the horizontal style, with 18-inch cylinder and 27-inch stroke, is completed and will arrive shortly from San Francisco. The foundations are all ready to receive it as well as the hoisting reels and other requisite machinery, all of which will be placed in working position as soon as practicable. Everything will be new and first class in every respect, with all the latest improvements.

The Buildings.

The main building over the shaft and hoisting works is 40 feet wide by 84 feet long, very substantially constructed, and the hoisting or galleys frame at the shaft is 36 feet high, very strongly constructed of heavy California spruce timber, from Dutch Flat. The house for boiler-room, carpenter shop, etc., adjoins the main building on the north, and is 38 by 64 feet in size. A convenient blacksmith shop stands at the south side. The mill of the company stands a few rods south of the works, and a tramway leads directly to its battery from the shaft, so that there will be no expense in the way of ore transportation. Being situated on the sloping bank of the ravine, the mill is as conveniently arranged as is possible, the ore being dumped from the ore cars directly at the battery, and thence passing on a continuous downward delivery to pans and settlers, and the tailings to the blanket sluices in the ravine. Everything about this mill is first-rate, except the battery of 10 stamps. It was an old battery when it was put in, and proved to be defective and inefficient, only crushing about half what the pans can handle. With a new 15-stamp battery, which is already contracted for, the mill is capable of working 35 tons of ore per day.

The New Shaft

Is 600 feet deep, and consists of two cage compartments four and a half by five feet each in the clear, and a third or pump compartment five by six feet in the clear. It is very substantially timbered throughout, and will prove to be the most advantageous and effective outlet arrangement possible in the future working of the mine. It was commenced nearly three years ago, and openings made from it into the old mine at the 80, 170, 250 and 380-ft levels respectively. Merely the incline from the old workings was found to have penetrated to that depth, all the drifts and other explorations being above that point. A station is opened for the 500-ft level, and the water in the shaft stands now nearly up to the 250-ft level.

The Ore and Bullion Resources.

The mine has been extensively opened at the three upper levels mentioned, and although a large amount of good paying ore has been extracted therefrom, thousands of tons yet remain which can be extracted and worked with good profit. Some very rich spots and bunches of ore have been found at the 80-ft level, of the green chloride character, with free gold, and at the 170-ft level, where ore of the white Comstock character commences coming in, one of the mining reporters of the News, who was taking an examination of the mine on Tuesday last,

brought out samples which gave assays of from \$15 to \$206 to the ton, silver predominating. There are many thousands of tons of that ore in sight, and together with what is developed in the level above as well as the level below, there is ore enough in sight, and immediately available, to keep the mill running for a year or two at least. The 380-ft level has been drifted upon some 700 feet south and 250 feet north from the shaft, following the east wall, but very little cross-cutting was done. The ledge was found to be all quartz, and considerable ore of a fair grade was met with, but as further explorations and development could not be conducted to advantage, all work in the mine was stopped until the present new pumping and hoisting machinery could be procured and brought to bear in the case. The shaft cut the east wall of the vein at the depth of 400 feet, and has passed through to the west or foot wall.

Mount Hamilton.

At the time of the recent visit to our city, says the San Jose Mercury, of the members of the Lick Board of Trustees, an order was given to Hermann Brothers for maps and surveys of the Mt. Hamilton road, the mountain itself, and such other facts and statistics as would aid Capt. Floyd, one of the Trustees, who is now in Europe, to perfect his plans in the selection of the proper astronomical apparatus, glasses, etc., to be required for the forthcoming observatory. In accordance therewith the above gentlemen, Messrs. Hermann, began their work, which has just been completed, the maps having been taken to San Francisco yesterday. A reporter of the Mercury called upon the firm, and was kindly permitted to examine the notes which accompanied the maps, from which the following statements may prove of interest to others besides those immediately connected with the building of the Mt. Hamilton road and the observatory:

The approximate geographical location of the observatory peak is 120° 36' 40", longitude west of Greenwich, and 37° 21' 3" north latitude. The approximate height of the same is 4,255 feet above the sea level. The scope of the horizon from this point takes in more ground, according to Prof. Whitney's judgment, than almost any similar peak in the United States, there being no obstruction to the view from any quarter. It is remarkably free from fogs and clouds, as the Messrs. Hermann had ample occasion to observe during their last winter's stay in the mountain, when locating the road. The bearings to the most notable objects are as follows, the distances being taken, when out of our county, from the most reliable maps:

Mt. Loma Prieta, S. 35° 5' W.....	19 1/2 miles
Mt. Umuhum, S. 40° 40' W.....	19 1/2 "
Mt. Thayer, S. 51° 15' W.....	19 1/2 "
Black Mountain, S. 87° W.....	27 1/2 "
Mt. Pouchet, S. 83° 35' W.....	6 "
San Jose Court House, N. 80° 50' W.....	13 1/2 "
Calaveras Point, on San Francisco Bay, U. S.	
Triangulation Station, N. 60° W.....	24 "
Mt. Tamalpais, N. 51° 20' W.....	68 "
County Corner Peak, N. 51° W.....	15 1/2 "
Mission Peak, N. 47° 55' W.....	10 1/2 "
Mt. Story, N. 25 1/2° W.....	10 1/2 "
Mt. Diablo, N. 21 1/2° W.....	19 1/2 "
Mt. Isabel, S. 83 1/2° E.....	3 1/2 "
Mt. Santana, S. 37° E.....	35 "
Murphy's Peak, S. 6° 25' W.....	15 "

None of these points reach the altitude of Mt. Hamilton. Of those within a radius of 20 miles only the Loma Prieta reaches 3,800 feet; Umuhum, 3,500 feet; Thayer, 3,550; Black Mountain, 2,800. All the rest are between 1,500 and 2,500 feet. Of the further peaks, only Mt. Diablo reaches 3,856 feet, but this is too far to come into consideration.

The formation of Mt. Hamilton, as of all the near surrounding ridges, is of trap-rock. The high points, not worn down by the atmosphere and the action of the rain, are therefore very hard as soon as you remove the upper crust. At the building of the road they struck this hard rock at six or seven points on and near the cone, with a good prospect of finding it continuous and getting harder in the same proportion as you get deeper. It has broken through the older formation at several points near the base of the mountains, where it shows the same character, only intensified. At the top it appears as a greenstone porphyry, with small feldspar veins, exceedingly hard, without any defined strata, but in huge boulders, more smooth and generally flat on one side, cemented together by other material, less hard and easier to work. At a great many places the metamorphic slate, uplifted by the latter upheavals, shows in considerable bodies, one of them being on the south side of the Observatory peak, and nearly opposite one of the hardest points of the porphyry. A well tempered drill will cut from two to four inches in one sharpening. The cost, therefore, of cutting down the top of the peak will be very considerable, and will increase, at an increased ratio as you go down from the upper to the lower contour line. Messrs. Hermann think, however, that a large proportion of the rock blasted off can advantageously be used to widen the space for the foundation, by laying it up in cement on a well prepared lower base.

As a meteorological station, Mt. Hamilton, no doubt, stands first in the list of our coast peaks, and as such will be of great immediate practical use after the establishment of the Observatory.

THE cartridge manufacture in the United States is said to be larger than that of any other country, and reaches at present 2,000,000 per day.

MECHANICAL PROGRESS.

Friction and Wear of Bearings.

M. C. Kunzel has tabulated the results of experiments made on the effects of friction between various substances, which are reviewed by the *National Car Builder*. The heat produced, (other conditions being equal) is in proportion to the hardness of the substances; and, on the other hand, the greater the difference in the hardness of two substances rubbing against each other, the less the heat produced by the friction, and the harder of the two heats more than the other. If friction takes place between glass and cork, the amount of heat received by the two respectively is as seven to one, and between bronze and cork, four to one.

For durability alone bearings should be of metal as hard as that of the arbors which they support, but considering the wear of the latter, the former should be as soft as possible. In practice, however, certain precautions are to be observed; the bearing must not cut the arbor, and it must wear as little as possible; it should not get hot even when lubrication fails; and, lastly, it should possess resistance enough to bear all the shocks that fall upon it without being deformed or broken. The alloys of copper and tin generally in use are rarely homogeneous, with the exception of that which contains 82 to 83 parts of copper to 17 to 18 of tin. When there is less tin in the composition, granulation takes place during cooling, which alters the homogeneity of the alloy and causes the cutting both of bearing and arbor. When an alloy of copper and tin sets slowly, the first part consolidated is a very soft alloy not containing more than 7 to 10 of tin. This forms, as it were, the shell of the bearing, while the hard alloy, containing 17 to 18 parts of tin, sets afterward and fills up the shell. When a bearing thus formed is in use the soft alloy soon gives way, and the hard grains within attack the arbor and are often torn out and carried away when grease fails.

A good bearing should be the very opposite of the above; its shell should be very hard and durable, and the interior filled up with a softer composition. This result is attempted to be obtained by fusing together several alloys of different compositions and degrees of fusibility, so as to produce by cooling two given alloys, but the operation is delicate and the result uncertain. Phosphorus bronze succeeds best in this way; the shell is then entirely formed of very hard bronze and the interior of a soft alloy of copper and tin. The bearing may then be considered as a series of layers of soft metal enclosed in a casing of metal almost as hard as the arbor itself. The microscope reveals this disposition very evident, and if one of these bearings be carefully submitted to heat to cause the soft metal to run, the rest remains in the form of a spongy mass.

Demagnetizing Tools.

The following from the *Art Journal* will be of interest to workers with fine steel tools: A correspondent, in your journal, asks how to remove the magnetism from a kit of tools. So far as the actual experience of the writer goes there is but one "sure cure," that is to heat the tools to a red heat. If they are plain, common tools, this will be the easiest and quickest way. The time expended is not necessarily lost, as there will be an opportunity to harden and temper them specially for the use to which they are put. A large share of common tools are very far from being properly tempered. But where tools are such as would be injured by the heating, or which the owner does not feel competent to harden and temper properly, there is another way to remove the magnetism. The writer has never tested it himself, being very careful not to have any occasion for the use of such a process. But it is strongly recommended by others whom he knows to be trustworthy and experienced mechanics. It is to take the common bar or horse-shoe magnet, and magnetize the tools by rubbing it over them lengthways, either in actual contact or very near to them, until they are well charged, then reverse the direction of the motions of the magnet and take the magnetism out. The object of the former part of the operation is said to be to make sure of the polarity of the article, so that the reversed motions will be certain to take the magnetism out, because the former had put it in. This seems reasonable, for everybody has magnetized his jack-knife with a poker, and demagnetized it by reversing the process. The only apparent difficulty would be to stop just at the right time, instead of going on and getting the article re-magnetized, only with the poles changed. But this could be effected by frequent tests, dipping the piece into clean, fine, dry iron filings, and the moment they ceased to be attracted at all, the operation would be considered completed.

MAGNETIZING WHEELS.—A Swiss inventor envelops the driving axle of locomotives in coils of insulated copper wire, and by the passage of an electric current converts the wheels into powerful magnets, with increased adhesion to the rails. This is charming, with the exception that numerous patents have already been taken for the same thing, and that it will not and could not work with any practical effect. The Swiss gentleman referred to has brought out something at once new and good.

Steel Experiments in Russia.

An English paper says that it is proverbial in Sheffield, and other centers of steel production and manipulation, that much remains to be learned in relation to that material. There are, in fact, phenomena and peculiarities observable about it, while in process of conversion and refinement, which baffle the judgment of the most practiced operators to understand. The same results by no means follow the same modes of treating steel in its gestatory stages; and the best makers freely admit that they cannot guarantee to supply, in continuity, steel of uniform grain and texture. In the midst of this uncertainty a Russian experimenter on steel, Mr. Chernoff, has published lately, at St. Petersburg, a pamphlet on the whole subject. The author states that "if steel melted in a crucible is constantly kept in violent agitation while cooling—agitation violent enough to keep all its particles in motion—then the cold ingot produced will have a very finely crystallized structure; if, on the other hand, the steel is allowed to cool in perfect quiet, then the resulting casting will consist of large, well-developed crystals. The appearance of these crystals, and generally the tendency to crystallize under such circumstances, will depend on the purity of the steel." Starting from this remarkable, but apparently well established base, Mr. Chernoff concludes that liquid steel really obeys the laws which regulate the crystallization of fluids. It is probable that chemists, at least, will agree to the truth of this deduction, for they know that if they wish to obtain crystals from a solution, the latter must be kept in perfect quiet. The author of the pamphlet asserts, too, that in the course of his long-continued experiments he has discovered that steel, when heated above a certain temperature, as to a dark cherry red, loses its crystalline structure and becomes amorphous. If, again, from this point it be allowed to cool undisturbed, it will become once more crystalline, unless it be hammered during the evolution of heat from it, when its fracture will exhibit its amorphous tendencies once more, and present a fine silky texture.

NEW AERIAL MACHINE.—Experiments were made recently at Chatham, on the Great Lines, with an invention of Captain M. T. Sale, R. E., who is Secretary of the Royal Engineer Committee. The invention is a new aerial machine, to be used for discovering the position, etc., of an enemy's camp at night. The machine consists of a light framework covered with loose canvas, which becomes filled with air, and thus the machine is kept aloft. When at a proper height a parachute provided with fire-balls is sent up the line holding the machine; and, on reaching the machine, the parachute explodes, and the fire-balls are discharged, and thus the surrounding country is lighted up for a considerable distance, and the position of an army would be shown. The trials proved very satisfactory, in spite of the bad weather which prevailed; and further experiments will be made under more favorable circumstances. The trials were made in the presence of Major Maquay, instructor in field fortifications, and many other engineer officers.

FLUID COMPRESSED STEEL.—The *Polytechnic Review* notes that, speaking at the Iron and Steel Institute on the application of the hydraulic power in forging, Sir Joseph Whitworth stated that his firm had recently completed two twin screw shafts for the *Inflexible*, 283 feet in length, 17 inches in diameter, and cast with a nine-inch hole through them. These shafts were made of compressed steel and weighed 63 tons, instead of 97 tons, if made of iron—a reduction permitted by the great strength of the compressed steel. He further stated that on applying the hydraulic pressure, a column of metal is reduced one-eighth in less than five minutes—a remarkable indication of the effect of pressure in expelling air-cells. The strength of the shaft was 40 tons to the square inch, and its ductility or power of extension was 30% of its length. By using compressed steel, the driving round of 34 tons was saved during the whole life of the engines.

PHOSPHOR BRONZE WINDING ROPES.—According to the *Mining Journal*, M. J. Manne, the manager of the Phosphor Bronze Works, at Val-Benoit, Liege, exhibited a winding rope made entirely of this alloy. Phosphor bronze ropes have the advantage of offering a great resistance to strains of traction, of being very pliable and inoxidizable and of resisting any attack of corrosive water, while the wear due to the contact of the wires is less than in other metallic ropes; they also preserve their pliability after wear. These phosphor bronze ropes are used in Belgium, at the Bois-du-Luc, Horloz and Courcelles-Nord collieries among others.

A TUBE STRETCHER.—Mr. J. T. Connelly, of the National Locomotive Works, is a man possessing no little genius. Among several indispensable inventions he has made in the manufacture of steam boilers, will be found a tube-stretching machine, that not only does away with welding boiler tubes, as heretofore, which is a very lame way of repairing flues, when once too short. By this invention a flue can be drawn out six or eight inches longer, by a common laborer, in less than one-half the time taken by a skilled workman in welding, and makes the job ten times better; in fact makes the flues as good as new.—*Connellsville Monitor*.

SCIENTIFIC PROGRESS.

Experiments with the Telephone.

We have formerly given a description of an apparatus by means of which Prof. A. Graham Bell expected to succeed in telegraphing sound. His experiments have met with wonderful success, and an exhibition lately given is reported by the Boston papers. From them we draw points of interest: The experiment was made from the office of the Boston Rubber Shoe Company, where a large company of gentlemen had assembled at noon on Wednesday. The wires used were those of the company, running from the office to the residence of Mr. Converse, in Malden, six miles distant. Thomas A. Watson, the professor's assistant, officiated at Mr. Converse's house. Stationed at the Boston end of the wire, Prof. Bell requested Mr. Watson to speak in loud tones, to enable the entire company to at once distinguish the sounds. To show that loud speaking was not essential to intelligibility, Mr. Bell explained that soft tones could be heard even more distinctly than loud utterances, and in confirmation of this Mr. Watson began speaking in turn with each member of the company, and after the efficiency of this method had been proved, he informed the assemblage that gold had closed the previous evening in New York at 105½. The desire for conversation having become general, Mr. Watson was plied with questions, such as "Is it thawing or freezing at Malden?" "Who will be the next President?" etc. It was remarkable that Mr. Watson was able to distinguish between the voices at the Boston end, he calling at least one gentleman by name as soon as the latter commenced speaking. A lady at the Malden end sent the company an invitation to lunch per telephone, and an appropriate response was made by the same medium. At length the company were requested to remain quiet while a lady at the other end conveyed to them the sweet strains of music. The assemblage thereupon listened with rapt attention while the lady sung "The Last Rose of Summer." The effect was charming. Possessing as the fair cantatrice does a voice of exquisite sweetness, the sounds penetrated into the Boston end of the telephone with a distinctness equal to that attainable in the more distant parts of a large concert-room, and a unanimous vote of thanks was sent by the handy little instrument which had procured for the assemblage so agreeable an hour. Among those present were electricians and gentlemen occupying prominent positions on our Western railroads, and one and all expressed the conviction that the telephone was destined to achieve the greatest possible results.

The telephone, in its present form, consists of a powerful compound permanent magnet, to the poles of which are attached ordinary telegraph coils of insulated wire. In front of the poles, surrounded by these coils of wire, is placed a diaphragm of iron. A mouthpiece to converge the sound upon this diaphragm substantially completes the arrangement. As is well known, the motion of steel or iron in front of the poles of a magnet creates a current of electricity in coils surrounding the poles of the magnet, and the duration of this current of electricity coincides with the duration of the motion of the steel or iron moved or vibrated in the proximity of the magnet. When the human voice causes the diaphragm to vibrate, electrical undulations are induced in the coils environing the magnets, precisely analogous to the undulations on the air produced by that voice. These coils are connected with the line wire, which may be of any length, provided the insulation be good. The undulations which are induced in these coils travel through the line wire, and passing through the coils of an instrument of precisely similar construction at the distant station, are again resolved into air undulations by the diaphragm of this instrument.

The simplicity of Prof. Bell's system will be apparent when it is known that the voltaic battery is entirely dispensed with. All that is required for communicating between the most distant points are the instruments and the telegraph wire, the latter taking the place of the speaking tube, and the former that of the mouth-piece.

A TALKING MACHINE.—The Marquis of Salisbury and Mr. Farjeon have recognized the merit of the writing machine, but we should like to have Mr. Carlyle's opinion of the newly invented talking-machine. We hear that after 30 years, which the historian of the Great Frederick will probably think might have been better employed, a clever gentleman has succeeded in producing an apparatus consisting of a table with pedals, an organ, bellows, and a keyboard. In the center is an elaborate arrangement, representing the human lungs, larynx, glottis and tongue. At the conclusion of the exhibition in the Grand hotel, Paris, it spoke "a piece" as follows: "I was born in America. I am speak all languages, and I am very pleased to see you. I thank you for your visit." There is already too much talk in the world, but yet this machine might be made useful. It would, for instance, be invaluable at railway stations where porters roar out the name of the place in tones equally loud and unintelligible. A good talking machine would be a vast improvement on the inarticulate porter.—*Iron*.

Hydraulics of the Ancients.

Father Secchi has written a letter to the French Academy of Sciences on the "Hydraulics of the Ancients." The monuments he mentions have been mostly discovered by him in the environs of Rome. The first mentioned by him is an aqueduct built at Alatri, 200 years before the Christian era. It is an inverted siphon, its lowest point being 101 meters below the orifice from which the water flowed into the town; so that it sustains at its bottom a weight of at least 11 atmospheres. The pipes of this aqueduct are of earthenware, buried in a thick bed of concrete; they were very firmly joined together along a length of seven and a half miles. This work seems to have been the model on which Vitruvius founded his description of siphon aqueducts. The second remarkable relic of antiquity found at the same place is a complete system of drainage, composed of enormous porous stone-ware pipes, a meter in length, 14 centimeters in diameter, and only two in thickness. This was done to dry up a plain intended for military maneuvers. Next come inclined planes expressly laid down on substantial foundations and near the top of a mountain, in order to collect rain water on a large surface, with a basin to purify it, and cisterns to preserve it. This was done to provide the town of Segni with potable water. Then follow contrivances of the ancients for turning the water filtering through porous ground into the aqueducts by turning the clayey strata to account. They used also to rid water of its carbonates of lime by boiling, then cooling it again by applying snow to the outside. They likewise had an ingenious way of cooling their "aqua tepular," which was too warm for drinking after it had been brought over to the Capitol. Father Secchi has discovered the spring whence it came, and found that it marks 18° Cent.—64° Fah.—in winter. The Romans used to mix it with water from the Julia, which only marked 11°. The other spring, now called "Preziosa," issues from an old volcanic crater.

Late Theories on the Earth's State.

Is the inside of the earth fluid or solid? Even in a such an apparently simple question as this we are still in some degree of doubt. You may think this is strange, because we find volcanoes throwing out lava, which is liquid rock, and because we find much other geological evidence to show that solid rocks, such as basalt and trap, have been protruded as molten masses within recent geological epochs; but it has recently been shown by Mr. Mallet that the fact of volcanoes throwing out liquid rock may not be inconsistent with the view that the earth as a whole is solid. Mr. Mallet's investigations go to prove that this liquefaction of the rocks which we observe may be produced at no very great depth from the earth's surface by the shifting and rubbing together of the rocks, owing to cracking due to the alteration of the temperature, just as boys at school rub a button on the bench until it is hot, when they often place it on their neighbor's cheek. Applying the laws of the mechanical theory of heat to this problem, Mr. Mallet believes that the friction of the rocks, caused by the cooling of the earth and the consequent shrinkage, is a sufficient and satisfactory explanation of the occurrence of the high temperature of volcanic action.

Sir Wm. Thomson, also, than whom no one is more capable of expressing an opinion, decides in favor of the earth's solidity. He tells us in his address to the Physical Section at Glasgow, that the conclusion concerning the solidity of the earth originally arrived at by Hopkins is borne out by a more rigorous mathematical treatment than that physicist was able to apply; so that the idea of geologists, who were in the habit of explaining underground heat, ancient upheavals, or modern volcanoes by the existence of a comparatively thin, solid shell resting on an interior liquid mass, must now be given up as untenable.—*Professor Roscoe*.

POCKET MICROSCOPE.—An ingenious English optical instrument maker has just invented a pocket microscope, upon which scientific writers are conferring much praise. The new lens consists of three lenses, the interior grooves of which are almost transparent; they are lined by transparent cement, which has a refracting index corresponding very nearly with the glass. In this way no light is lost by the refraction from the surfaces of the curves. The peculiarities of this remarkable invention are that it focuses three times, as far from the object under examination as either the Stanhope or Codrington lenses. By this means scientists and others using the microscope can examine opaque objects as well as transparent ones, as the light can be conveniently allowed to fall upon them at any required angle, as the definition is exceedingly sharp.

AN APT COMPARISON.—The late M. Ste. Claire Deville was one day discussing with a famous anatomist the subject of the advance of knowledge. "After all," he said, "you have made great advances; but don't you think you are very like the hackmen, who know all the streets, but haven't the remotest idea of what is going on in the houses?"

Table of Highest and Lowest Sales in
S. F. Stock Exchange.

Name of Company.	Week Ending Feb. 1.	Week Ending Feb. 8.	Week Ending Feb. 15.	Week Ending Feb. 22.
Alpha	23	20	21	19
Alta	13	12	11	21
Andes	13	11	12	11
Baltimore Con.	24	12	11	11
Belcher	24	12	11	11
Belmont	24	12	11	11
Best & Belcher	34	33	37	34
Bullion	19	14	17	13
Caledonia	11	10	10	9
Challenge	45	41	50	45
Chollar-Potosi	70	60	70	65
Confidence	10	9	10	8
Con Imperial	24	24	24	23
Crown Point	9	7	8	5
Croton	12	12	14	15
Dayside	22	12	12	12
Excelsior	8	6	7	6
Geddes & Bertrand	70	50	60	40
Gen Thomas	70	50	60	40
Grand Prize	70	50	60	40
Globe Con.	70	50	60	40
Golden Chariot	24	2	3	2
Gould & Curry	12	11	11	11
Hale & Norcross	30	30	30	30
Hussey	30	30	30	30
Julia	44	44	44	44
Justice	15	14	14	13
Jackson	44	44	44	44
K & K Con.	84	78	78	78
Kentuck	84	78	78	78
Knickerbocker	1	75	1	75
Kossuth	1	75	1	75
Lady Bryan	24	24	24	24
Lady Wash.	4	3	2	2
Leopard	4	3	2	2
Leviathan	120	115	120	115
Leeds	54	54	54	54
Manhattan	124	111	111	111
Mansfield	1	1	1	1
Meadow Valley	1	1	1	1
Mexican	13	13	13	13
North Con Virginia	87	50	50	50
New York	50	50	50	50
Niagara	24	24	24	24
Northern Belle	24	24	24	24
Occidental	4	3	2	2
Ophir	24	24	24	24
Overman	102	94	101	96
Pacific	1	1	1	1
Phanther	75	60	70	60
Poorman	16	10	10	10
Prospect	30	25	30	25
Raymond & Ely	16	16	16	16
Rock Island	60	50	60	50
Sage	8	8	8	8
Seg Belcher	65	65	65	65
Sierra Nevada	8	8	8	8
Sierra Hill	7	7	7	7
South Chariot	50	50	50	50
Succor	55	50	50	50
Trojan	1	1	1	1
Union Con.	15	14	14	13
Utah	15	14	14	13
Wells Fargo	27	25	25	25
Woodville	75	62	70	60
Yellow Jacket	16	14	14	14

Sales at S. F. Stock Exchange.

FRIDAY, A. M., FEB. 16.	230	Eureka Con.	181
70 Alpha	204	70 Gould & Curry	13
150 Alta	242	500 Grand Prize	41
50 Andes	11	100 Golden Chariot	31
30 Best & Belcher	34	150 General Thomas	40
45 Belcher	47	40 Hale & Norcross	50
75 Bullion	17	400 Hale & Norcross	50
50 Baltimore Con.	11	370 Julia	64
1280 Con Imperial	210	125 Justice	13
1515 Crown Point	91	100 Jefferson	40
1400 California	91	100 Kossuth	40
505 Con Virginia	52	100 Kentuck	71
5 Chollar	68	30 Knickerbocker	50
350 Caledonia	91	450 Lady Washington	24
270 Dayton	65	450 Leeds	54
75 Excelsior	65	500 Leviathan	75
330 Gould & Curry	12	550 Mint	12
550 Hale & Norcross	55	465 Mexican	18
325 Justice	13	345 Manhattan	8
70 Julia	25	300 Modoc	30
100 Kentuck	71	175 Northern Belle	25
25 Knickerbocker	60	1415 N Con Virginia	95
100 Kossuth	87	1000 Prospect	62
400 Lady Washington	24	500 Overman	55
300 Leviathan	62	1155 Ophir	25
610 Mexican	17	20 Occidental	1
100 Mint	100	625 Poorman	30
55 New York	50	50 Rye Patch	1
400 North Con Vir.	1	230 Succor	50
605 Ophir	25	340 Sierra Nevada	8
575 Overman	90	100 Seg Belcher	8
100 Occidental	14	50 Sierra Hill	7
345 Prospect	95	50 Trojan	40
495 Phil Sheridan	5	140 Utah	16
950 Succor	1	290 Union Con.	9
70 Savage	74	23 Ward	70
450 Sierra Nevada	13	200 Wells Fargo	70
1600 Trojan	13	140 Alpha	20
240 Utah	16	35 Andes	13
10 Union	9	300 Alta	21
50 Woodville	62	110 Best & Belcher	34
50 Ward	70	110 Bullion	17
90 Yellow Jacket	14	1185 Belcher	9

2550 Leeds	30
565 Manhattan	30
230 Mexican	18
845 Modoc	7
130 New Coso	4
335 Ophir	25
75 Overman	88
200 Poorman	17
50 Raymond & Ely	6
100 Rye Patch	3
30 Sierra Nevada	3
200 Trojan	13
80 Utah	16
150 Union	9
TUESDAY, A. M., FEB. 20.	
65 Alpha	20
270 Andes	12
400 Alta	21
470 Belcher	9
480 Best & Belcher	36
270 Bullion	17
115 California	9
245 Crown Point	9
740 Con Imperial	49
1730 Con Imperial	20
55 Eureka Con.	46
80 Chollar	67
690 Dayton	10
170 Excelsior	67
585 Gould & Curry	12
120 Hale & Norcross	18
150 Julia	62
320 Justice	13
50 Kossuth	9
50 Knickerbocker	25
250 Leviathan	60
360 Lady Washington	24
150 Lady Bryan	57
120 New York	50
90 New York	50
1100 North Con Vir.	75
130 Ophir	24
480 Overman	86

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M., FEB. 15.	WEDNESDAY, A. M., FEB. 21.
200 Alta	145 Alpha
255 Andes	120
110 Alpha	17
35 Bullion	17
230 Best & Belcher	35
50 Belcher	30
1050 Crown Point	24
120 Con Imperial	24
225 Chollar	70
500 California	49
807 Con Virginia	51
450 Caledonia	91
20 Confidence	11
1180 Dayton	11
340 Excelsior	67
305 Gould & Curry	12
120 Hale & Norcross	18
1010 Justice	14
150 Julia	62
50 Knickerbocker	25
200 Lady Washington	24
1400 Lady Bryan	57
150 Leviathan	60
55 Mexican	17
120 New York	50
175 North Con Va.	75
320 Ophir	25
50 Occidental	1
80 Savage	74
100 Sierra Nevada	13
10 Seg Belcher	8
1230 Succor	50
900 Trojan	13
100 Union	9
700 Wells Fargo	70
100 Woodville	75
500 Ward	70
250 Yellow Jacket	14

AFTERNOON SESSION.	
955 Alpha	11
60 Alta	21
50 Belmont	2
120 Bullion	17
230 Best & Belcher	35
115 Belcher	30
555 Con Virginia	53
1155 California	48
120 Crown Point	9
115 Caledonia	91
180 Eureka Con.	18
150 Gila	85
200 Gen Thomas	25
50 Geddes & Bertrand	24
800 Grand Prize	50
1150 Grand Chariot	30
210 Gould & Curry	12
120 Hale & Norcross	18
100 Hussey	25
150 Jackson	21
430 Justice	13
230 Julia	64
70 Mexican	17
110 K K Con	30
405 Leeds	30
370 Leopard	44
440 Manhattan	25
120 Northern Belle	25
425 New Coso	50
95 Ophir	25
70 Overman	91
100 Poorman	30
115 Rye Patch	31
100 Union Con.	9

Pacific Board—Latest Sales.

WEDNESDAY, A. M., FEB. 21.	
40 Alpha	21
200 Atlantic	13
110 Andes	12
200 Bullion	17
205 Best & Belcher	33
30 Belcher	30
50 Crown Point	9
825 Con Imperial	49
1000 Con Virginia	47
100 Chollar	67
200 City of Boston	25
60 Caledonia	91
740 California	49
95 Excelsior	67
235 Gould & Curry	12
80 Hale & Norcross	18
200 Julia	62
50 Kentuck	71
120 Leviathan	48
200 Mexican	17
230 Ophir	25
50 Overman	88
350 Prospect	50
50 Rock Island	50
215 Sierra Nevada	13
20 Silver Hill	7
300 Succor	50
110 Rye Patch	31
50 Savage	74
800 Trojan	13
30 Utah	16

California Board—Latest Sales.

WEDNESDAY, A. M., FEB. 14.	
235 Andes	12
145 Alpha	21
100 Occidental	1
100 Baltic	25
120 California	49
170 Best & Belcher	33
30 Bullion	17
150 California	44
110 Chollar	67
280 Con Imperial	49
20 Crown Point	9

MINING SHAREHOLDERS' DIRECTORY.

(Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.)

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.									
COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Arizona M Co	Neu	3	25	Feb 6	Mar 13	Mar 30	W Willis	309 Montgomery st	
Baltimore Con M Co	Washoe	14	50	Feb 7	Mar 13	Mar 31	C A Sankey	331 Montgomery st	
Belmont M Co	Washoe	11	50	Feb 7	Mar 12	Mar 12	J W Wells	419 California st	
Best & Belcher M Co	Washoe	1	100	Feb 8	Mar 15	Mar 15	J S Kennedy	419 California st	
Bullion M Co	Washoe	2	100	Jan 15	Feb 19	Mar 4	J S Kennedy	419 California st	
Caledonia S M Co	Washoe	19	100	Feb 10	Mar 15	Mar 15	R Wegener	414 California st	
Crown Point G & S M Co	Washoe	29	100	Jan 10	Feb 14	Mar 7	J Newlands	419 California st	
Deleone Con M Co	Washoe	10	10	Jan 31	Mar 6	Mar 6	D A Jennings	314 Montgomery st	
Florida S M Co	Inyo	8	50	Feb 14	Mar 24	Mar 24	L Hermann	309 Montgomery st	
Gen Thomas M & Co	Neu	4	25	Feb 12	Mar 20	Mar 20	W Willis	309 Montgomery st	
Gould & Curry M Co	Washoe	29	100	Jan 23	Feb 28	Mar 21	A K Durbrow	309 Montgomery st	
Hale & Norcross S M Co	Washoe	53	100	Jan 22	Feb 27	Mar 30	J F Lightner	331 Montgomery st	
Julia Con M Co	Neu	3	50	Feb 18	Mar 9	Mar 9	C A Sankey	419 California st	
Leviathan M Co	Washoe	2	100	Jan 4	Feb 8	Feb 28	A Noel	419 Montgomery st	
Metallic M Co	Neu	1	25	Feb 17	Mar 26	Mar 26	F E Luty	507 Montgomery st	
Mint Gold & S M Co	Washoe	10	10	Jan 31	Mar 6	Mar 6	W Willis	309 Montgomery st	
New York M Co	Washoe	11	25	Jan 25	Feb 27	Mar 17	D L Thomas	419 California st	
Niagara M Co	Washoe	5	50	Feb 7	Mar 12	Mar 12	W R Townsend	Nevada Block	
North Con Virginia M Co	Washoe	7	25	Feb 20	Mar 28	Mar 28	J Maguire	419 California st	
Occidental M Co	Washoe	4	25	Feb 6	Mar 13	Mar 13	A K Durbrow	309 Montgomery st	
Original Consolidated M Co	Washoe	3	25	Jan 6	Feb 9	Feb 27	J P Moore	426 California st	
Phil Sheridan M Co	Washoe	6	25	Jan 16	Feb 23	Mar 2	W R Townsend	Nevada Block	
Savage M Co	Washoe	26	100	Jan 27	Feb 28	Mar 20	E B Holmes	309 Montgomery st	
Sierra Nevada M Co	Washoe	47	100	Feb 15	Mar 7	Mar 7	W W Benson	309 Montgomery st	
South Constock M Co	Washoe	5	25	Jan 30	Mar 6	Mar 27	J M Buttington	419 California st	
Sierra Hill M Co	Washoe	10	100	Feb 2	Mar 13	Mar 3	G E Dean	419 California st	
Utah M Co	Washoe	15	100	Feb 2	Mar 8	Mar 27	C Pratt	309 Montgomery st	

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Aureola G & S M Co	Neu	3	10	Dec 29	Feb 5	Feb 28	T S Fitch	240 Montgomery st
American Nevada M Co	Neu	2	10	Jan 15	Feb 24	Mar 19	L Hermann	220 Sansome st
Alpha Tunnel Co	Utah	1	3	Jan 2	Feb 26	Mar 19	J M Haven	420 California st
Allison Ranch Franklin M Co	Cal	1	50	Jan 30	Mar 3	Mar 20	T M O'Connor	505 Front st
Cherokee Flat Blue Gravel Co	Cal	37	5	Feb 5	Mar 15	Mar 5	O H Bogart	402 Montgomery st
Crandall M Co	Cal	3	5	Jan 13	Feb 16	Mar 3	D H Williams	Grass Valley
Cross Bay Coal M Co	Oregon	5	50	Jan 25	Feb 16	Mar 24	T P Beach	Montgomery Block
Dolores Con M Co	Neu	1	10	Feb 1	Mar 14	Apr 11	F W Clark	418 California st
Enterprise Con M Co	Cal	11	20	Jan 29	Mar 6	Mar 28	J J Hermann	612 Commercial st
Florida S M Co	Neu	8	50	Jan 24	Mar 14	Apr 14	L Hermann	220 Sansome st
Grass Valley New M Co	Cal	11	10	Jan 27	Feb 28	Mar 17	P H Paynter	Grass Valley
Howland Tunnel Co	Utah	1	3	Jan 2	Feb 26	Mar 19	J M Haven	420 California st
Kennedy M Co	Amador	13	100	Feb 13	Mar 19	Apr 9	J Wiswell	210 California st
Lucky Rock G M Co	Cal	1	5	Jan 31	Mar 3	Mar 20	C S Healy	Merchants' Ex
Mariposa Land & M Co	Cal	9	100	Jan 16	Feb 17	Mar 19	L Leavitt	309 Montgomery st
North Carson M Co	Neu	6	15	Jan 9	Feb 7	Mar 5	O H Bogart	402 Montgomery st
Oceanic Quicksilver M Co	Cal	12	10	Jan 25	Mar 3	Mar 26	C G Cump	438 California st
Omega Table Mt M Co	Cal	12	10	Feb 7	Mar 12	Apr 5	D Wilder	228 Montgomery st
Pine Peak Co	Cal	3	60	Jan 16	Feb 21	Mar 5	D F Sampson	401 California st
Silver Sprout M Co	Cal	—	20	Dec 19	Feb 15	Apr 14	T B Wingard	328 Montgomery st
Tuolumne Hydraulic M Co	Cal	—	5	Jan 19	Mar 16	Apr 2	I T Milliken	528 California st
Vulcan Coal M Co	Cal	2	10	Dec 19	Feb 6	Mar 1	J Greif	636 Washington st
Wheatfield M Co	Arizona	1	50	Jan 5	Feb 15	Mar 3	J E Foulde	535 Clay st

Continued on page 124.

THE ENGINEER.

Government Tests of Iron and Steel.

The President has sent the following message, upon the subject of testing iron and steel, to Congress:

I desire to call the attention of Congress to the importance of providing for the continuance of the board for testing iron, steel and other metals, which, by the sundry appropriation act of last year, was ordered to be discontinued at the end of the fiscal year. This board, consisting of engineers and other scientific experts from the army, the navy and from civil life—all of whom, except the Secretary, give their time and labors to this object without compensation—was organized by authority of Congress in the spring of 1875, and immediately drafted a comprehensive plan for its investigations, and contracted for a testing machine of 400 tons capacity, which would enable it to properly conduct the experiments. Meanwhile the subcommittee of the board have devoted their time to such experiments as could be made with smaller testing machines already available. The large machine is just now completed and ready for erection at the Watertown arsenal, and the real labors of the board are therefore just about to be commenced. If the board is to be discontinued at the end of the present fiscal year the money already appropriated and the services of the gentlemen who have given so much time to the subject will be unproductive of any results.

The importance of these experiments can hardly be over-estimated when we consider the almost endless variety of purposes for which iron and steel are employed in this country, and the many thousands of lives which daily depend on the soundness of iron structures. I need hardly refer to the recent disaster at the Ashtabula bridge, in Ohio, and the conflicting theories of experts as to the cause of it, as an instance of what might have been averted by a more thorough knowledge of the properties of iron and the best modes of construction. These experiments cannot properly be conducted by private firms, not only on account of the expense, but because the results must rest upon the authority of disinterested persons. They must therefore be undertaken under the sanction of the Government. Compared with their great value to the industrial interests of the country, the expense is very slight. The board recommend an appropriation of \$40,000 for the next fiscal year, and I earnestly commend their request to the favorable consideration of Congress. I also recommend that the board be required to conduct their investigations under the directions of the Secretary of War, and to make full report of their progress to that office in time to be incorporated in his annual report.

U. S. GRANT.

Executive Mansion, Jan. 30th, 1877.

The *Iron Age* says: This is timely. The importance of the work is great, while it is of such a character that we can only look to the Government to carry it on. Every day demonstrates the need we have of a greater knowledge of the properties of iron and steel when manufactured in large masses. Materials which show most extraordinary powers of endurance in one form are often weak in another; changes of structure take place and a variety of phenomena occur for which we are at a loss to account or interpret. The labors of the board will give us what we want, and there is little doubt but the needed funds will be appropriated by Congress.

The East River Bridge.

Chief Engineer Roebling has presented his annual report to the trustees. The following were the principal facts: The small quantity of stone yet remaining to be put on the anchorages and towers cannot be laid until the cables are completed. The masonry constitutes one-half of the whole work, which is therefore about half done. The machinery for delivering the stones on top of the towers is so perfect that it costs no more per yard to lay the top courses than the bottom ones. The arches of the Brooklyn tower were completed in the spring of 1874. The keystones, blocks weighing 11 tons, were fitted in without trimming, which showed great accuracy of measurement at the quarry and in the adjustment of the joints. On the completion of the tower the saddle and saddle-plates, which are twice as heavy as those at Cincinnati, were raised and put in place without accident. The resistance offered by the weight of the masonry on the plates against the upward pull of the chains affords a margin of safety of two and one-half times. This figure seems small compared with those of the main cables, where the margin of safety is about six times. But in the anchorage only two factors have to be considered—granite and gravity. The anchor chains are so disposed as to form the quadrant of a circle from a point of 20 feet above the anchor-plate to within 25 feet of the front of the anchorage, the cable itself emerging eight feet below the top of the masonry. In all previous wire bridges each cable was composed of seven strands. In this they contain 19, requiring 38 bars for their attachment. These bars are of iron, as preferable to steel for such a use. Investigations at the Pittsburgh and Niagara bridges have shown that the old style of preserving the chains is safe, viz: painting the chemically-cleaned surface of the iron and then imbedding the chain in hydraulic cement. The

rusting power of Brooklyn air is 20-fold that of Cincinnati. The main cables are not made on land and hauled across the river, but are laid up in place, the strands being first put 60 feet above the ultimate destination of the cable. Men called "regulators" are put upon ten cradles in the center of the main spans and in each of the land spans, to give the wires a uniform deflection as the cables are formed. All four cables are made simultaneously, and are put five or six feet above their destination to make allowance for all depressions. It will take about three years to make the main cables. It took nine months to lay 1,000,000 pounds of wire at Cincinnati. Preparations have been making for cable-laying for two years. As soon as the foot-bridge is completed all will be ready. Access will be had to the cradles of the regulators by this bridge, which will be 210 feet above the water. To protect such a frail structure against storms is no easy task, and Mr. Roebling predicts that the temporary works will be disabled more than once before the cables are finished. Inverted parabolic storm-cables serve to prevent the foot-bridge from being carried away bodily.

Irrigation of the Rhone Valley.

The inhabitation of the Rhone valley have, of late years, been remarkable sufferers from a variety of causes—the devastations wrought by phylloxera, the disease which has attacked the silk worms, and the necessity of giving up the cultivation of madder, which is no longer able to compete with artificial alizarine. It is known that a project was started a little time ago for making an irrigation canal from the Rhone. M. Dumont was charged to make the necessary studies and observations, and his scheme, as now matured, has been brought before the French Academy by M. Lesseps. The canal would begin above Condrien, and terminate in the outskirts of Montpellier, 61 meters above the sea level. The total cost is put at 110,000,000 francs. An irrigation zone would thus be formed in five departments, Drome, Vaucluse, Gard, Herault and Aube, with an irrigable surface capable of producing annually 450,000 tons of hay, and of supporting at least 100,000 head of large cattle more than at present. The canal could be easily applied in submersion of at least 80,000 hectares of vines on the plain, and thus afford an effective remedy against phylloxera. It would be complete in four years. M. Dumont considers that it need not be injurious to navigation, but that the present condition of the bed of the Rhone greatly needs improvement. It is desirable to obtain in the interior system of navigation a sufficient and uniform draft of water.—*Eng. Mechanic*.

A PROPOSED RAILROAD BUREAU.—Mr. Charles Francis Adams, Jr., in an open letter to Mr. Garfield, the representative of the Ashtabula district in Congress, recommends the establishment of a bureau of railroad statistics in connection with the Department of the Interior, the said bureau to consist of two officers, one an accountant and statistician, and the other a railroad expert and engineer. It should be the duty of the first to collect and put in shape for reference, information relative to the internal commerce of the country, and the second should investigate all railroad accidents, and especially such as present unusual features, or the causes of which are difficult of ascertainment. By this means the public would be made acquainted with such facts as the railroad companies are now under the strongest inducements to suppress. Apart from mere statistics, showing the number of accidents, the lives lost and injuries sustained, we should then know to what cause, whether carelessness, defective material, imperfect appliances, poor construction or natural agencies, each disaster was due. The experience of one road would then be made the experience of all, instead of limiting each official, as now, to his own narrow range of observation. The working of such an agency would also tend to enforce the adoption of the most improved appliances.

CANADIAN RAILWAY GAUGES.—The disadvantages attending the adoption of various railway gauges do not seem to be thoroughly appreciated in Canada. In the parliamentary returns of railways for 1875, we find a list of railways completed, in process of construction, or projected, which show no less than seven gauges. Their mileage, as given in detail, is as follows: five feet six inches, 606 miles; four feet eight and a half inches, 6,167 miles; three feet seven and a half inches, one and a half miles; three feet six and a half inches, one mile; three feet six inches, 819½ miles; three feet, 40 miles; two feet, eight and three-quarter inches, one and a half miles; total, 7,637 miles. There are still some permutations of the scale which might be used for future roads.

CANAL NAVIGATION.—The *Engineering News* says: A meeting of persons interested in canal navigation was held a few weeks since at Buffalo, to see what measures could be taken to improve the efficiency of these water-ways and to revive the traffic. The Belgian system of towing by cable on the bottom of the canal was strongly advocated, and additional steps were suggested for inaugurating such a system; but it was stated that there was already no legal hindrance to the introduction of the plan, and that whenever any one wished to introduce train boats they could do so. One party urged the laying of a T rail upon piles on the tow-path, and using small locomotives for traction.

Reduction of Miners' Wages.

Concerning the strike of the miners at Smartsville, Sucker Flat and Timbuctoo, the Grass Valley Union says:

We received a lengthy communication from Smartsville, on the subject of mining affairs connected with the strike of the miners of Smartsville, Timbuctoo and Sucker Flat. The communication is entirely too long to appear, in full, in our columns. We give some of the points sent to us by the miners of the places mentioned in the heading.

The wages of the miners having been reduced from three dollars to two dollars and fifty cents a day, per man, on the first of the present month most of the miners quit work. There was a parade with music and banners, and almost all the miners joined in a procession, thereby protesting against the reduction of wages. Our correspondents, the miners, go on and detail the oppressions which the companies, operating at Smartsville, Sucker Flat and Timbuctoo, have exercised towards the miners. The statement goes on to say that some eighteen months ago the Excelsior water company consolidated with John McAllis & Co., the later owning small claims and a flourishing general country store. After that consolidation the employees of the company were compelled to trade at the company's store, or to quit work. The company thus combined the mining business with a trade in ham, eggs, butter, etc. The miners were, by this order, compelled to pay from 30 to 35 per cent. more on their goods than they had previously to pay, when they were allowed to trade directly with Marysville, and at least 20 or 25 per cent. more than when they had the liberty of trading at any of the local stores. An instance is given in the article of coal oil. "Devoe's" brand of oil was sold at the Excelsior store for \$3.50 and \$3.75 per five gallon can, when it could be bought at another store, not two hundred yards distant, for \$1.75.

If a miner employed by the company was caught buying at the cheaper place he lost his situation. If one not employed by the company bought goods at the cheaper place the household supply of water was cut off—for the company supplies all water there used for domestic purposes. It is moreover asserted that single men employed there were expected to buy largely of fancy dry goods or have no work to do. Of course employed men, with families, had to patronize the dry goods department of that store in an extensive way. It is said that single men employed there have to board only at such houses as trade with the company's store. Formerly the companies had their own boarding houses, where each employee had to board and lodge, no matter where they ate and slept. It is also charged that an attempt was made to plant a "miners' physician" on the employees, and that the miners were to pay the doctor \$6 a year for each single miner, and \$12 for each miner with a family. This doctor was to have charge of the health of the miners and their families. An agreement to that effect was gotten up, but did not succeed in getting a sufficient number of signatures. In short, the miners, as they make out their case in the communication sent to us, are bulldozed in every way, so far as their food and clothing is concerned.

The Blue Point company, under the superintendence of Mr. Kemp, is excepted from the complaint of reduction of wages, and we infer also, from the tenor of the communication, that that company is not exercising the privilege of controlling the trade of employees.

The miners think that the companies operating in the district named could easily reduce expenses by cutting down the pay of some of the officers of the company who have little to do.

We gave a short statement of the contents of the miners' communication, and we believe we have covered the ground of the complaint. We express no opinion as to whether a strike will furnish a remedy in the matter. Strikes generally fail, and that too after damaging both parties in the contest. A man has a right to quit work when wages do not suit him, or for any other cause or reason; but when he does quit, he had better try to find some other place in which to labor, where he is better suited.

To quit and remain idle does not pay, and in this avaricious world appeals do but little good. We are strongly opposed to the reduction of miners' wages, and are still more opposed to systems which force working men to trade with particular mercantile establishments; yet we must say that we see no sure way to avoid such things or to right such great wrongs. Consolidations and monopolies are overshadowing the industries of the country, and their tendency is to reduce working men to mere serfs.

The other side of the question is thus given in the Nevada Transcript: We have mentioned the fact that the wages of miners for some of the companies on the Ridge, have been lowered 25 cents per day, and after the first of May the price will again be reduced 25 cents per day, making the wages then amount to \$2.50 per day. This is regarded as a hardship by miners, and is a thing we are sorry has happened. We have frequently expressed our opinions in reference to the matter, and have published such correspondence opposed to it as has been sent to us, and are still ready to do so. We always intend to be fair in any discussion affecting the interests of the county, and desire to give both sides of the question. With this view, we inquired the other day of one of the parties interested in the mining companies which have made the reduction, to learn that side of the question, and find the arguments to

be about as follows. In the first place, there are two parties interested in the question of wages. The capitalist desires a fair compensation for his labor and his money, as well as the laborer does for his work. The owners of the North Bloomfield mine have expended in the neighborhood of \$2,000,000 in the purchase of the ground and in opening it up ready for work. This amount, loaned at one per cent. per month interest, would amount to \$240,000 per annum. But supposing the amount is reduced from the above figure \$500,000—still the interest of the investment, alone, would amount to \$190,000 per year. This investment has been non-productive for a number of years. The largest yield of the mine so far, in any one year, was \$192,736, and that was in 1875-6. In 1874 it was only \$74,272. Hence it will be seen that the company have been paying \$3 a day per man for years, while the mine was unproductive, and while the interest of the investment alone greatly exceeded the gross yield of the property, to say nothing about the expense of working it. Of course it is expected the yield will be doubled or trebled in coming years, but the company feel entitled to a liberal return after investing such an amount of money and taking the chances of losing it all. The company further say that a majority of the work now done does not require skilled laborers, and that the price offered is better than is paid elsewhere in the State for the same kind of labor. They say that many of their men have been steadily employed for years. That ten hours make a day's work, while a farm hand has to work from 12 to 16. A laborer in the valleys gets from \$25 to \$40 per month and board. At \$2.50 per day, the wages amount to \$65 per month, for 26 days' work, and many men put in 30 days in a month. Board costs from \$5 to \$6 per week at boarding houses, and, if a miner cabins himself, he can live for about \$3 per week. In either case the company claims the wages at the reduced figure are a good deal better than other outside labor is paid, in any of the agricultural counties; while the hours per day are less, and the number of days working per month are three or four less than a farm hand has to work. This is the other side of the question, and we give it publicity so that the discussion may be fairly conducted.

The Bonanza.

Under the heading of "\$1,080,000," the Virginia Enterprise of the 8th says: This is the California mine dividend day. During the month its shipments have been over \$1,600,000, so there is no doubt about the dividend. We wonder if one in a thousand who reads the brief announcement every month on a certain day, that a certain mine has paid a dividend of \$1,080,000, has the slightest idea of what is necessary to be done in order to make such an announcement possible? Every one who ever owned a note in a bank knows that 30 days is a very brief period of time. To cause a mine to produce \$60,000 in a single day is a tremendous feat; to continue this product daily through weeks and months, almost without variation, is a marvel. It takes foresight, endurance, judgment and nice calculation, such as very few men possess in this world. The ore from which this mighty yield is extracted lies hid away almost a third of a mile below the earth's surface. It lies where consuming heat and baffling waters join their forces to try and drive away the invading miner. While the ore is being hoisted, every month 1,250,000 feet of lumber has to be lowered and put in position, to keep safe the weakening caused by the mighty excavations. While one level is being worked another has to be explored, for a drain of 500 tons of ore per day would soon level a mountain down. Then the Comstock is an uneasy fissure. In a single week, sometimes, the swell of the ground shivers into splinters 14-inch square timbers. Shafts and drifts and inclines and tracks have to be watched incessantly, for a mine, like a glacier, seems ever to be working. This is all below ground. Above the surface is a world of machinery, always to be kept in order—steam engines, air engines, cables, cages, air pipes, pumps and all the multiplied devices intended to expedite the work and lessen the dangers of mining. Five hundred men have to be lowered into and hoisted from the depths daily. Three hundred cords of wood have to be provided daily for fuel. And there must be no delays, no serious accidents. The needed repairs must be anticipated and provided for; the accidents must be anticipated and guarded against; the explorations must be carried on months in advance; the supplies must never fail. A vast space of forest-land, 30 miles away, has to be denuded of its timber yearly to fill the insatiable maw of this one mine. It requires 15,000,000 feet of timber and 100,000 cords of wood annually to supply the mine and to furnish fuel to hoist and reduce the ores. How many can appreciate the ability necessary to carry on this work without any mistakes? Many a man of mind sufficient to accomplish the feat would fail through sheer lack of physical strength. The work means being up at 5 o'clock in the morning; means two or three daily journeys into the depths, and when anything unusual happens, it means standing guard day and night, like a ship's captain in a storm, until the trouble is over. It means a mind large enough to take in the immense work going on at a glance, yet careful enough to include its smallest details and exact enough to anticipate the wants of the enterprise months in advance. For 10 months the California mine has monthly given up this tremendous yield.

Amador County Coal.

The *Ione City News*, in a description of "Carbondale" and its coal mines, says:

The Carbondale mine, under the supervision of J. F. Steinberger, Esq., has been opened evidently with a view to extensive working. Last Friday we made a visit to it and were most courteously received by the superintendent. Engineer Fleming turned the crank, and away we glided, at an angle of 30°, a distance of about 200 feet, which brought us to the entrance of the main tunnel. The tunnel extends for 150 feet in a north-north-west direction, and is being pushed through to the air shaft. The bed of coal is almost flat, is 10 feet thick and of very compact body. Borings which have been made proved beyond doubt that it extends, with but little variation in the depth from the surface, for several miles. The coal can be taken out very easily, at a small expense, and in immense quantities. Any number of men could be profitably employed in the mine, as there is an unlimited area of the coal available, and it can be worked straight-head without taking out with it any waste dirt or contiguous casing.

Those who have doubted the fuel properties of the Carbondale coal have done so mainly upon appearance, comparisons and unfair tests. Its brown-black, dull color when compared with the bright lustrous black of the imported article, will for a time detract from its ready sale. In the testing of it, it has been subjected to the same treatment that the anthracite and anthracite bituminous coal is; burned in the same grates and with the same draft—all of which is wrong, and an unfair test of this description of mineral coal. Of the three known varieties, the anthracite, bituminous and lignite, there is no question but the Carbondale deposits are of the latter variety. The texture of the wood from which it is formed is very distinctly traceable in it all. Occasionally pieces are found—which, perhaps from the peculiarity of their species, have resisted the mineral-forming process more than the great bulk of the buried forest, in which the woody nature remains almost *au naturel*. These may be whittled with a knife as easily as any piece of soft pine. That such carbonaceous matter will not make good fuel is too preposterous a proposition to need further reference to here. The combustible qualities of brown-coal, or wood-coal as it is called, are better understood in the Baltic States of Europe and the southeastern provinces of Australia, where it is in constant use for domestic fuel, steamboat, and all stationary bodies. Whether it is adapted to locomotives in California can only be surmised, as a great deal depends upon the shape and style of the furnaces. The day engineer, Mr. Fleming, at the Carbondale mine, finds no difficulty in running his engine with it, the only objection to it being, that it is now and again very wet—not very surprising, seeing he uses it quite green from the mine, which might do well enough if it were anthracite in place of lignite. He says "it doesn't blaze as much as Seattle nor as high;" this is conclusive that in its composition there is more carbon and less bitumen than in Seattle. The only precaution necessary to be taken in regard to Carbondale brown-coal is, that it be allowed a few days for the moisture which it contains to evaporate before sending it to market. It will then burn as brightly and give as much solid heat as the best qualities of Cumberland anthracite.

The bituminous clay, distributed in veins through the main body of the vein of coal, is a light colored clay, which, when dried, burns similar to sperm wax or pitch. The highly inflammable nature of this clay has attracted considerable surprise and comment. It was supposed by its appearance to be of no account, and was discarded as refuse. Last week, at the instance of Master Mechanic Stevens, of the Central Pacific railroad, who believes the clay is more valuable than any coal, a carload of it was sent to Sacramento. We have not heard how it proved itself. The light color of the clay where thoroughly dried closely resembles the pale yellow cast of hardened naphtha, as also does its specific gravity. Mr. Stevens, we are told, believes this clay will be specially valuable for making gas. Whether or not the coal is adapted for locomotives, or the clay for gas making, it is to be hoped—for the sake of providing a cheap fuel superior to wood, and less costly than any other fuel in the market available for domestic use by the working classes in the large labor centers of the State—that these bountiful resources will be speedily brought within the reach of consumers.

A RICH STRIKE.—The Rye Patchers are very much excited over a strike made in the Rye Patch. We have seen a specimen of the ore, and from the most reliable information attainable, that is, from the men who work in the mine, we learn that the body of ore, which is three feet wide, was struck on the 220-foot level in a drift run from the main shaft. Some choice specimens assay as high as \$3,000 in silver, and the whole three feet averages about \$800 per ton.—*Silver State*.

ADDITIONAL FORCE.—The Alps mine has added to the working force of the mine, so that there are now working in the mine alone 15 men, a large addition to what has heretofore been working. The mine is now shipping ore to the mill at the rate of six tons daily, preparatory to the mill starting to work. Outside of what is shipped by the mine, 400 tons are already on hand for the mill to start on.—*Pioche Record*.

USEFUL INFORMATION.

The Effect of Oil on the Sea.

A very interesting account of the application of oil to mitigate the raging of the sea, and to relieve a vessel in a storm, has been received by the Bombay mail, in relation to the *King Celtic*, a vessel of 1,490 tons, which left Liverpool in June last for Bombay. When off the Cape of Good Hope she encountered a heavy gale from the northwest, which continued for some time. Tremendous seas broke over the ship, bursting in the main hatch, washing away the hatch-houses and boats, smashing in the front of the cabin, and destroying the Captain's and officers' stores and clothing. A young lad, one of the crew, was carried overboard, and it was impossible to rescue him. The gale lasted for nearly five days, and though the vessel stood it very well, it was impossible to repair any of the damage, as the waves were continually sweeping her decks. At length the chief officer, Mr. Boyer, suggested the trial of throwing oil upon the water. Two canvas clothes-bags were obtained, and into each two gallons of fine oil were poured, the bags being punctured slightly, and hung over each quarter in tow of the vessel. The effect was magical; the waves no longer broke over the poop and sides of the ship; but several yards away, where the oil had spread itself over the surface, and around the poop, in the wake of the vessel, was a large circle of calm water. The crew were thus able to repair the damage with greater ease, and the ship was relieved from the tremendous shocks she had previously received from the heavy seas. The bags lasted two days, after which, the worst fury of the gale having expended itself, no more oil was used.

RAPID SYSTEM OF PLASTERING.—By the use of this system, the lathing and two coats of plastering, with lime and hair, give place to large slabs fixed to the joists, which form the body of the ceiling at once. The edges of these slabs are bevelled reverse ways, and fit into each other so that the stopping cannot be shaken out. The faces of the slabs are made rough, and the whole receives a thin finishing coat of cement or stucco, which effectually conceals the joints, and produces ceilings of good appearance. By this means no time is lost in waiting for drying; and the annoyance of dirt and rubbish caused by mixing and using lime and hair is entirely avoided. The manufacture of the slabs may be briefly described. A sufficient quantity of plaster and fiber is mixed with glue-water; half of this, while in a plastic state, is spread evenly upon a plate-glass bench, with edges raised three-eighths of an inch, beveled. A sheet of strong open canvas is then stretched tight across, and wrapped round two laths which are embedded in the two edges of the slab. The object of having these laths is to tighten the canvas, and to stiffen the edges of the slabs in their span from joist to joist. The remaining portion of the plaster and fiber is spread evenly upon the canvas, which then remains firmly embedded through the center of the slab. A bass broom is then passed over the face of the slabs to form a "key" for a finishing coat. When sufficiently set, the slabs are removed from the bench, and exposed to the air to dry. These slabs are two feet six inches wide, of sufficient length to reach across four joists, and are secured to the joists by driving 1½ in. zinc nails through the laths before mentioned, and about four inches apart, along wherever the joists come. The joints are then roughly stopped with cement, and the whole receives a thin "setting" or finishing coat of cement or "stucco," as in the ordinary way. The system certainly has its advantages.—*Builder*.

TEST PAPER FOR WINES.—*Les Mondes* says that *enokrine* is the name of a test-paper sold in Paris, for the purpose of detecting the fraudulent coloration of wines. With a genuine red wine the color produced is a grayish-blue, which becomes lead-colored on drying. With magenta and other aniline colors, it turns a carmine red; with ammoniacal cochineal, a pale violet; with elderberries, the petals of roses, etc.; a green; with logwood and Brazil wood, the color of dregs of wine; with Pernambuco wood and phytochrome, a dirty yellow; with extract of indigo, a deep blue. The manipulation required is very simple. A slip of the paper is steeped in pure wine for about five seconds, briskly shaken in order to remove the excess of liquid, and then placed on a sheet of white paper to serve as a standard. A second slip of test-paper is then steeped in the suspected wine in the same manner and laid beside the former. It is asserted that 1-100,000th of magenta is sufficient to give the paper a violet shade, whilst a larger quantity produces a carmine red. The inventors of the test paper, MM. Lainville and Roy, are also said to have discovered a method of removing magenta from wines without injuring their quality, a fact of some importance, if it be true that several hundred thousand hectoliters of wine sophisticated with magenta are in the hands of merchants.

CEMENT FOR JOINING AMBER.—A solution of hard copal in pure ether, of the consistency of castor oil, is suggested by Ph. Rust for cementing amber. The carefully-cleaned surfaces of fracture, coated with the solution, should be pressed together, and retained in contact by

means of a string wound around the object, or in some other suitable way. The operation should be performed as rapidly as possible, since the evaporation of the ether impairs the adhesiveness of the cement; so that all arrangements for compressing the object should be made before laying on the cement. A few days are required for the complete hardening of it. In repairing tubes, as for pipes, any of the solution happening to pass into the interior should be carefully removed at once with a slender feather.

CLEANING SILK.—The following mode of cleaning silk garments, says the *Manufacturers' Review*, has been successfully tested. The garment must first be ripped and dusted. Have a large flat board; over it spread an old sheet. Take half a cup of ox gall, half a cup ammonia and half a pint tepid soft water. Sponge the silk with this on both sides, especially the soiled spots. Having finished sponging, roll it round on a stick like a broom handle, being careful not to have any wrinkles. Silk thus washed and thoroughly dried, needs no ironing and has a luster like new silk. Not only silk, but merino, barege or any woolen goods may be thus treated with the best results.

MECHANICAL POWER OF WATER.—Water is a purifier, a cleanser, a dissolver and a mechanical power, and will run along down an incline the solid ingredients of town sewage, with road detritus—such as grit and silt—the moving power of water being in proportion to the volume, the vertical depth and the gradient down which the flow is directed. Flushing by volume and head, artificially formed, will remove detritus from sewers of low gradients, where accumulation may have taken place. A velocity in the sewage of two feet six inches per second will remove any solids likely to be passed into drains and sewers.

GOOD HEALTH.

Remedy for Rheumatism.

EDITORS PRESS:—To know the special causes of disease and to remove them is generally all that is needed to preserve health, if done in time. Rheumatism is no exception to the rule. Although regarded as a hereditary disease, persons subject to it need favorable conditions to develop it. Dr. Hall says, that persons may bring it on by riding in a top buggy with the sides open, so as to get a current of air against the shoulder.

Four or five years ago I had a severe attack of rheumatism for the first time, though my father was subject to it, and his father was also. I took it in my hands and wrists by exposure about water, and thinking that it was the result simply of heavy lifting of fruit chests during the previous summer, I poured cold water on the hands and wrists to strengthen them. But they got worse instead of better, when I found I had the rheumatism. When I reflected that my Chinamen are not subject to this affliction, although exposed to cold fogs during a portion of the berry-picking season, and when I remembered that they practiced bathing their arms and legs with hot water, I thought I had "struck a lead." So I used hot or warm water whenever I washed my hands, keeping the feet dry and the whole system comfortable by a change of clothing to suit the weather, and I soon cured myself. I am still careful in these habits, avoiding exposure to cold or wet, and applying the warm water still whenever I think it necessary, and although I have now and then threats of an attack, I keep it at arm's length. Santa Clara, Feb., 1877. I. A. W.

POISONS.—For any poison, the most speedy, certain and most frequently efficacious remedy in the world, if immediately taken, is a heaping teaspoonful of ground mustard, stirred rapidly in a glass of cold water, and drank down at a draft, causing instantaneous vomiting. As soon as the vomiting ceases, swallow two tablespoonfuls or more of sweet-oil, or any other mild oil. If no ground mustard is at hand, drink a teaspoonful or more of sweet-oil or any other pure mild oil, melted hog's lard, melted butter, train oil, cod-liver oil, any of which protect the coats of the stomach from the disorganizing effects of the poison; and, to a certain extent, by filling up the pores of the stomach (the mouths of the absorbents) prevent the poison being taken up in the circulation of the blood. Persons bitten by rattlesnakes have drank oil freely and recovered. These are things to be done while a physician is being sent for.

EXTRACTION OF A LIVING INSECT FROM THE EAR.—The *Archives Medicales Belges* relates the following case: A little girl, three years old, put an insect, "*bete du bon Dieu*," into her ear. Sharp cries, agitation and convulsive symptoms ensued. Injections of water were made without result. The physician then conceived the idea of asphyxiating the insect by means of chloroform; he dropped four drops of chloroform upon a small piece of cotton, which he introduced into the ear. Immediately the child ceased crying and complained no further of any disagreeable sensation; the insect had become asphyxiated; an injection of warm water brought it away dead, and no further trouble ensued.

Out-Door Safety.

The fear of the weather has sent multitudes to the grave, who otherwise might have lived in health many years longer. The fierce north wind and the furious snow storm kill comparatively few, while hot winter rooms and crisp summer suns have countless hecatombs of human victims to attest their power. Except in localities where malignant miasms prevail, and that only in warm weather, out-door life is the healthiest and happiest, from the tropics to the poles.

The general fact speaks for itself, that persons who are out of doors most take cold least. In some parts of our country, near one-half of the adult deaths are from diseases of the air passages. These ailments arise from taking cold in some way or another; and surely the reader will take some interest in a subject, which, by at least one chance out of four, his own life may be lost.

All colds arise from one of two causes.

1. By getting cool too quick after exercise, either as to the whole body, or any part of it.

2. By being chilled, and remaining so for a long time, from want of exercise.

To avoid colds from the former, we have only to go to a fire the moment the exercises cease in the winter. If in summer, repair at once to a closed room, and there remain with the same clothing on, until cooled off.

To avoid colds from the latter cause, and these engender the most speedily fatal diseases, such as pleurisy, croup, and inflammation of the lungs, called pneumonias, we have only to compel ourselves to walk with sufficient vigor to keep off a feeling of chilliness. Attention to a precept contained in less than a dozen words, would add 20 years to the average of civilized life: keep away chilliness by exercise; cool off slowly. Then you will never take cold in-door or out!—*Hall's Journal of Health*.

BEEF-TEA.—Dr. Christian says that "every one will be struck with the readiness with which certain classes of patients will often take diluted meat-juice and beef-tea repeatedly, when they refuse all other kinds of food." This is particularly remarkable in "cases of gastric fever, in which," he says, "little or nothing else besides beef-tea or diluted meat-juice" has been taken for weeks or even months, "and yet a pint of beef-tea contains scarcely one-fourth of an ounce of anything but water." The result is so striking that he asks, "What is its mode of action? Not simply nutritive; one-fourth of an ounce of the most nutritive material cannot nearly replace the daily wear and tear of the tissues in any circumstances. Possibly," he says, "it belongs to a new denomination of remedies." It has been observed that a small quantity of beef-tea, added to other articles of nutrition, augments their power out of all proportion to the additional amount of solid matter. The reason why jelly should be in nutritious and beef-tea nutritious to the sick is a secret yet undiscovered, but it clearly shows that careful observation of the sick is the only clue to the best dietary.

COFFEE AS AN INVIGORATOR.—A correspondent of the London *Lancet*, who owns a water-power mill, says: "I am frequently compelled, at this season of the year, to have men working in water even in frosty weather. I find the following allowance gives great satisfaction to the men, and we never have a case of cold or injury to the men in any way: Kettle of coffee, made with half sweet milk, half water, three or four eggs, whipped, poured into it when off the boil; hot toasted bread with plenty of butter of finest quality. Serve up this every two and a half hours. The expense is much less than the usual allowance of whisky, and the men work far better, and if care is taken to have the coffee, milk (cream is still better), bread and butter, and especially the butter, of the very finest quality, the men are delighted with it. I am persuaded it would be worth while to try this allowance instead of grog. Giving extra grog gives the men a notion that it is good for them, and perpetuates the belief in stimulants among workmen."

WORTH KNOWING.—We are assured that one pound of green copperas, dissolved in one quart of water and poured down a water-closet, will effectually concentrate and destroy the foulest smells. On board ships and steamboats, about hotels and other public places, there is nothing so nice to purify the air. Simple green copperas, dissolved in anything under the bed, will render a hospital, or other place for the sick, free from unpleasant smells. In fish-markets, slaughter houses, sinks and wherever there are offensive gases, dissolve copperas and sprinkle it about, and in a few days the smell will pass away. If a cat, rat or mouse dies about the house and sends forth an offensive gas, place some dissolved copperas in an open vessel near the place where the nuisance is, and it will purify the atmosphere.

A BEAUTIFUL COMPLIMENT TO THE PHYSICIAN.

—I dare not place any gift, however beautiful, or any success, however brilliant, above the talent or the skill which can relieve a single pang, and the self-devotion which lays them at the feet of the humblest fellow creature.—*Oliver Wendell Holmes*.

MINING SCIENTIFIC PRESS

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ADDRESS all letters to the firm, and not to individual members, or others, who may at any time be absent.

Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, Feb. 24, 1877.

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DELAY OF CENTENNIAL AWARDS.—The *Herald's* Philadelphia special says: Although nearly five months have elapsed since the official announcement of awards to exhibitors at the Centennial exhibition, and over three months have passed since closing, not a single exhibitor has yet received either a diploma or a medal, and but very few have been favored even with reports from their exhibits. This causes general dissatisfaction, the fault being at the Centennial Commissioners' office, where the reports are delayed. In answer to the question when the reports upon exhibits would be ready, the inquirer was told they were all ready; but when, seeing a pile of them upon a table, he asked if the reports had all been sent out, he was answered, "oh we are holding them back to send diplomas with them." As to when the diplomas would be likely to be sent out, the Director General's Secretary stated that those awarded to foreign exhibitors had been transmitted, and they were going to begin on American diplomas in about a month. As to how long it would take to get through the business, he would not say.

The Southern Pacific railroad is now completed to a point 37 2-10 miles east of Indian Wells. The work has been pushed forward with great energy.

Premiums for the Mechanics' Fair.

As we have previously mentioned, the 12th industrial exhibition of the Mechanics' Institute will open to the public on Tuesday, August 7th, and continue from 10 A. M. to 10 P. M., for one month thereafter. The pavilion will be opened for the reception of goods from and after Monday, July 16th. The driving engine will be in operation one week previous to the opening and exhibitors of machinery in motion will be required to have their machines in running order on that day. No charge of any kind will be made to exhibitors for space. Steam and water will also be furnished free, in reasonable quantities.

The premium list has been issued by the officers of the exhibition. It is important to remember that all premiums will be for the first order of merit only. No second class awards or decisions will be made or reported in any case, unless otherwise specified in the premium list. No premiums will be awarded to sewing machines, in accordance with the request of agents. In the list of paintings, outside of the regular medals for certain classes of work, a prize of \$250 will be given for the best painting in oil by a local artist, and a similar prize for the largest and best display of paintings by any exhibitor.

By the means adopted, each article in the premium list must stand on its own merits. It will be understood that while one class may be considered inferior in merits to another class, yet the awards made will be for the best (as particularly specified) in that class to which the article receiving the award belongs. A copy of the award of the jury, certified to by the proper officers, will, in all cases, be given when demanded, for which no fee will be charged. The management state elaborate experimental tests will be made whenever practicable, and the results embodied in a formal report. In cases where cash constitutes the premium, as in the horticultural department for instance, the awards vary in accordance with the value of the exhibit, and the list already published may be elaborated if thought advisable by the Board. The managers do not consider the list already issued as complete, nor are those articles subject to premiums limited to those enumerated. One of these premium lists will be forwarded to any one desiring it, by addressing the Secretary of the exhibition, 27 Post street.

Water for Mining.

Although the rain which has fallen thus far this season has been plenty for the purposes of the farmers thus far, the fall of snow in many parts of the mountains of the State has been so light that the water in the mining ditches is already falling. In fact, unless we have a few more good storms next month, many mining camps will suffer. The rains thus far have been so warm that in place of leaving snow on the high mountains they have melted what there was there. Of course with no snow to keep the streams running the miners must stop work.

The miners naturally took advantage of what water there was running in the ditches during and after the storms, and they used it to the best advantage, too. The rains were so long delayed that the miners had plenty of time to get their claims in first-class order for work, so that when the water came they "turned it loose" with great effect.

The miners draw their supplies of water from high up in the mountains, where nature stores it up in reservoirs of snow. Long and expensive ditches bring it to the claims where it is to be used, and on the abundance of the supply depends almost entirely the result of the year's work for the gravel miner. Of course, if snow is scarce, water will be scarce also, so that the miner looks to the snow for financial salvation as the farmer looks to rain for his.

As we have stated, thus far the deposits of snow in the mountains are very light for this season of the year. Heavy snows from this out for the next month or more, will help the miners out. If they do not come, in a good many camps the prospects for a good season's work are poor, for a warm rain or two, or a few days' sunshine, will melt what little snow remains, and then the ditches will run dry. The gravel miners are anxiously awaiting for the next storm, and we hope it will not be long in coming.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Con. Virginia, 17th, 6 bars, value, \$19,636.42—February to date, \$167,076.79; California, 17th, 33 bars bullion, value, \$132,726.47—total to date, \$519,349.99; Washington, (Cal.), 561 ounces; Gila, 10th, \$2,341; Tybo Con., February 13th, \$15,319.09—total to date, \$23,837.13; Leopard, February 19th, \$5,200; Modoc, 18th, \$5,250—total to date, \$15,840; Manhattan, 20th, \$12,400.

The resident physician at the small-pox hospital reports to Mr. Gibbs, chairman of the hospital committee of the Board of Supervisors, that during the week ending last Saturday night 25 patients were received, four were discharged cured, and seven deaths occurred. The total number of patients under treatment was 67.

Comstock Papers.—No. 17.

The Big Mills of Washoe.—They Adhere to the Old Methods.

Notwithstanding the success of amalgamation by the pan or Washoe process had been fully established by the experimental trials made in the summer of 1860, as already related, such was the distrust of the new plan entertained by the Ophir, Gould & Curry and other of the leading companies on the Comstock, that they, acting under the advice of the old school of metallurgists, declined to adopt it in the extensive reduction works commenced by them in the fall of 1860 and finished the following year. Another reason for these companies sticking to the old and more expensive methods was the belief entertained by them that the great body of their ores was much richer than they afterwards proved to be; it having been supposed that an expense of \$40 or \$50 per ton for their reduction could well be borne, provided the work were so effectually done as to secure a very high percentage of the gold and silver they contained. How much these companies overrated the value of their ores at the start may be inferred from the fact that they offered, in the spring of 1860, to contract with Judge Walsh for the reduction of large quantities thereof at an average rate of \$75 per ton, it not being their intention then to work anything of less value than this. Acting under these misapprehensions these parties projected their reduction works on an extensive and costly scale, these establishments in the subdivision of their departments, the elaboration of the ores, and, in short, in both completeness and details, conforming largely to European models.

The Mill of the Ophir Company

Was put up in Washoe valley at a point 12 miles westerly from their mine, this site having been selected because of its proximity to wood and water and in the expectation that a railroad would soon be built between these two points. The buildings erected here covered an area of fully an acre, everything having been constructed on a grand scale. Besides the main edifice, an immense building was put up for the use of the patio process, which was here employed for a time on the poorer class of ores. Shops, stables, carriage houses, quarters for workmen, superintendent's residence, offices, etc., were all well built and capacious. The machinery, material and workmanship were also first class, the cost of the entire hacienda having amounted to over \$1,000,000. Besides the crushing mill, carrying 36 stamps, several furnaces for roasting or chloridizing the ores were provided, the Freiberg in connection with the patio process having been here practiced. Rows of huge barrels, used for amalgamating purposes and extending the whole length of the mill, were kept in ceaseless revolution. The services of 100 men were constantly required in the several departments, besides nearly as many more in cutting and hauling wood, making lumber, burning charcoal and other outside employments apart from those connected with the mines. A hundred tons of ore were worked here daily, independent of that disposed of by the patio method. In addition to the ground about their works the company owned 700 acres of grazing and agricultural lands lying in the valley near by and 9,000 acres of woodland on the adjacent mountains, where a saw-mill had been put up for cutting their own lumber. Over this grand establishment Captain William L. Dall exercised a general supervision, with Captain Henry A. Cheever for his assistant, both of these men having had a long and honorable service as commanders in our merchant marine.

The Ores Grow Poorer and the Works Cease to Run.

Thus situated, the owners of the richest section of the Comstock lode, and having within themselves everything requisite to work their ores to the best advantage, it was expected by everybody that the Ophir company was on the highway to sure and early fortune, and for a time their affairs really seemed prosperous enough. But their ores, which at first averaged about \$150 per ton, soon began to decline in value, leaving, under their expensive modes of manipulation, such a narrow margin for profit that they were obliged to supplant the same by the more cheap and simple but much derided Washoe pans, through the use of which they would no doubt have reached satisfactory results had not their works been located at such a great distance from their mine and had not the latter within a short time after this substitution been pretty well exhausted of its paying ores. As it was, this company, with all their bright prospects at the start, their valuable mine, extensive works and great facilities for ore reduction, achieved but a brief and moderate success; their expenses after two or three years having outgrown their income to such an extent that they found it expedient to close up their works, which, after their own ore supplies had failed, could not, owing to their remoteness, compete for custom work successfully with mills located nearer the mines.

The Final Collapse.

Having ceased operations and stood idle for a

time, the business of dismantling this vast establishment was at length commenced, some of the machinery and more valuable material being disposed of to one party and some to another, until its entire demolition was finally accomplished, the company having meantime disposed of most of their other property in the neighborhood. With the stoppage of the reduction works the considerable town built up around them was depopulated and speedily went to decay, scarcely a house being now left in the once flourishing city of Ophir to mark where it stood. The extinction of the town and of everything pertaining to it has been as utter as of the once promising industry which built it up.

The Gould & Curry Mill,

Which was commenced about the same time and finished a little later than the Ophir works, surpassed the latter not only in size and cost of construction but also in style and perfection of finish. Possessing a property of great supposed value, the owners of this mine, the most of whom were men of wealth and liberal notions, determined that they would put up an establishment commensurate with the magnitude and importance of their mine and which should out-rival anything of the kind ever before constructed in this or any other country, a purpose in which they were heartily and ably seconded by their general Superintendent, Charles L. Strong, also a man of large ideas, and by no means deficient in enterprise, energy and practical ability. With such a management, well supplied with money, the grand undertaking after being entered upon was pushed ahead rapidly, the site fixed for their structure having been a small flat at the junction of Six and Seven Mile canyons, two miles northeasterly of Virginia City. The spot was a rugged one, rocky and uneven, the cost of clearing away the ground and preparing for the foundation of the main building having amounted to more than had yet been expended upon any mill in the Territory. The massive walls laid for the reception of the main edifice, which was 250 feet long with wings 75 feet in length, all built of timber, were constructed of hewn stone, taken from a quarry near by, and dressed at great expense. The engine, of 150-horse power, a splendid piece of machinery, was built at the Pacific works, in San Francisco. There were eight batteries of five stamps each, capable of crushing 40 tons of ore per day. For generating steam to propel this engine, six furnaces, with three boilers, each 26 feet long and 42 inches in diameter, with 14-inch flues, were provided. In the various departments of this establishment, notwithstanding every labor-saving device then known in the business had been introduced, the services of 75 men were required, working in relays day and night, operations here never having been interrupted. With its terraced walls and numerous out-buildings, the place bore something the appearance of a fortified city.

And the End.

This company, like the Ophir, entertaining at first a great distrust of the Paul or pan process, employed at the outset the Tyler or Veatch plan of amalgamation, which involved the use of numerous deep tubs, the system being a mixture of the German, the patio and the pan process, which latter was after a time wholly adopted. The total cost of the Gould & Curry mill, all accessories and surroundings included, amounted to over \$1,250,000, a good deal of this expenditure having been of a kind that would, with our present experience in the business of ore reduction, be considered superfluous, and some of which was even at that time by many believed unnecessary. The history of this grand and costly establishment was so similar to that of the Ophir that we need not here rehearse it in detail. After a successful career extending through a few years, the current expenses began to drag heavily on the company and the mine itself giving out, brought operations at last to a stand-still, after which the work of disintegration began and proceeding at rapid pace, has left only the massive foundations of the great mill to attest where it stood.

MINES IN THE BASE RANGE.—The result of the present great mining trial is of peculiar interest to our citizens and readers, and of great importance to mine owners in this district. The Base range has been troubled and vexed with a multiplicity of theories bearing on the geology of the country and the deposition of mineral bearing veins, and outside capital has always been very timid in investing in limestone formations ever since the subsidence of the White Pine excitement; yet the rewards for continued explorations have been just as certain, and the returns equal in value, as any other mining section on the Pacific coast, not even excepting the Comstock. This has been peculiarly the case in the Eureka district, and the developments in depth have been of a character that has astonished the early doubters. Call them what you may—pipe, segregated, fissure, or contact veins, walls, or no walls—and the fact remains that at a depth of 1,000 feet ore is found as rich and valuable as at the croppings or surface, and with every indication of a permanent character at a lower depth. We do not propose to comment on either of the rival theories now being ventilated, for decisions of the courts will not alter geological formations, but to call attention to the immense ore bodies that do exist from the surface to an unknown depth, and we think we can predicate from that fact the continued prosperity of Eureka.—*Sentinel*.

Washington's Birthday.

As we write it is the eve of another anniversary of the birth of Washington. Time has brought us 145 years from his birth, and yet his name and memory stand where they have stood for a rounded century—first in the hearts of his countrymen. Later years have brought us newer heroes. Other names have been placed beside his in the country's roll of honor, but they do not detract from the glory of him whose patriotism and virtue they have emulated. Rather do they show us that his example has been of force with his people and that his life and work were not in vain.

Did the reader ever contemplate the advantage which we, as a people, have in the memory of Washington? Other nations have their heroes, but none so real, so genuine, so true as he. It has been the tendency of modern investigation to discover signs of unreality in the personages which many nations hold in high esteem. The Swiss have been well nigh robbed of their William Tell. He has been pronounced a myth. The tragic apple, which caught the winged shaft ere its fellow could seek the tyrant's heart, has been declared apocryphal. It has passed through the press of investigation and has run out in the cinder of distrust. Not so with Washington. He was a real and tangible man, for we have his clothes in the Patent Office at Washington. The demon of investigation has done its best to dull the edge of the hatchet which has cut its way down through a hundred and forty years of history and is as keen to-day as when it first scored the shins of the paternal tree. All honor to our Washington. All honor to the hatchet which cuts the fingers of those who would tear it from its place in the national heart.

The thought of Washington is a profitable theme for the American people to contemplate at this time. Never since his birth has his anniversary found his people in such a situation politically as now excites us. There have been trying times when war threatened and afterwards when its dire presence cursed the country. The situation to-day is different and, as we regard it, teaches us a lesson of thankfulness for our national holiday. What trying issues have come before the American people during the last two months! What opportunities for hot-headed counsels and hot-handed deeds. The whole political complexion of the country has been hanging upon the thread of doubt since the election day in November last. It has been impossible to tell which way the scale would turn. What other country in the world would have stood in dignified silence until the supreme law should dissolve the doubt? How many nations could have restrained the arm of tumult and turmoil during such a season of suspense? What people could have so nobly curbed the power of passion or prejudice until peaceful processes should declare the result?

It seems to us that the American people has reason to be proud of itself for this its latest achievement. It is a noble attribute to exhibit for the beginning of its second century of national life. It is a most promising surety of its future. It is such an offering as this which the country makes to commemorate a birthday of Washington. It is easy to believe that the calm earnestness and charity of purpose which have been shown in the national behavior during this our latest trial is a fitting reproduction of the spirit which led to victory under Washington. The times called for different manifestations but the spirit was the same. It was a spirit of belief in our institutions and of trust in the idea of popular government. It is true that factionists on either side have made angry threats, but they have found no answering approval in the national heart. That heart has been true and calm, approving the reign of law and order, content to abide such result as ordained methods shall set forth.

In the face of such an experience we rejoice again in the memory of Washington. We recall his quiet dignity, his unflinching patriotism, his unswerving devotion to the best good of the whole country. We honor him again for his lofty example. We look forward confidently to the unnumbered years during which his spirit shall still guide us, and we trust that in each of those years the American people may see in its growth, in its peaceful prosperity, in its noble and self-sacrificing love of country, some fresh evidence that the founder of the republic builded well. No better monument to Washington can be reared than that in which all of us can build a part, and that is the future of our beloved land.

NOVEL MINING CONTRIVANCE.—The Lyon County *Times* has the following: Mr. Wyman, who is placer mining in the gulch just east of town, has lately had in operation a new contrivance, so far our somewhat extended observation goes. The water and gravel from his sluices falls into a box, in which a horizontal shaft with projecting arms is made to revolve by a belt extending to a water-wheel a convenient distance away. The box is shaped to closely fit the revolving arms; is made watertight and serves to retain everything passing from the sluices until thoroughly washed, and also to catch all of value which escapes from the riffles above.

THE assessments of the mines of the coast for the month of February are 24 in number, as follows: Nevada, \$873,500; California, \$62,050; Arizona, \$15,000. Total amount, \$950,550.

Action of Air Currents.

The accompanying engravings illustrate in a comprehensive manner an interesting study into the wonders which are wrapped up in air currents. Often in our going about over the face of the earth we are struck with the peculiar behavior of the air currents when they meet obstructions, natural or artificial. Some points in their actions may be better understood after reading the following.

Visitors at the Centennial remember the wonder which they felt at seeing balls suspended in the air without any visible means of support.

The Phenomenon.

In exhibiting the Westinghouse air brake, in

in the direction shown by the arrow, but sometimes it remains stationary, owing to the fact that the center of gravity not coinciding with the geometrical center; for the same ball, once made to rotate by an external force, will continue the rotation with increased speed. The vertical inclination of the jet may be changed to about 45° before the ball loses its state of suspension and drops off.

A similar phenomenon, a ball dancing on top of the water jet of a fountain, is often seen, and will likewise remain sustained if the jet is more or less inclined.

The Explanation.

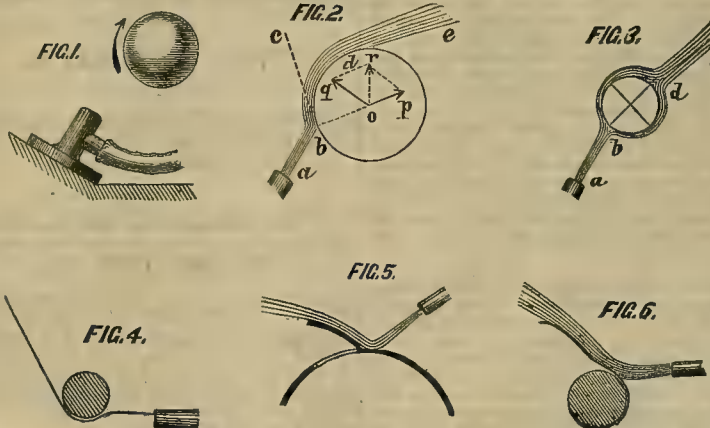
The investigation of the cause of this phenomenon was commenced by Mr. H. Bilgram with an examination of the course the air current takes in striking the ball. This investigation



LEVELING TARGET ADOPTED BY U. S. COAST SURVEY.

machinery hall, a receiver filled with compressed air, at about 70 pounds pressure to the square inch, is required. When the brake is not shown in operation the air of the receiver, being continually supplied by an air pump, is allowed to escape through a nozzle of about one-eighth-inch bore, set to a vertical inclination of about 30°. Over this jet of air is placed a ball

revealed the fact that the current $a\ b$ (Fig. 2), instead of leaving the ball in the line $b\ c$, as might be expected, follows the curvature of the ball along the line $b\ d$, and at length leaves the ball in the line $d\ e$. A light ball, when placed in the jet, is struck nearly centrally (see Fig. 3); the current envelops the whole ball and unites again, leaving the ball in the line $d\ e$, appearing



THE PHILOSOPHY OF AIR CURRENTS.

(see Fig. 1), which remains afloat in the air without any visible means of suspension. There are five balls; a solid glass ball of one and one-half inches diameter, two solid wooden balls of three inches and three and three-fourth inches diameter, and two hollow rubber balls of three inches and five inches diameter, each of which, when placed in the jet, will show this phenomenon. Even more curious it appears when two balls are suspended simultaneously; the current of air, after leaving the small glass ball, being sufficiently strong to give support to the largest of the rubber balls. The impression this experiment creates is very striking indeed. As a rule, the suspended ball rotates very rapidly.

as though the current was passing through the ball. It can, however, easily be found that the upper branch of the current is stronger than the lower one.

By a series of subsequent experiments, it was found that any current of air striking a convex surface has the tendency to follow that surface. One of these experiments is as follows: Attach to one end of a small tube, about one-eighth-inch to one-fourth-inch diameter, and four inches to six inches long (which may be made by rolling up a piece of writing paper), a piece of thread or yarn, about four inches to five inches long. Blow through the other end of this tube and direct the current against an ob-

ject with a convex surface. The thread, following the current, will indicate a deflection, as shown by Fig. 4.

After demonstrating this fact, the next step was to find its cause. It is well known that any current tends to carry along with it the surrounding particles of air; hence, the supposed current $b c$ (Fig. 2), being freely supplied with air from the left side only, will create a rarefaction of air in the angle $b d$. It is thus exposed to a one-sided pressure, and will therefore be deflected, as mentioned, and follow the curvature of the surface until it meets a counter current sufficiently strong to prevent a further rarefaction. If this view can be substantiated, it is plain that two external forces are acting upon the ball. One, the impact of the air-current at b , transmitted at right-angles to the surface, acts radially, and can be represented by the line $o p$. The other force, $o q$, is occasioned by the surplus pressure of the atmosphere on the lower side of the ball, over that of the rarefied zone under the curved current, and combined with $o p$ it forms the vertical resultant $\equiv r$, by which the weight of the ball is sustained.

Easy Experiments for Proofs.

The rarefaction of air under the deflecting current can be proved by the following experiments to the *Polytechnic Review*.

Cut a small hole, say one-half-inch square, in a card board, fasten over this hole a cover of the same material, by means of a strip of thin paper and mucilage, to form a valve, and bend both the card and the valve into a cylindrical form. If now a current of air is directed against the card, as shown in Fig. 5, the valve will open wide, showing the pressure under it to be greater than that above it.

Or take a strip of ordinary paper, about one inch to two inches wide, lay it over a cylindrical surface and blow against it in a nearly tangential direction. The end of the strip will then rise as shown in Fig. 6.

Quite a number of other experiments might be mentioned, showing the same facts.

The rotation of the ball is produced by the friction of the air-current passing over the ball, and is therefore a secondary result.

The phenomenon of deflection of a current when striking a convex surface can be brought to bear on geographical and meteorological facts. The Gulf stream follows the curved shore of the United States, for the identical reason that the ærial current follows the shape of a cylinder or a globe, and takes a course which otherwise it would not take. When a current of the higher strata of the atmosphere strikes the peak of a mountain it will be deflected, follow the sides of the mountain, and will sweep the valley.

New Leveling Target.

In the operation of spirit leveling in the work of the United States Coast Survey, and especially in the levelings made in connection with the observations for the determination of the co-efficient of refraction, several improvements have been made in the construction of the leveling rod, such as a slow-motion movement, means of correcting for temperature, etc.; but the ordinary target was retained, although imperfect.

Last season Professor George Davidson, of the United States Coast Survey, experimented upon ten forms of leveling targets proposed by observers. They were placed upon one rod, and the leveling instrument directed upon each successively at a given distance. This eliminated the weakest. At a specific distance, under tests, a larger number was laid aside; and at the third distance, of nearly four hundred yards, the target shown on this page alone remained clear, well defined, readily recognized and capable of affording the best results.

The long narrow line of white can be bisected by the horizontal thread of the level with the utmost precision; and, moreover, the least want of verticality of the rod is readily detected. On each side of the horizontal thread a clear line of white is exhibited and bisected with almost the same certainty that the graduation of a large theodolite is bisected by the two parallel threads of the microscope micrometer. The small white "lozenge" in the middle gives, at proper distances, a broader space over which the horizontal threads can be detected, while the broad vertical bands of white on the edges of the target serve a similar purpose when the horizontal thread is projected above or below the "lozenge."

In describing and showing the drawing of the target illustrated, at the last meeting of the California Academy of Sciences, Professor Davidson stated that, in the method of observing which he had adopted, extra precaution is used to avoid mistakes in reading off the vernier of the leveling staff. The rodman keeps a form of record, and when the observation has been made, he enters the reading therein. In going forward past the observer, the latter reads the staff, makes his entry, and then compares the records. When the observer moves forward with his instrument, he stops at the rodman's position, reads the staff, and compares his record with that of the rodman. In this way the probabilities of error in reading are reduced, and can be at once tested and corrected.

The target described is plain black and white, in the form shown on this page. The size is precisely similar to that used by Professor Davidson at four hundred yards. For greater distances, of course, a larger one could be used.

Our Lead Product.

The following interesting article on the lead product of the United States is copied from Edward A. Caswell's circular:

The Centennial year has passed away, and with it all its expected remunerative business and large profits; in place of which we have seen a somewhat limited sale of goods, shrinkage of values, unhealthy competition, and small entries on the profit side. The decline in gold of nearly ten per cent. has added to trials of importers and consumers, who purchased their raw material in coin, but at present writing, this variable, speculative and troublesome factor bids fair soon to disappear from merchants' calculations. With that point settled, the Presidential muddle cleared up, and confidence reassured, we may fairly hope for the long expected reaction in business, and the much talked of "better times."

Pig lead has, of course, sympathized with trade in general, except that its decline has been proportionally greater than that of other articles, owing to the fact that the price had been previously sustained by large capital in strong hands, so that to the normal fall was added the margin of factitious advance. Within ten weeks the actual currency decline was nearly \$20 per ton; at the same time base bullion only fell \$12 to \$15 per ton, showing pretty clearly that refiners must either have made very large profits previously, or else are now working nearly at cost. Every one familiar with the figures knows the latter supposition to be correct, and that bullion must decline or lead advance to afford a reasonable profit.

The United States product of 1876 exceeded that of 1875 by 3,967 tons and the supply of 1876 exceeded that of 1875 by 1,482 tons. Stocks throughout the country, January 1, 1877, were less by about 600 tons than in 1876, so that our consumption was apparently about 2,000 more last year than the year before, but it must be noted that about 4,300 tons of imported metal that figures in the supplies of 1876 were re-exported to Europe in the form of bullets, so that in reality the consumption fell off 2,000 tons, while with a fair demand and ordinary increase of trade, it should have been an increased consumption of six or eight thousand tons.

The year has been devoid of any peculiarly new features in lead, except that we have clearly shown our capacity for a domestic production, sufficient to render us entirely independent of any supply from foreign sources, and figures confirm the view that the supply must eventually be large enough to admit of exportation, for the mines thus far opened and worked, are so rich, added to the known and unopened rich deposits in Missouri and the Far West, that we may almost consider their capacity as illimitable; also the variety of sources is a guarantee of continuance which we would not have were we entirely dependent on two or three mammoth mines that might give out at any time. For although the superb Richmond and Telegraph mines together have turned out about one-sixth of the desilverized product, we can point to a dozen others that are scattered through Colorado, Utah, Montana, New Mexico and California, that also have work in sight for some years.

Utah at present far outstrips all other States in lead, has produced about three-fourths of the refined supply in 1876, and has even run ahead of Missouri, "by a large majority on a fair count." Missouri gave promise early in the year of yielding an enormous increase; but the output fell off toward the end of the year, and the total is but a few tons ahead of 1876. Galena on the contrary shows an increase of 25 per cent. Both Missouri and Galena are to-day unquestionably in far better position than ever before to increase production, having made judicious outlay of capital and introduced labor-saving appliances and more systematic methods of working.

In the Far West the lead interests are on a substantial footing and mainly in the hands of working men who know their business and use their own capital with that caution and judgment which did not characterize the policy of stock companies, having high salaried officers whose ignorance and reckless management ruined many good mines, and cast a shadow over mining investments, which are in reality as safe and remunerative as others.

The last year has shown the beginning of a competition between the argentiferous ores of the Far West and the virgin leads of Missouri, which will assume more serious character in the future. The Missouri ores are rich in lead, near the surface, and prepared at slight cost, convenient to lines of transportation and a market, and worked in such a manner as to incur no risk or loss to the owner, so that the production can only be checked when labor readily finds more remunerative employment in other occupations.

On the other hand, argentiferous ores carry less lead, are deep in the earth and must be extracted with greater risk at considerable outlay of capital, require an expensive treatment and pay high rates for transportation; but all these drawbacks are paid by the silver extracted, and render these ores dangerous competitors to Missouri.

The improvement in quality of leads used for corrosion has been very marked, and the desilverized brands have reached a standard that satisfies our most fastidious corrosors, and precludes further importation except at competition in price. Greater care and new methods in

smelting have improved the quality, and rendered more uniform the Cranby and several other brands of soft Missouri lead, and opened the way to an improvement in this respect which was greatly needed. It has also shown the Missouri smelters that the added cost of extra refining is more than covered by the enhanced price obtainable.

The Mendocino Gold Mines.

A reliable special correspondent gives the Sonoma Democrat the following: You have heard of the gold mines above Ukiah, near Calpella. Visiting them a few days ago I was astonished at the extent of the preparations to work them. The owners claim that in prospecting the gulch and surrounding hills that "the color" can be obtained almost anywhere; that the gold seems to be thoroughly distributed, and hence they conclude with the aid of hydraulic machinery they can be made to pay. Taking advantage of the living streams that form the headwaters of the Russian river, they are constructing an immense ditch seven miles in length. This ditch is to be five feet wide at the top, three at the bottom and two and a half feet deep. It has a fall of 12 inches to the mile. The entire length has been graded with the exception of a large tunnel near the lower end. It is a splendid piece of engineering. It winds around the hills, though rocky and rough, and at three points it plunges right through the hills. Two of the tunnels are short, but one of them is 600 feet long.

There are about 90 men at work, several miles of the ditch is completed and work on the remainder is progressing rapidly. When the water is brought in they will have a fall of from 50 to 100 feet—enough to tear the mountain from its base. The whole enterprise is in the hands of a company in San Francisco, who are furnishing the sinews of war. They have built a large hotel at Calpella, as if they expected the thing to last. Your correspondent traversed almost the entire length of the ditch with Mr. Holman, the Superintendent, as cicero. He was remarkably polite and communicative.

Just at noon we reached the upper camp and partook of a hearty dinner of boiled beans, beef and potatoes in regular miner style, eating off bare boards in a tin plate. The fare was excellent, especially with the sauce of appetite created by a walk of several miles. The work of constructing this ditch was commenced the first of last November, and the favorable winter has enabled them to push it forward with great rapidity. For one I never had much faith in gold mines in the Coast range, and should these prove productive I shall be surprised.

The Outlook in Eureka District.

The Sentinel says: The tendencies to an early and healthy revival of business are among the signs of the times to be noted among all classes in Eureka. There is no surer barometer of the prosperity of a community than the faces of the merchant and artisan, and all express themselves confidently as to the future outlook. An energetic and enterprising people, like ours, who have so long fretted at the general stagnation of trade, will be the first to take advantage of the favorable condition of the mining industries, and that there is a very perceptible change for the better, the most skeptical will acknowledge. Glancing over the field, we see all of the principal mines showing new developments and renewed activity. There is a certainty that more bullion will be produced during the next 12 months than in any previous year, and strong probability of there being a large addition to the working force. The rise of silver to its old standard operates greatly to our benefit, relieving the mines of an onerous discount on the precious yield. The districts in the eastern part of the State are in a healthy and flourishing condition, and Eureka participates in their general prosperity. The recent storm, though retarding hauling and coal delivery to some extent, will help the stock interests of the country and prevent the depletion or removal of herds to other points. Our agricultural interests do not figure very largely in our resources, but the recent acquisition of a portion of Pine valley swells it to quite a figure. We think we may safely prophesy that the coming season will be one of the most prosperous that this county has ever enjoyed.

THE LEACHING PROCESS.—From a gentleman connected with the Martin White company's mill the White Pine News gets the following report of the leaching process, now being experimented upon: "On the 1st of January steam was gotten up in the mill, and on the 10th the White furnace was fairly started; on the 14th the first ore pulp was put in the leaching barrels. Up to the 31st of January the results were: Ore average, \$26.40 (\$20 to \$40); chlorination, 47% (30% to 60%). The base metals not being chloridized are sent through in such a state that they are leached through with the silver, and so make exceedingly base bullion, of which only one or two pounds has been produced. As the leaching process depends entirely upon the furnace work, therefore no better results can be obtained until the roasting is bettered. Again, the attempts to manufacture the leaching liquors as yet are hardly perfected, and the mill is short of water. This latter defect is being remedied by bringing in one or two springs, and the assayer (Wagner) has lately succeeded in making the former. So the 20 days' run has been productive of some experience, and the ultimate success of the mill is almost certain."

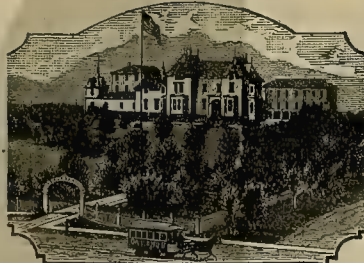
AN IMPORTANT DISCOVERY.—Some time since says the Eureka Sentinel, Professor Stewart said there was no coal to be found in eastern Nevada. In spite of this decision, the Pancake coal mine continues to be worked with good results, and gives great promise for the future. We have now an important discovery to record. John S. Jones and William R. Huse have been prospecting for some time on the Pancake range of mountains, and have now struck it at a point on the Sullivan road, one and one-half miles west of the Pancake coal company's mine. The vein is two feet wide and of a quality of coal known as "binding coal," considered the best. The vein was struck after sinking a depth of 72 feet, and running a drift for the distance of 20 feet. The bottom of the under lead is blue sandstone and the top slate. The vein pitches to the southeast, and seems to increase in width as it is developed. Messrs. Jones and Huse have been prospecting in that locality for about a year. The above vein was struck one year ago. They are now engaged in extending the drift along the course of the vein.

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Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOTT CUT and SLOTT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

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All classes of mining properties reported on, consultations had on reduction of ores of all descriptions, plans for furnaces and reduction works furnished, and the construction of them superintended. Ore tests made at the office.

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Established for the Manufacture of

RAILROAD AND OTHER IRON

—AND—

Every Variety of Shafting.

Embracing ALL SIZES of
Steamboat Shafts, Cranks, Piston and Con-
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Axles and Frames.

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ALL STYLES OF FANCY HEAD BOLTS.
HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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Repairing promptly attended to at the lowest possible terms.

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THIS ELEGANT HOTEL IS SITUATED ON THE MEDITERRANEAN AND AT THE ENTRANCE OF THE SUEZ CANAL, AND COMBINES WITH THE COMFORTS OF THE FIRST-CLASS HOTELS OF EUROPE THOSE OF THE ORIENT. IT IS RECOMMENDED TO THE TRAVELING PUBLIC ON ACCOUNT OF ITS VERY BEAUTIFUL AND HEALTHY SITUATION, AND MORE ESPECIALLY TO PERSONS OF DELICATE HEALTH, WHO ARE OBLIGED TO SEEK A SOUTHERLY AND MILD CLIMATE DURING THE WINTER MONTHS.

The Hotel contains Dining, Smoking and Billiard Rooms, Ladies' Drawing and Reading Rooms, the latter supplied with all the most important Papers, and possesses a Pretty Garden, with Fountain, which is protected against the rays of the Sun during Daytime and illuminated in the Evening, and offers to the Visitors of the Hotel an agreeable resort. All Public and Private Rooms command a view on the Sea, the Canal, and the Garden. Hot and Cold Baths in the Hotel.

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Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

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Light and Heavy Castings of Every Description Manufactured.

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The Only Illuminating Tile Manufactured for Lighting Cellars, Basements and Dark Rooms which provides proper ventilation for such places.

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STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 40-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

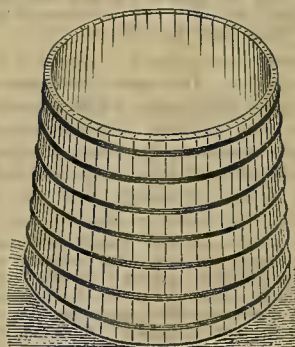
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Mechanics' Mills, Mission Street,

Bet. First and Fremont, San Francisco. Orders from the country promptly attended to. All kinds of Stair Material furnished to order. Wood and Ivory Turners. Billiard Balls and Ten Pins, Fancy Jewels and Balusters.

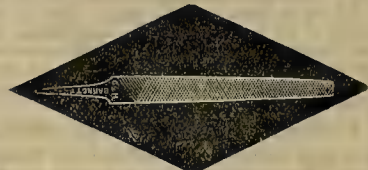


WATER TANKS of any capacity made entirely by machinery. Materials the best in use; construction not excelled. Pan Staves, Tubs and Oak Guides for mining purposes a specialty.

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G. & H. BARNETT,

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SEND FOR DESCRIPTIVE CIRCULAR AND PRICE LIST.

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Selling Agents for the Pacific States,
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CHLORIDIZING FURNACE

Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing by this Process:

Two cords of wood at \$6.....	\$12.00
Two firemen at \$4.....	8.00
1,500 lbs of salt at 14c.....	22.50
Wear of shoes and power.....	1.50

Cost for 15 tons.....\$44.00
Cost for one ton.....2.93

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Consolidated Co.'s mines, in the Peavine District. For further information, apply to

D. J. O'HARRA,
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Is Extensively Used in the East and

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Wherever introduced, because it can be run with less power, labor and repairs, and do more work than any other Drill in the market. It has but few parts, is easily handled, being light, and has AUTOMATIC FEED, which saves labor. WE ASK FOR TRIAL AGAINST ANY COMPETITOR. For particular information regarding Drills or Air Compressors, send for circular to

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The Great Western Scroll Saw Co.'s new and improved \$5.00 Foot and Steam Power Scroll and Bracket Saw is the best one yet invented. With it men and boys are making from \$3 to \$10 per day. We will send you a Machine, six Saws, 15 Patterns and two feet of prepared wood, on receipt of \$5. Address,

GREAT WESTERN SCROLL SAW CO.,
Leavenworth, Kansas.

\$55 to \$77 a Week to Agents. \$10 Outfit Free. P. O. VICKERY, Augusta, Maine.

Continued from page 117.

ELY DISTRICT.

ALPS MILL.—Pioche Record, Feb. 10: The Alps mill started up on Sunday last and has been running steadily on custom ore during the week, although there is quite a lot of ore on the platform from the Alps mine. There is a quantity of chlorides ore there awaiting milling, and several lots from Leeds, Utah. While we were at the mill on Friday we witnessed the casting of a couple of bars of bullion, valued at about \$2,300.

FOR EL DORADO CANYON.—Several members of the company in Pennsylvania, who purchased mines down in El Dorado canyon, in the southern part of Lincoln county, and who have been stopping in Pioche for the past eight weeks, left town yesterday for that section. We soon expect to hear a good account from that portion of the country, for it has been a well-known fact for the last two years that there are some very promising mines at El Dorado.

Arizona.

PROSPECTING.—Arizona Miner, Feb. 9: A. W. Callen has recently been prospecting through the mountains and had the good luck to drop on a lead, which, from its magnitude, richness, etc., he has named the Giant silver mine. It is in the Peck district, where there are already some of the best paying mines in Arizona, and those that have been prospecting to that extent so as to leave not the least doubt as to their permanency, and Mr. Callen has, no doubt, just as good a discovery as any in the district.

T. M. ALEXANDER, one of the owners in the famous Peck mine, arrived from Alexandria yesterday and he reports everything at the mine as looking better than ever before.

THE TOP.—D. C. Thorne has shown us a certificate of a pulp assay of 13 tons of ore from the Tip Top mine in Humboldt district, near Black canyon. The assay is by Blake, and shows \$678.62 per ton in silver and \$11.30 in gold.

LUKE'S MILL.—C. A. Luke has purchased the Constanca mill, near Ehrenberg, which is rigged as a first-class 10-stamp gold mill, the finest perhaps that ever came to Arizona. It was bought by Dr. W. W. Jones, in 1870, to work the Constanca mine, and put up one mile from Tyson's Wells. The mill originally cost \$45,000. Mr. Luke has also purchased in San Francisco, pans, settlers, etc., to convert it into a complete silver mill, and will move the whole thing into Bradshaw basin, where it will be set up and put to work on ore from the mine of Luke & Co.

THE SILVER PRINCE.—D. K. Houghtelin this morning showed us the plat and field notes of the Silver Prince mine, as surveyed by E. D. Thomas, Deputy U. S. Mineral Surveyor. The entire claim contains 10,977,1000 acres, having been located about 50 feet short of the 1,500 feet. Houghtelin & Curtin have recently taken out considerable ore from a ten-inch pay streak where they originally found the extraordinarily rich ore. They are ascertaining what is now coming out into two classes, and a day or two ago sampled up the dumps and found their first-class worth by average assay, \$2,500 per ton, and the second-class something over \$800. Meyers & Henderson, who have a lease on a portion of the claim, have out about a ton of \$1,400 ore.

Idaho.

SOUTH MOUNTAIN.—Idaho Avalanche, Feb. 17: A new pump has been ordered wherewith to carry on operations in the Bay State mine. The old pump was insufficient for keeping the water out, and operations have consequently been suspended until the arrival of the new pump. The miners have been paid off up to the first of February. This will enable them to settle a portion of their indebtedness and make a fresh start.

GOLDEN CHARIOT.—At the Golden Chariot operations are being vigorously prosecuted and everything wears a very hopeful look. A large quantity of high grade ore has recently been taken out from the stopes, and from every section of the mine the indications are very promising. The winze between the 6th and 7th levels is down 28 feet, and the developments all the way through are of the most promising character. Some rock has recently been encountered which assays \$300 to the ton in silver, and all the indications here point to the existence of a very valuable ore body in the immediate vicinity. The prospects of the Chariot were never better at any previous stage of development.

FLINT DISTRICT.—We understand that parties in San Francisco are making an effort to revive work in the Flint district the coming season. Fred. Warnke is reported to be taking an active interest in the matter. Flint was a lively camp once, and even a man who invested money there profited by the operation. None of the rock was extravagantly rich, but it always paid well, and the mines of that section are just as good now as they ever were. There is still abundant machinery in the old camp for crushing the rock and practical men who are intimately acquainted with the mines there have no hesitation in saying that there is not a more promising spot in the country.

WAGONTOWN MINES.—The prospects of the Wagontown camp continue to be regarded as very favorable, the best evidence of which is found in the desire displayed by many to become interested in the leading mines of that camp. Only a small amount of work has been done on the Henrietta the past few months, but the rock taken out reveals marvelous richness, comprising in many instances chunks of almost solid metal. A quantity of rock recently taken from the Lepley mine was sold for \$300 a ton on the dump. Favorable reports also come from many other mines. The Jones & Adams mill has recently been crushing rock from the St. Clair, Webfoot and Stoddard, and in each instance we understand with satisfactory results.

Work is progressing on the main shaft at the Belle Peck, where the ledge continues to improve as the work of development progresses. The Potosi is looking fine and there is a large quantity of rich rock on the dump awaiting crushing.

Utah.

LITTLE COTTONWOOD.—Salt Lake Tribune, Feb. 15: For some months past Walker Bros. have been, in part, working the Antelope and Prince of Wales mines, in Little Cottonwood, by what they call the tribute system. That is, they allow the miner a certain per cent. of the ore he takes out, and have their own superintendent supervise the work, so that the developments made shall be of a substantial character. A quantity of rock recently taken to the owners and the workman, as both find it to their mutual interest. Since the system has been in vogue it is said the miners have averaged \$5 a day each, and the prospects are it will become a popular method of working mines of high-grade ore in narrow veins. Ore is being shipped out of Little Cottonwood at the rate of 127 tons daily, with a prospect for a speedy increase the coming season. On Ensign, all there is hardly enough to make good sleighing, there being only about three feet on the level. The road in many places has to be repaired by filling it in with snow, so as to render it passable for sleighs. The present winter in Little Cottonwood has been the lightest ever known there, and the weather has been continuously delightful. An exceptionally early spring is anticipated, and heretofore the great body of snow has fallen before the 1st of January. The camp is lively, and flush times the coming season are universally expected.

The Central Pacific Railroad Company has recently purchased the marsh land extending from the south line of Bay View homestead to the San Antonio estuary, on the other side of the bay. It is surmised that this purchase, which adjoins the railroad company's 60 acres of upland at Oakland Point, is intended to be the site of a portion of the railroad workshops and also a rolling mill.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING FEBRUARY 13TH, 1877.

EARTH AUGERS.—George Watson, Oakland, Cal.
SHEEP SHEARS.—William George, Modesto, Cal.
HARVESTERS.—Edward D. Stewart, Wheatland, Cal.
FRUIT DRIERS.—Russell B. Blowers, Woodland, Cal.
UNDERGARMENTS.—Coelia C. Curtis, S. F.
SHACKLES.—Henry William Dilg, Portland, Ogn.
COMPENSATING CRANKS.—Robert D. Milne, Santa Barbara, Cal.

MITER MACHINES.—John P. Tierney, Sacramento, Cal.

TRADE-MARKS.

BORAX.—Smith Brothers, S. F. and New York, N. Y.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

FRUIT DRIER.—R. B. Blowers, Woodland, Yolo county. This fruit drier is more especially valuable as an assistant in curing raisins which have been partially dried in the open air, but have not been completed because of bad weather. It is adapted, however, to all classes of fruit. It consists of a series of rooms provided with cleats to receive sliding trays, which are especially arranged to cause the currents of hot air to pass over them in a peculiar manner from above. These rooms are arranged on each side of the central heating apparatus, and are provided with transom doors by which the heat is admitted or cut off, as may be desired. The hot air, after doing its work, escapes through openings in the bottoms of the chambers into parallel flues which open into a central chimney of sufficient height to produce a proper draft. Each drying chamber is provided with doors opening outwards and any number of them may be used or cut off at will by simply closing the hot-air gates. In curing grapes for raisins it is well known that the best product is obtained by open air or sun drying, and this can only be accomplished in climates which are rendered very dry by reason of long, rainless seasons such as occur in California and some other parts of the United States. A great difficulty is however encountered from the fact that the season when the grapes are in proper condition to be cured is so near the border of the rainy season that the half-cured fruit is often caught by the early rains; and, although it may be covered and protected from the direct injury of wet, yet the atmosphere never becomes dry enough again to complete the curing of the raisins. This sun drying is therefore supplemented by the addition of artificial heat, and it is necessary at the same time that the fruit should be handled as little as possible from the time it is picked until packed in boxes. To effect this the inventor has devised this peculiar style of drier.

"COMPENSATING CRANK."—Robert D. Milne, Santa Barbara. The object of this invention is to provide a novel method for the conversion of reciprocating rectilinear motion into rotary motion by a mechanism, by means of which the inequality of crank power is equalized and balanced in such a manner that the direct pressure of a piston or other motor is transferred to the crank with greater uniformity of action than in the case of an ordinary crank. The mathematical principle of the invention consists in producing a series of changes in the line of direct propulsion, as it affects the crank, so that the point of impact or force approaches or recedes from the center of the crank during its revolution; this point of impact being furthest from the center of the crank at the beginning and end of stroke and nearest at the middle of the stroke. The invention is also designed to utilize the independent motion of the connecting-rod thus acquired, by bringing it to bear upon the crank at such angular inclination as to be equivalent to direct propulsion in a line varying from the line of force inversely as the angle which the connecting-rod makes with the crank varies from a right angle. The novel points of the invention are the applications of the mathematical principle defined above to the matter of crank motion, and also the mechanical means which are employed to accomplish that end.

UNDERGARMENT.—Coelia C. Curtis, Oakland. This is an improved undergarment for female wear. The invention relates to a mode of cutting and forming that class of undergarments for female wear, in which the waist and drawers form a single garment. It consists in forming the entire garment, with the exception of the sleeves and back of the waist, in two pieces or parts, each of which pieces or parts form one

leg and one side of the waist front, thus economizing in material and labor. The back of the waist is cut on which is known as a "sacque style," so that it will fit the person more comfortably and snugly. This provides a complete and convenient garment which is cut in the most economical style and without waste.

MITERING MACHINE.—John P. Tierney, Sacramento. This invention relates to certain improvements in mitering machines, these improvements being more especially adapted to a machine for which letters patent were granted to the same inventor in August, 1873. It would be impossible to give an intelligible description of this invention without the aid of engravings.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening last, President Davidson in the chair.

The following donations to the cabinet were received: From Professor Davidson, specimens of earth showing the cell-work of the white ant of India, collected in April, 1875; *Coleoptera* from the tomb of Sokwra, Memphis, Japan and Sierra Nevada mountains.

From Henry Edwards, *Chirus pictus* from San Francisco market; and from W. Murray, batrachians, locality San Francisco.

From Colonel Gray, Chief Engineer of the Southern Pacific railroad, fresh-water bivalve, fossil and marine shells from the Colorado desert; presented with some remarks by that gentleman, who stated that they were found at a point about 250 feet below the level of the sea. This was another evidence of that desert having once been an arm of the main.

From Eugene Gillespie, United States Consul at San Jose del Cabo, Lower California, specimens of seeds and flowers. It was stated, in connection with this donation, that arrangements would be made by which the Academy would receive a number of interesting plants from Mr. Gillespie.

Mr. F. T. Newbery presented the following, received from Mr. Cheeseman, Curator of the Public Museum at Auckland, New Zealand: Four specimens of vegetable caterpillar; a fungus (*Cordyceps Robertsii*), parasitic on the larva of the moth *Hepialus Vireceus*; eight portions of the eggs of the gigantic moa bird, and four boulders used by that bird in assisting its digestive function; three stone adzes; four specimens of siliceous deposits of maize cob, with siliceous incrustations, from Rotamahana; specimens of New Zealand flax, both hand and machine dressed, and cloth manufactured from that flax, together with specimens of ramie fiber.

Mr. Newbery called the attention of the Academy to a collection of moa bones in the possession of the Curator at Auckland, and suggested that the Academy communicate with the owner as to the terms of their disposition. He also read a paper on the

Vegetable Caterpillar.

Which he found while surveying in New Zealand. It is a fungus, found standing at the height of three or four inches above the level of the ground, and a good specimen was procured by digging. It was found in a vertical position, with the head uppermost. In the fresh specimen, the marking of the ordinary structural appearance of the living creature was beautifully apparent. The stock was round, with a curious furry ornamental top, more or less developed. The interior of the stock was white, in fiber like the crust of a cocoon. These evidences indicated that at some time the creature belonged to the animal kingdom, and that theory was countenanced by authorities. If this point should be conceded, it would be a curious matter for speculation and investigation as to how this larva, whilst in the course of nature, and buried three inches beneath the surface of the earth, was seized by a parasitic plant, changing its nature, causing it to become a vegetable organism in its entirety, without undergoing any ordinary process of disintegration or dissolution.

Tattooing.

Mr. Newbery also presented some photographs of New Zealanders, illustrating the effects of their tattooing, and described the process. It is done with a chisel and mallet, and is a slow and tedious operation, requiring several days. It is extremely painful, the most sensitive parts being the temples and eyelids. Women are suffered to tattoo the lips and chin only, but the men are not restricted. One side of the face always corresponds with the other, no matter how intricate or elaborate the design. The curves and lines are very graceful. The chiseling sometimes extends over the whole surface of the body. Of late years the process of tattooing has been neglected, on account of the natives' increasing appreciation of European manners and customs.

Professor Davidson read a continuation of his series of papers on irrigation in India, Egypt and Italy.

He also described a new leveling target used by the Coast Survey, which is more fully referred to in another column of this issue.

A CORRESPONDENT of the Western Associated Press at Calcutta says: The Viceroy's official dispatch of February 16th states that the famine in North Ancol is much worse than supposed, and there is great distress in Mysore.

[Copyrighted.]

Mechanical Ore Concentration and Separation—No. 23.

[Written for the Press by FRANCIS M. F. CAZIN, M. E. Santa Fe, New Mexico.]

Before entering on the description of the operation of separating slimes into the different materials by quality, I should here again draw the attention of the reader to the fact that, although in all cases where the presence of a difference in specific gravity makes such mechanical separation applicable, such separation forms the most economical mode of operation with all classes of ores preparatory to reduction.

It therefore is not true that mechanical separation is economical and profitable in all its stages. It is the most economical mode of treatment, as above stated, as long as the sizes of grains and sands form the object of separation; but when slimes are the object, it deserves a close examination to ascertain whether a direct (chemical) reduction may not be the better mode of operating. This is because slimes are of such a degree of minuteness as to require some of the reductive operations, as, for instance, roasting, leaching, or amalgamation. It should be mentioned here that the mill practice of California and Nevada has contributed largely to locating the limit where the milling of slimes is more profitable than dressing far ahead of a place where European practice would stand in favor of mechanical separation; and this is a decided progress attained by the ingenuity of American mill-men.

But the fact is, that American practice is to treat as slimes what might, for one-half or one-quarter of the expense, be treated as grains or sands. This persistence in treating ores as slimes results in obtaining a lower percentage of valuable parts than might be obtained otherwise. This American practice is indeed almost a public calamity, because it results in large losses of valuable mineral, which would otherwise benefit not only the owners of large and important mines, but the world at large.

This will in time be obviated by the continual desire of enlarging the capacity of the existing works, when it will be found that with the present mill capacity, two, three or four times the product can be worked in preparing the ore for the mills by concentrating the waste rock out of the grain and sand sizes, and letting the mills work all the slimes resulting in dressing the total mechanically, but made richer by stamping only the concentrated grains and sand without the waste rock; which rock may be so easily dispensed with without material loss, and at comparatively much lower cost in dressing grain and sand sizes.

The operating on a good jig on grain and sand sizes results, not only in clean concentrated ore and in waste rock. A good jig should and does also save, as a separate product, such particles of rock to which a particle of metallic ore still adheres. The specific gravity is by such a particle influenced sufficiently to permit a hesitancy of motion in comparison with clean rock particles; and such hesitancy is sufficient to let them be saved. It is a great mistake usual in practice to refeed these particles of mixed constitution to the jig-sieves. They should be invariably delivered to the stamps or pulverizers, so as to break their particles into the different qualities. Thereafter they may be treated with success as slimes, as well where these slimes are subjected to further mechanical separation, as where they form the material for direct reduction.

MONTANA MINES.—The Butte Miner has the following Phillipsburg items: The Northwest company's mill has been shut down and the hands which have had employment there have been discharged. The reason for stopping these works is said to be from the want of ore, the capacity of the mill being much greater than the supply of ore that can be taken from the mine until further development is made and another shaft sunk in order to bring the ore to the surface, there being at present only one outlet for the ore. The Hope mill still runs quite successfully. There is plenty of ore on hand and more in sight and the yield from the ore has been very satisfactory. The Algonquin mine, which lately has passed into the hands of Eastern capitalists, is being developed by a force of 15 men. A tunnel has been run into the side of the hill which strikes the lead at a depth of 80 feet below the surface, and from this point levels have been run each way to a distance of about 60 feet, where sinking upon the lead has been commenced. The lead as far as developed shows very favorably. The width of vein matter at places is quite large but the average is probably a little over six feet. The ore is argenteous galena carrying a high per cent. in silver. Both walls are met with and are well defined. The mine has been well timbered throughout and is in a most excellent condition for future operations.

RUSSIA has 600,000 men, or two-fifths of her army, organized. About half are on the frontier, ready to begin operations. The Russian army south of the Caucasus, on the Asiatic frontier of Turkey, is in readiness for action. It numbers 115,000 men, with 35 field batteries and 250 heavy siege guns.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

Testing Roasted Silver Ore.

(Written for the SCIENTIFIC PRESS by C. H. AARON.)

The usual way of testing the percentage of silver chloride in roasted ore is by lixiviation with a cold solution of sodium hyposulphite. I have long suspected that this test was not altogether reliable, and some experiments which I have made seem to sustain the suspicion. These experiments were as follows:

1. Roasted ore containing silver to the amount per ton of \$65.00
 - A. Leached with ammonia, retained, per ton 13.20
 - B. Leached with solution of sodium hyposulphite, retained, per ton 5.20
2. Roasted ore, containing, per ton 60.00
 - A. Leached with ammonia (after digestion for several hours in warm ammonia), retained, per ton 15.00
 - B. Leached with sodium hyposulphite, retained, per ton 3.50

3. Sample of tailings containing silver to the value per ton of 9.00
 - A. Washed on filter with cold water. Filtrate contained Cl, but gave no metallic precipitate with solution KS.
 - B. Washed with hot water. Filtrate contained neither Cl nor heavy metal.
 - C. Washed with cold solution of sodium hyposulphite. Filtrate treated with KS gave a copious brown precipitate containing Ag, Pb, As, Fe, etc.
 - D. Excess of KS was added to filtrate C and to prevent resolution of As, a little Fe SO₄ also (in slight excess), then HNO₃ to decompose the sodium hyposulphite. A white precipitate was slowly formed, which on boiling became yellow (sulphur).
 - E. Precipitate from D removed by filtration and filtrate treated with an acid solution of Ag NO₃ gave no precipitate.

The inference is that the metal salts contained in the tailings, and dissolved by means of sodium hyposulphite, were not chlorides.

4. Sample of tailings, containing silver, per ton \$4.00
 - A. Washed on filter with hot water. Filtrate tested with barium nitrate showed SO₃; washing continued till no more SO₃ was found.
 - B. Washing repeated with hot solution of Na Cl (free from SO₃). A portion of the filtrate tested with KS gave a metallic precipitate; the remainder, tested with barium nitrate, showed SO₃ strongly.

The inference is that the metal salts extracted by Na Cl were sulphates, and as the silver is extracted by hot brine about as perfectly as by sodium hyposulphite, it seems probable that these metals exist as a multiple sulphate, otherwise the silver sulphate would have been extracted by hot water alone. The tailings gave no appreciable Ag Cl by treatment with ammonia. The metals extracted by hot brine are very slowly reduced by metallic iron, so that a good result is obtained from ore in this state, in pans, only by long continued working, and a base bullion is obtained, while the addition of lime to the pulp, intended to produce finer bullion, entirely prevents the reduction, causing richer tailings; whilst with silver chloride even a great excess of lime does not impede reduction nor prevent amalgamation, though the latter is somewhat impeded. By longer roasting of the ore the formation of silver chloride was improved.

An Elevated Railway for San Francisco.

San Francisco is to have an elevated prismoidal railway shortly; at least the preliminary steps have been taken in that direction. At a meeting of the Board of Supervisors on Monday an order was presented to grant a franchise to J. S. Kohn and his associates to construct, maintain and operate a prismoidal railroad on Market street and such cross streets as may give a continuous line to the ocean beach by way of the Golden Gate park, and thence southerly to the city and county line. The order defines the route as follows:

Commencing at the ferry landing on Market street and thence running along the southerly line of Market to Valencia, at a height of not more than 14 feet above the curb line, and thence in a westerly direction to and along and over such streets as are or may be opened to the entrance of Golden Gate park, being on and along and across on the south side of the entrance to the park on Baker street; thence along and near the south line of the Golden Gate park in a westerly direction to the ocean beach, and thence along said beach to the city and county line, with a branch road commencing at or near Fifth avenue, and thence by way of the Laguna Honda to the Laguna de la Merced, over the most feasible route, and thence easterly to the intersection of the line crossing in a southerly direction and along the ocean beach, and thence in a southerly direction to the southern boundary line of the city and county. Also, commencing at a point on the southern boundary line of the city and county of San Francisco, at or near San Miguel station, and running in a northerly direction along such lines and lands and on such streets as may hereafter be established, by any grade hereafter adopted, to the westerly line of Valencia street, and thence along said line of Valencia street to its intersection with the southerly line of Market street.

Section 4 prescribes that the road on Market street shall be built on elevated posts and pil-

lars of not more than 12 feet span, so that the prism or chord shall not be less than 14 feet above the top of the curbing, except at such places as the Board of Supervisors may give permission to build lower. The posts or pillars shall be securely imbedded in the curbing of the sidewalks.

The company proposes to propel trains by steam or compressed air engines, all locomotives to be supplied with spark-arresters and not to blow off steam-whistles in the built-up portion of the city.

The order prescribes the rates of fare as follows: From each passenger to and from any point between the eastern terminus and Scott street, five cents; between Scott street and Fifth avenue, on the south side of Golden Gate park, five cents; to and from any point between Fifth avenue and the ocean beach, 10 cents, and along the ocean beach to or from the county line, and on the branch road to and along the beach, 20 cents. From the county line to the westerly line of Valencia street, 10 cents; thence along Valencia street to the intersection of Market and Valencia streets, five cents.

The order gives the company the right to construct the railway over and across the sidewalks whenever necessary to run their engines and cars into and out of the depots.

Section 9 provides that the privileges and franchises shall continue for 25 years, to date from the completion of the railway, provided that two miles of said railway shall be completed within one year from the passage of the order, and the entire "line" be completed within five years from the passage of the order. The order was referred to the Street Committee.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

The average assay of car samples of ore from the Chollar is \$26 per ton. They are making three feet a day in sinking the South Comstock shaft.

The water in the Savage keeps the pumps busy to simply keep even with it. The news from the Golden Chariot (Idaho) is still encouraging. The bunches of ore encountered assay very well.

The mill at the Grand Prize started up Monday, and is running well.

Letter of the 17th, from the Eureka Consolidated, says: Since last report, the developments in the mine are of a very satisfactory nature, and no fear is entertained but what a steady improvement will follow as the work proceeds. During the week, the explorations made on 9th level, in connection with those made in other portions of the ground, will firmly establish the reputation of the mine and make it one of the most valuable in the district.

Both furnaces and mill of the Tybo are running steadily.

Connection between the Savage and Hale & Norcross mines has been made by the 1900-foot drift.

The south cross-cut in the Overman shows the quartz on the 1200-foot level to be 46 feet wide near the Caledonia line.

The last clean-up of the Eureka (G. V.) mine was 210 ounces of amalgam.

The north upraise—600 feet—of the Justice is now developing a well-defined body of ore, containing rich black sulphurets.

The water is all out of the main incline of the Indian Queen, and a part re-timbered. The incline was caved in several places.

The Manhattan mill reduced, last week, 141 tons of ore, valued at \$26,213.

The miners in the Exchequer mine, Alpine county, are on a strike. Cause—difficulty with the manager.

The Eureka Sentinel of the 18th says: "The decision of Judge Cole, in the late mining suit, by no means terminated the proceedings on injunction, as many thought. The case will be brought up again this week with the Richmond mining company of Nevada et al., as defendants."

THE ISTHMIUS CANAL.—The latest rumors concerning the isthmus canal are not favorable to its speedy construction. It has been reported that the government of Nicaragua has given a franchise to Harry Meigs, the railway builder, and that he has gained it merely to cut off the enterprise from other hands and not to accomplish the work himself. Another report denying the foregoing, states that the government of Nicaragua is determined to make the canal a source of profit for all time and will levy such restrictive taxes upon it that no one will undertake the project. If Nicaragua adopts any such policy as that it will be standing directly in her own light so far as success and development are concerned. It is to be regretted that a little sunshine country on the isthmus should so conduct itself as to stand in the way of a work which will be of advantage to all the world. We are not lawyers, but we cannot see why some sort of an international congress could not condemn the route and then lay it open for public benefit. But the matter is not settled yet. We only give the prevailing rumors.

THE damage by fire to the St. Louis bridge across the Mississippi will not exceed \$50,000.

General News Items.

MR. WORTMOUGH, Pay Inspector in the Navy, is appointed Paymaster General.

A HEAVY storm has prevailed for several days at the mouth of the Columbia river.

A BOARDING house for women only is about to be opened in this city. It is intended especially for the accommodation of girls who are sent in from the country to attend school.

THE rinderpest has appeared at Hull, England. It cannot be traced to contact with infected cattle. The strongest measures are being taken to prevent an outbreak.

THE Health Officer is prosecuting people for misdemeanor who do not report small-pox cases. Several aggravated instances of concealment have transpired within a week.

FIVE car-loads of machinery from Cincinnati have been received in this city and will be sent to Melbourne by next steamer for exhibition at the international exhibition in Australia.

OUR export trade during the first 15 days of the current month amounted to \$1,932,700, of which \$1,781,400 was in wheat. For the corresponding period in 1876 the total was only \$1,037,500.

THE Board of State Prison Commissioners on Saturday accepted the boilers, engines and shafting in the new workshop of the prison. All the bills presented were ordered paid, leaving a balance of \$50,000 out of the \$200,000 originally appropriated by the Legislature. This money will be used in building additional cells in the prison.

JUDGE DWINELLE, of the Fifteenth District Court, filed an opinion on Monday adverse to the city in the suit brought against it by the Spring Valley Water Works. The suit relates to the payment of a contested bill of \$92,000, which Auditor Ashbury refused to audit. The council for the city and county will at once appeal the case to the Supreme Court.

Wonder Quicksilver Mines.

During the past year, the Consolidated quicksilver mining company have expended about \$3,400 in the working and prospecting of the mine. About 150 feet of tunneling penetrates the hill, and cuts through a portion of the ledge beneath the Queen Victoria croppings. Another tunnel, 150 feet long, is run into the Doctor's Wonder, through streaks of cinnabar. A shaft is sunk 50 feet on the Queen Victoria ledge. There is a kiln of 40,000 brick, owned by the company and deposited near the claim, to be used in the construction of a furnace, as soon as the cash payments due for pool stock are in the treasury.

The \$3,400 already disbursed was raised by the sale of shares and by assessment No. 1. The following statement represents the present financial condition of the company: Cash on hand, \$452.56; balance due for pool stock sold, \$1,358.42; total, \$1,810.98; less present indebtedness for merchandise and labor, \$603.02; balance in favor of company, \$1,207.96.

The prospects of the mine are encouraging to the stockholders. The present foreman is an expert at the work assigned him, and he is performing his duty well. The croppings on the west wall of the Victoria ledge are rich in cinnabar and antimony, and it is presumed the tunnels will strike bonanzas when they reach the ledges. The work on the shaft is at present stopped on account of water. We look for this mine to be well developed the present year, and trust all the stockholders will grow rich enough out of it to snap their fingers with indifference to the probable effects of the dry season.—*San Benito Advance*.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

MURCHIE G. & S. M. Co.—February 16th. Location: Nevada county. Capital stock, \$1,000,000. Trustees: Andrew Murchie, Robt. M. Fryer, S. F. Murchie, W. H. Smith, A. H. Eddy, F. H. Wells, W. H. Murchie, Robt. L. Tracy, F. Madge and E. G. Frend and J. B. Meeks.

SAN JOAQUIN AND SAN FRANCISCO WATER WORKS Co.—Feb. 16th. Object: To supply the city of San Francisco and other cities. Capital stock, \$20,000,000. Directors: H. B. Tichenor, Wm. T. Coleman, John O. Earl, Wm. B. Hyde, H. D. Bacon. This corporation will endeavor to sell certain privileges to San Francisco, being one of the competitors in the field against the Spring Valley.

WIDE AWAKE PROSPECTING AND M. Co.—Feb. 21st. Location: Arizona. Capital stock, \$1,000,000. Directors: H. M. Cameron, C. E. Lloyd, Christopher Queen, Joseph Goyette, James L. Cogswell, W. H. Roberts, Aaron Bunker, S. Sturgis, R. D. Manzy.

GLOBE GASLIGHT CO. OF NEVADA.—Feb. 19th. Capital stock, \$1,000,000. Object: To supply gas in all parts of Nevada. Trustees: J. J. Palmer, Wm. N. Meeks, Israel W. Knud, Chas. B. Kendall and John B. Meeks.

WIDE AWAKE PROSPECTING AND M. Co.—Feb. 21st. Location: Arizona. Capital stock, \$1,000,000. Directors: H. M. Cameron, C. E. Lloyd, Christopher Queen, Joseph Goyette, James L. Cogswell, W. H. Roberts, Aaron Bunker, S. Sturgis, R. D. Manzy.

Gold, Legal Tenders, Exchange, Etc.
[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, February 21, 3 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 56½¢ SILVER, 54¢.

GOLD IN NEW YORK, 104½.
GOLD BARS, \$800. SILVER BARS, 7@10 ¢ cent. discount.

EXCHANGE ON NEW YORK, 50¢55-100 ¢ cent. premium for gold; on London bankers, 49½; Commercial, 49½; Paris, five francs \$ dollar; Mexican dollars, 92¢100.
LONDON CONSOLS, 96½; Bonds, 102½.
QUICKSILVER IN S. F., by the flask, 1 lb, 43¢44¢.

METALS.

[WHOLESALE.]

THURSDAY, M., February 22, 1877.

IRON.—		
American Pig, ton.....	30 00	@—
Scotch Pig, ton.....	29 00	@30 00
White Pig, ton.....	30 00	@—
Oregon Pig, ton.....	—	@—
Belmont Bar.....	41 00	@—
Belmont 1 to 4.....	60 00	@ 31
Plate, 5 to 9.....	50 00	@ 31
Sheet, 10 to 14.....	—	@—
Sheet, 16 to 20.....	54 00	@—
Sheet, 22 to 24.....	—	@—
Sheet, 26 to 28.....	61 00	@—
Horse Shoes, keg.....	6 00	@—
Nail Rod.....	94 00	@—
Norway.....	81 00	@ 94
Rolled.....	71 00	@—
COPPER.—		
Copper Tinned.....	37 00	@ 40
Sheeting, lb.....	37 00	@—
Sheeting, Yellow.....	21 00	@ 21
Sheeting, Old Yellow.....	10 00	@ 11
Composition Nails.....	21 00	@—
Composition Bolts.....	24 00	@—
SPECIAL.—		
English Cast, lb.....	14 00	@ 25
Anderson & Woods, ordinary sizes.....	16 00	@—
Drill.....	16 00	@—
Steel Bar.....	15 00	@—
Flour steel.....	84 00	@ 20
TIN PLATES.—		
10x14 C Charcoal.....	10 50	@—
Banca Tin.....	24 00	@—
Australian.....	18 00	@ 18 1/2
ZINC.—		
By the Cask.....	11 00	@—
Zinc Sheet 7x3 ft, 7 to 10, lb.....	11 00	@—
7x3 ft, 11 to 14.....	11 00	@—
8x4 ft, 8 to 10.....	12 00	@—
8x4 ft, 11 to 10.....	12 00	@—
NAILS.—		
Assorted sizes.....	3 50	@—
CLOCKS AND REAR.—		
By the lb.....	45 00	@—

LEATHER.

[WHOLESALE.]

WEDNESDAY M., February 21, 1877.

Sole Leather, heavy, lb.....	26 00	@ 23
Light.....	22 00	@ 24
Jodot, 8 Kil, doz.....	48 00	@50 00
11 to 13 Kil.....	68 00	@70 00
14 to 18 Kil.....	82 00	@84 00
Second Choice, 11 to 16 Kil.....	57 00	@59 00
Cornellian, 12 to 16 Kil.....	57 00	@59 00
Females, 12 to 13 Kil.....	63 00	@65 00
14 to 15 Kil.....	71 00	@73 00
Simon Ulmo, Females, 12 to 13 Kil.....	58 00	@60 00
14 to 15 Kil.....	68 00	@70 00
16 to 17 Kil.....	72 00	@74 00
Simon, 18 Kil.....	61 00	@63 00
20 Kil.....	65 00	@67 00
24 Kil.....	72 00	@74 00
Robert, 7 and 9 Kil.....	35 00	@40 00
Kips, French, lb.....	1 00	@ 1 35
Cal, doz.....	40 00	@50 00
French Sheep, all colors.....	2 00	@15 00
Eastern Calf for Backs, lb.....	1 00	@ 1 25
Sheep Roans for Topping, all colors, doz.....	9 00	@13 00
For Linings.....	5 50	@10 5
Cal, Russia, cheap Linings.....	1 75	@ 4 50
Boot Legs, French Calf, pair.....	4 00	@ 4 50
Good French Calf.....	4 00	@ 4 75
Best Jodot Calf.....	5 00	@ 5 25
Leather, Harness, lb.....	35 00	@ 38
For Bed, doz.....	48 00	@ 50
Skirting, lb.....	33 00	@ 37
Welt, doz.....	30 00	@50 00
Ruff, ft.....	18 00	@ 20
Wax Side.....	17 00	@ 18

CAMPO, SAN DIEGO CO., CAL., July 3d, 1874.
MESSRS. DEWEY & Co.—Gentlemen: To-day I received the patent and other papers of my animal trap, that you so successfully worked through the patent office for me, for which please accept my best wishes. The chances are that I will have another application for you to make for me before long. I am well satisfied with your manner of doing business, and I think it very good that you stand in their own light when they do not put their business into your hands. I remain yours truly,
A. M. GASS.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice upon individuals at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Dolores Consolidated Mining Company.

Location of principal place of business, San Francisco, Cal. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of February, A. D. 1877, an assessment, No. 1, of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, 418 California street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 1st day of March, A. D. 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 16th day of April, A. D. 1877, to pay the delinquent assessment, together with cost of advertising and expenses of sale. By order of the Board of Directors.

Office, Room No. 2, 418 California street, San Francisco, California.

Tuolumne Hydraulic Mining Company.

Principal place of business, city and county of San Francisco, State of California. Location of works, Tuolumne county, State of California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 19th day of January, 1877, an assessment of Five (5) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, Room 2, 528 California street, San Francisco, Cal.

Any stock on which this assessment shall remain unpaid on the 12th day of March, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 26th day of April, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

Office, Room 2, 528 California street, San Francisco, California.

PACIFIC MACHINERY DEPOT,

H. P. GREGORY & Co., Nos. 14 & 16 First Street,

San Francisco, Cal.

P. O. Box 168.

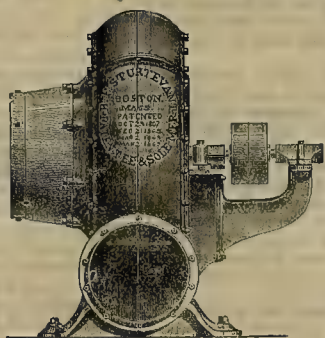
SOLE AGENTS FOR THE PACIFIC COAST FOR

J. A. Fay & Co's Wood-working Machinery,

Blake's Patent Steam Pumps,

Tanite Co's Emery Wheels and Machinery,

Fitchburg Machine Co's Machinists' Tools.



Sturtevant Exhaust Fan for Removing Shavings and Sawdust from Machines.

Sturtevant's Blowers and Exhaust Fans,

J. A. Roebling's Sons Wire Rope,

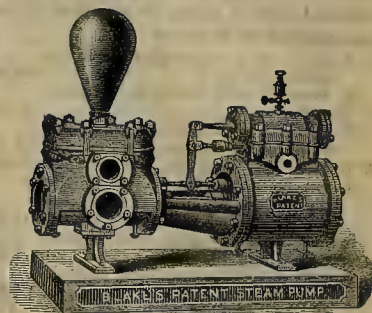
Pure Oak Tanned Leather Belting,

Perin's French Band Saw Blades,

Planer Knives,

Nathan & Dreyfus' Glass Oilers, and Mill and Mining Supplies of all Kinds.

BLAKE'S PATENT STEAM PUMP.



Over 8,500 in Successful Use in the United States.

PICKERING ENGINE GOVERNOR.

VALLEJO FOUNDRY, October 17th, 1876.

Messrs. NEYLAN & YOUNG, San Francisco,

Agents for "PICKERING GOVERNORS."

Gentle:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this year for my patent Straw Burning Threshing Engines give splendid satisfaction. They far surpass for regularity of speed any Governor that I have ever seen, and I have seen all the best kinds: I have seen the main belt fly off the pulley several times this season while threshing, and the engineer did not discover it, so perfectly was the speed maintained, until he was told of it; this I consider something wonderful; I consider the Governor absolutely perfect, so far as speed is concerned. I bought and put on to one of my engines a Shive Governor, to see which was the best, and after one season's trial I have no hesitation in saying they are superior to any other Governor that I have seen or used. I wish you would send me the lowest price that you can furnish 25 Governors for next season's engines.

Yours respectfully,

J. L. HEALD.

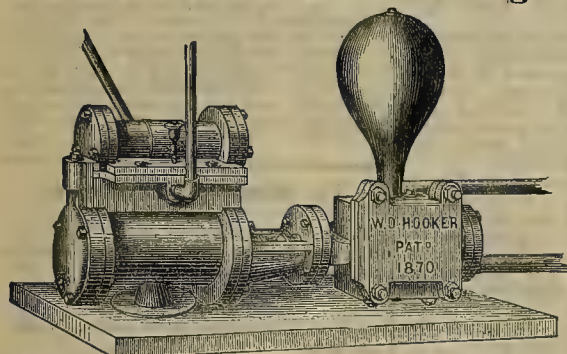
The only Governor that has received awards at each of the International Exhibitions. American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Baltimore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals; International Exposition, Paris, 1867, One Bronze and Two Special Medals; International Exposition, Vienna, 1873, Medal of Progress and Decoration; International Exhibition, Philadelphia, 1876, Medal and Diploma.

CAMERON'S CELEBRATED STEAM PUMPS

For Feeding Boilers and Draining Mines. MACHINISTS' TOOLS AND WOOD WORKING MACHINERY.

NEYLAN & YOUNG, SOLE AGENTS FOR THE PACIFIC COAST, 18 and 20 Spear Street, S. F.

Hooker's Patent Direct Acting Steam Pump.



W. T. GARRATT,

Cor. Fremont & Natoma Streets, S. F.

Sole Proprietor & Manufacturer for the Pacific Coast.

SIMPLE, CHEAP AND DURABLE.

Adapted for all purposes for which Steam Pump are used.

The Best Pump in Use.

SEND FOR CIRCULAR.

N. B.—Also manufacturer of Hooker's Deep Well and Double-Acting Force Pump. Received the Silver Medal awarded at the last Mechanics' Fair in San Francisco.

PATENTED CAST STEEL SHOES AND DIES.

Guaranteed Cheaper than the Best Iron.

IMPORTANT NOTICE.

Reduction in Price from 16 Cents to 12 Cents Per Pound.

Owing to our largely increased business, the present low price of iron from which our Steel is manufactured, and the improved facilities for casting and forging, we take great pleasure in announcing that from and after this date we will supply our IMPROVED CAST AND FORGED STEEL SHOES AND DIES FOR QUARTZ MILLS at twelve cents per pound, delivered at San Francisco or Sacramento, instead of sixteen cents, as heretofore.

We also furnish Steel Plates for Blake and other Ore Crushers, Steel Gut Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

Address all orders, with dimensions or drawings, to

CAST STEEL SHOE & DIE CO.,

59 Nevada Block, S. F.

THE ASBESTOS PATENT FIBER COMPANY,

TWO MEDALS OF HONOR.



TWO CERTIFICATES OF THE HIGHEST MERIT.

Of Philadelphia, offer for sale through their agent in San Francisco,

Asbestos Steam Packing, Asbestos Boards and Asbestos Steam Joints,

All manufactured from the pure utilized Asbestos Patent Fiber, and under patents granted to J. S. Rosenthal. The packing is in all sizes from one-quarter to three inches in diameter, round, and free from all grit or mineral matter. The non-utilized or crude Asbestos, manufactured by some parties into packing, is impure and gritty, liable to injure the piston rod and should not be used. The packing made under the Rosenthal patents is of pure utilized Asbestos fiber, and a very superior article and entirely different from the so-called Asbestos packing heretofore offered for sale. It is compact in form, will not fuzz or disintegrate, and will wear much longer than any other kind of packing. The indestructible, expanding, contracting and lubricating qualities of Asbestos are now universally recognized, and packing made from it is peculiarly adapted for steam engines and pumps.

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This is the champion non-conductor, to prevent radiation of heat and condensation of steam, as covering for marine, stationary, or locomotive boilers and pipes, and for lining wood-work, where exposed to great heat. It is light, flexible, is not disturbed by vibration, and will not char or crumble. The sheets are 30 by 44 inches, of any desired thickness, and are easily applied.

ASBESTOS PATENT FIBER STEAM JOINTS.

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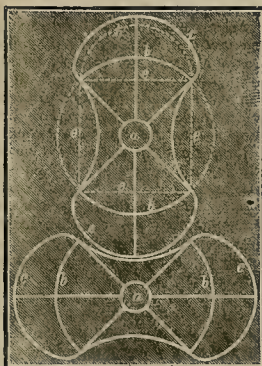
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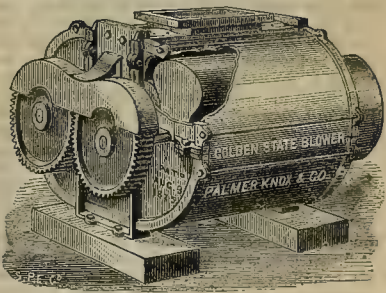
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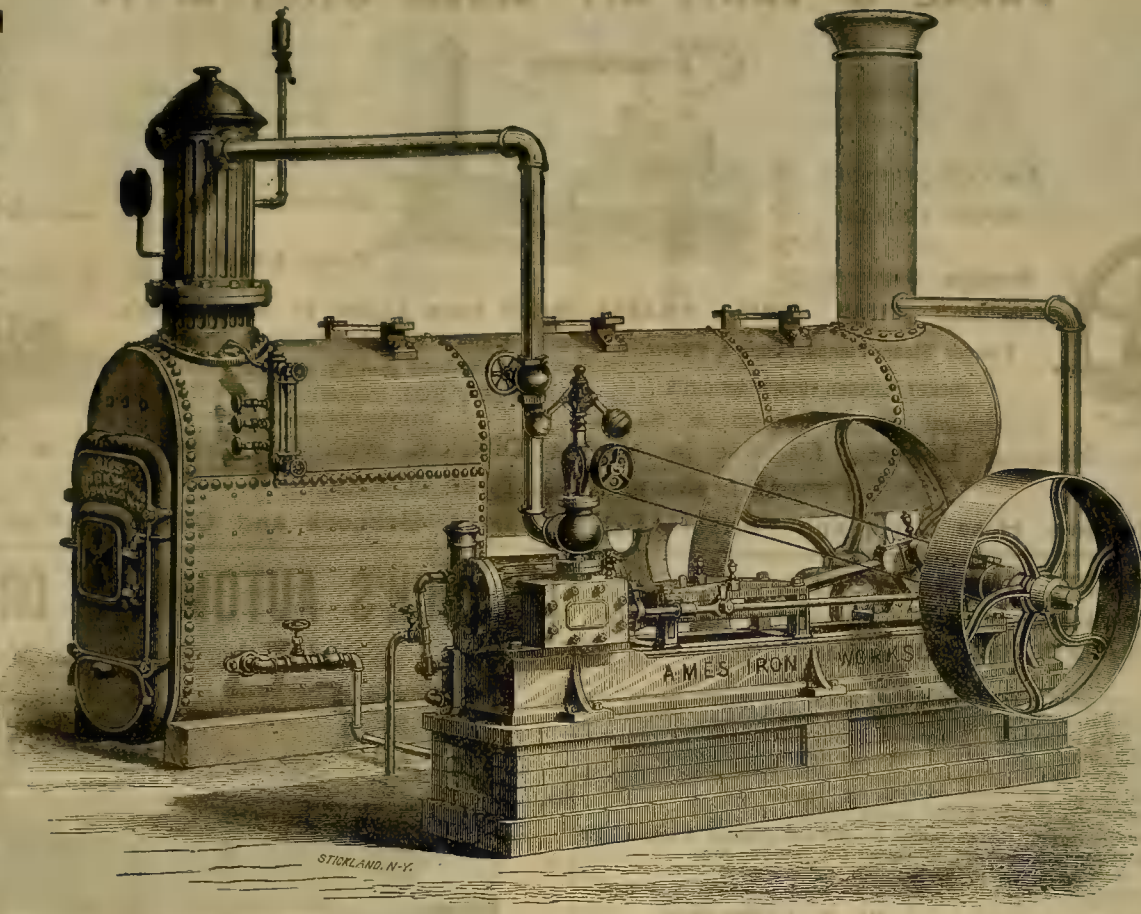
Steam Engines and all Kinds of Mill and Mining Machinery.

“AMES” CELEBRATED PORTABLE & STATIONARY ENGINES.

This cut illustrates some of the important advantages of our “Portables.” As regularly made, the Engine may, at pleasure of owner, be used on top of Boiler, or detached from it, as shown in cut, thus combining the adaptability of either form for any location. It will be necessary to send us a sketch, showing relative position of Engine and Boiler, and their distance apart, when intended to be run “stationary,” in order to send with them suitable connecting pipes, which will be charged for according to extra quantity required over that furnished with the “Portables.”

The boilers are of the Locomotive Pattern, which requires no setting, and is made of such material and proportions, and so arranged as to insure safety, durability, and the greatest efficiency for the amount of fuel consumed.

The shell and tube sheets of boiler are of the best Pennsylvania iron, of proper thickness to secure strength, while we take extra precaution, at an increased expense, of making



the furnace of the best solid fire box plate, which has never heretofore been used in portables on account of its high price. We prefer, however, to make less money, and produce a really first-class article, safe and sure beyond peradventure, than to increase our profits by using cheaper material. The tube sheets are also selected from iron of proper strength and thickness, according to the diameter of the boiler. The Tubes are the best American lap-welded. Great care is taken in bracing the furnaces at the sides, as well as the top and bottom, in the manner adopted by the best locomotive builders.

We would call especial attention to the great improvement in the form of our Furnaces, obtained by extending around them a water space of ample size and curved form, its under side forming an ash pan, and allowing the water to circulate freely, thus preventing sediment from accumulating and adhering, as it does in the ordinary form of locomotive boilers, in that part of the furnace below the grate.

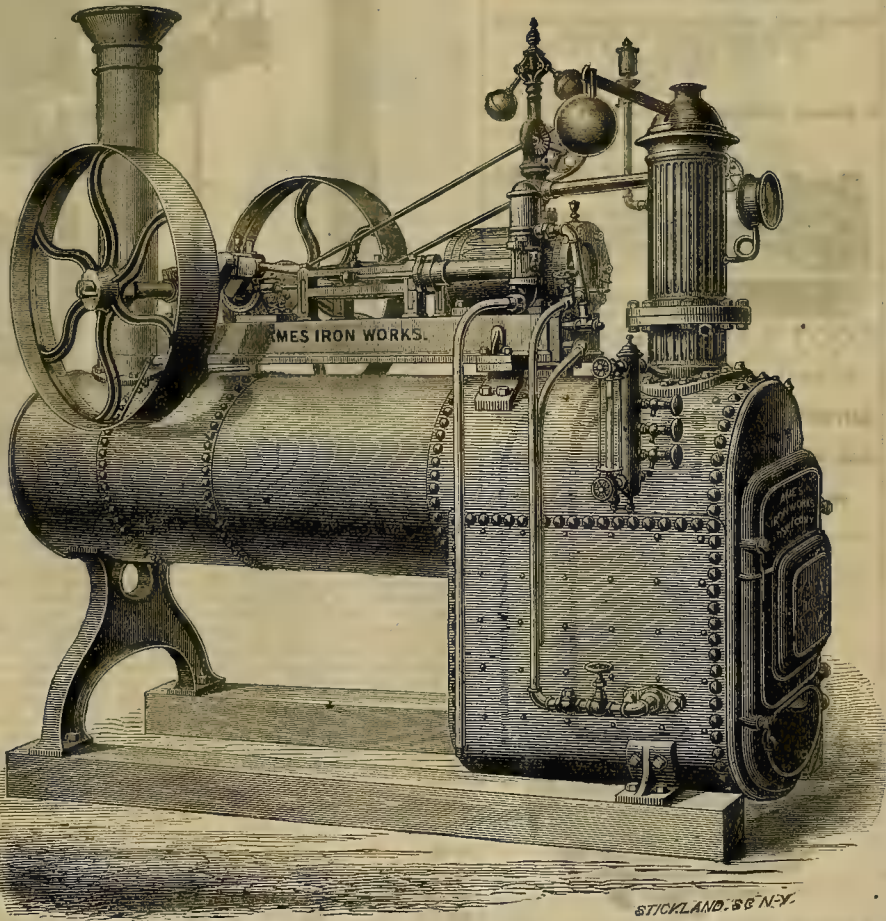
“Ames” Portable Engine and Boiler Erected as a “Stationary.”

The Engine is of the horizontal style, and is made with a bed plate, from entirely new and improved patterns, designed with a view to elegance, simplicity, convenience and strength. It is built entirely separate from and independent of the boiler, and can at any time be used as a stationary by obtaining the necessary additional length of steam and exhaust pipes. In our portables it is placed on the saddles on the top of the boiler, and secured with bolts.

Particular attention is paid to boring the Cylinder accurate and smooth, and to fitting the Piston and Valve. The Piston is of the most approved locomotive pattern, fitted with metallic packing rings, which are adjusted by steel springs of proper proportion, regarding tension, elasticity and strength.

The Slide Valve and its face are made perfectly true and steam tight, and it is constructed with the proper amount of lap to develop the most approved data of expansion that has been proved by numerous experiments to point the correct working of the engine, in relation to the use of steam, with greatest economy and efficiency.

This cut, taken from the “pump side” of No. 2 Ames Portable Engine, gives a good idea of the appearance of the sizes from five to 20-horse power. Trusting that it will convey a favorable impression as to the style of our engines, we would say as to material, that we use only the best; as to workmanship, that we do not claim any extra polish for external show, but do claim accurate and fine finish to all the working or wearing parts; we also claim that the boiler, steam and exhaust passages, and other vital points, are scientifically proportioned in accordance with the best experience and the use of the Steam Engine Indicator; also, that as we make a specialty of Portable Engines, we can sell a better and larger engine



for less money than those who do not confine themselves to any particular article of manufacture. We will not attempt in this space to enumerate the uses to which our engines have been applied, but assert that no engine surpasses them in adaptability to any work or location.

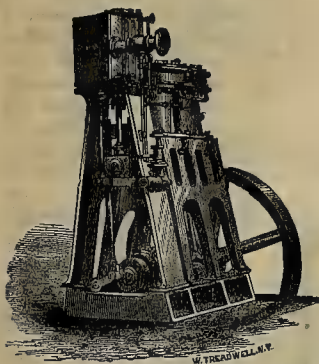
PRICE LIST OF AMES CELEBRATED PORTABLE ENGINES.																							
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	CYLINDER.		No. 11											
										Diameter in Inches.													
										Stroke in Inches.													
										Diameter of Waist.													
										Length in Inches.													
										Width in Inches.													
										Height in Inches.													
										Number.													
										Diameter in Inches.													
										Length in Inches.													
										FLY WHEEL.													
										Diameter in Inches.													
										Faces in Inches.													
										Revolutions per Minute.													
										Estimated weight of Engine and Boiler in lbs.													
										Horse-power as usually rated.													
										PRICE ON SIDS.													
										0	1		6	10	16	22	28	34	40	46	52	58	64
										0	3		6	10	16	22	28	34	40	46	52	58	64
1	4	7	10	16	22	28	34	40	46	52	58	64											
2	5	8	12	18	24	30	36	42	48	54	60	66											
3	6	9	14	20	26	32	38	44	50	56	62	68											
4	7	10	16	22	28	34	40	46	52	58	64	70											
5	8	12	18	24	30	36	42	48	54	60	66	72											
6	9	14	20	26	32	38	44	50	56	62	68	74											
7	10	16	22	28	34	40	46	52	58	64	70	76											
8	12	18	24	30	36	42	48	54	60	66	72	78											
9	14	20	26	32	38	44	50	56	62	68	74	80											
10	16	22	28	34	40	46	52	58	64	70	76	82											
11	18	24	30	36	42	48	54	60	66	72	78	84											
12	20	26	32	38	44	50	56	62	68	74	80	86											
13	22	28	34	40	46	52	58	64	70	76	82	88											
14	24	30	36	42	48	54	60	66	72	78	84	90											
15	26	32	38	44	50	56	62	68	74	80	86	92											
16	28	34	40	46	52	58	64	70	76	82	88	94											
17	30	36	42	48	54	60	66	72	78	84	90	96											
18	32	38	44	50	56	62	68	74	80	86	92	98											
19	34	40	46	52	58	64	70	76	82	88	94	100											

We are also Agents for Ames “Hero” Vertical Engine and Boiler, a new style of Semi-Portable, which we feel confident will meet a want long unsupplied, viz: An Engine and Boiler both efficient and durable, economical in fuel as well as in space occupied, and a thorough, serviceable and well constructed Engine and Boiler at a very low price. The Boilers are made from the best material, and subjected to a test of 150 lbs. pressure to the square inch, besides a careful and satisfactory steam trial with the Engine erected thereon. Price, for six-horse power, \$600. Address:

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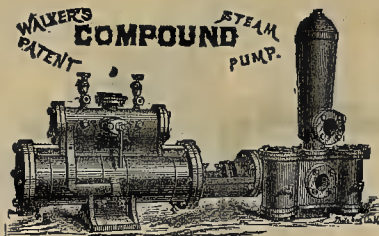
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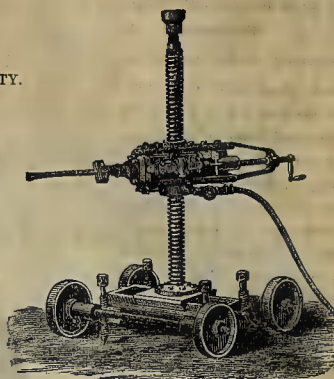


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Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

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RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES,
SUGAR MILL MACHINERY, WATER WHEELS, Etc., ALL OF THE
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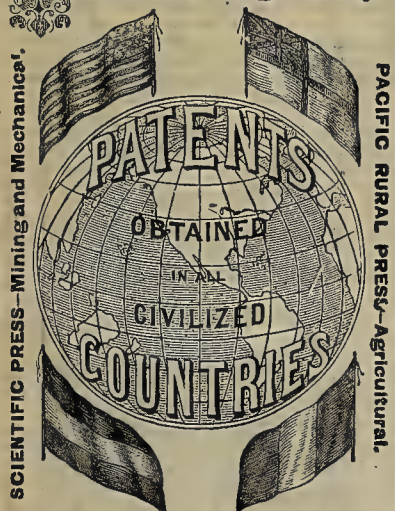
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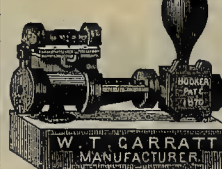
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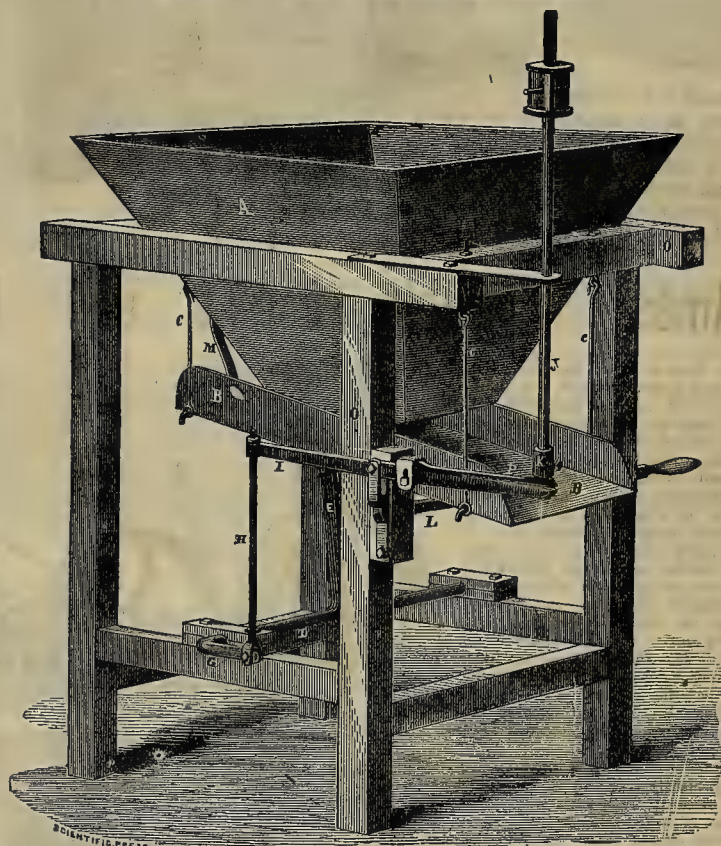
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Dewey's new elastic fileholders (black walnut), size of the *Pacific Rural Press* and *Scientific American*, for 50 cents. Larger sizes to suit any newspaper, 75 cents. By mail, postpaid, 10 cents extra. Cash with all orders. Patent allowed. Address, Dewey & Co., Publishers, San Francisco.

TULLOCH'S AUTOMATIC ORE FEEDER,

Awarded the Centennial Medal.



The TULLOCH AUTOMATIC ORE FEEDERS have been practically tested during the last year and a half in 40 mills, of from five to 80 stamps each, and have, in every case, given perfect satisfaction. The Tulloch machine is so constructed that the drop of the stamp feeds the ore in just such quantities as the stamps require. Each drop regulates the supply required for the next drop, whether it be more or less, and this is the true principle of an automatic feeder. The tray moves longitudinally, and a stationary scraper forces the material forward at each backward movement of the tray, thus insuring the perfect feeding of all classes of ore, whether it be dry or wet.

We append a few extracts from the many testimonials which we have received from mill men and practical mining men, of the effectiveness and positive action of the Tulloch Feeder. We do not depend solely upon these testimonials, as we are aware that testimonials are easily secured for almost any machine, but the high character of the parties certifying to those herewith given, will establish their value and genuineness:

Mr. Jas. G. Fair has 28 in use; says: I regard them superior to any Feeder with which I am acquainted; I consider no mill perfect without them. Mr. E. R. Burke, Sumner mine, Kern county, has 16: They never get tired; no man living can feed a battery as well; they save us in labor alone \$48 a day. Mr. Green, of the Phoenix mill (12), Amador, writes: The first machine we had is working away; is as good as ever; have not spent a dime on it; in use 14 months; you need fear no competition on wet ore. Mr. W. H. Armstrong, of Consolidated Virginia mill: We are running 60 stamps with your Feeders; they give unbounded satisfaction; they have not cost the company one dollar since starting up. Mr. H. C. Bidwell, Supt. Green Mountain and Gold Stripe companies, Plumas county, writes: From the start they have done splendidly; no trouble whatever; requiring but little attention; a boy can manage them; the saving in both labor and castings is fully one-half over the old style of feeding by hand. Mr. Preston writes: I have four of your Automatic Self Feeders, and my mill men each and all say they are the best they have ever used. They are an improvement on all I have ever seen, being simple in construction, and good for either wet or dry crushing; refer to over 40 mills using them; they are guaranteed to give perfect satisfaction. Send for circulars.

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PACIFIC RURAL PRESS,

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PASO ROBLES, CAL., October 18th, 1875.

DEWEY & CO.—Gents:—The letters patent for the Tire Upsetter have come to hand. For the prompt manner with which you have brought the matter to a successful issue, please accept my thanks. Yours respectfully, JOHN H. MERTZ.

Assaying Taught. Practical Instructions on General Analysis.



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MINING AND SCIENTIFIC PRESS.

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BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MARCH 3, 1877.

VOLUME XXXIV.
Number 9.

Ancient Ruins.

In the extreme southwestern corner of Colorado Territory, west of the one hundred and eighth meridian are numerous groups of old ruined houses and towers, proving that in former times a more civilized and intelligent race lived there than at present. Mr. W. H. Jackson, who accompanied the Hayden survey, wrote a paper on the subject of these towns, describing them in detail. Ruins of a similar character are said to exist along the Rio Las Animas and San Juan, but the observations of the party were confined to the valley of the Mancos. Mounds in different localities show that the banks of the streams once held numerous villages. Foundations of great square blocks, of single buildings and of circular enclosures, can be made out; the latter generally with a depressed surface, showing an excavation for some purpose. The greater portion of these mounds are now overgrown with artemisia, pinyon pine and cedar, concealing them almost from casual observation. The surest indication is the quantity of pottery, curiously ornamented, painted and glazed, all broken into very small pieces.

Some of the buildings are found in a remarkable state of preservation, considering the time since they were built and occupied. The engravings on this page represent a few of them, and other illustrations which we will give hereafter show even better preserved and more curious specimens.

Figure 1 shows a portion of an old tower, which was found in the midst of a group of more dimly marked ruins or foundations, extending some distance in each direction from it. As seen in the figure referred to, the tower consists of two lines of walls, the space between them divided into apartments with a single circular room in the center. The outside diameter of all is 25 feet, and the walls 18 and 20 inches thick. The stones of which the tower was constructed are irregular in size and shape, but with the outer face dressed to a uniform surface.

Figures 2 and 3 show another view. The tower is circular as shown, is 12 feet in diameter and now almost 20 feet high, with 16-inch walls. Facing the valley to the north is a window-like aperture. By referring to Figure 3 it will be seen that a rectangular structure, divided into two apartments, each about 15 feet square, joins the tower. Only one corner of three or four courses of masonry remains, shown in the sketch by shaded lines; the rest being indicated by loose debris. These squares were probably underground apartments, their roofs not reaching to the window.

Fig. 4 shows the corner and portion of the doorway of a house, showing considerable care and skill in its construction. Fig. 5 is one of the little nest-like habitations built in the vertical face of the rock. Communication with the outside world is from a small window-like door not shown in the sketch. Two small apertures furnish a lookout over the valley. The walls are as firm and solid as the rocks upon which they are built. The stones are small but regular in size. This is not a commodious dwelling; 15 feet would span its length and six its height, while in depth it is not more than five feet. Near by, upon a low ledge, and readily accessible from below, is a string of five or six houses, evidently communicating. Scratched into the face of the cliff which contains these houses are various inscriptions, one of which is depicted in Fig. 6. As they are not cut in very deeply, and in some places mere scratches, it is very doubtful whether they are contemporaneous with the houses themselves.

INCREASE OF PATENTS.—For some time previous to January 1st, the number of weekly issues of United States patents for inventions was unusually low. From that date there has been a rapid increase, as the following figures, obtained by us during a recent visit to the Patent Office, show: There were issued January 2d, 199; 9th, 227; 16th, 264; 23d, 297; 30th, 302; February 6th, 352. We observed, in our brief visit, substantial improvements made in the workings of the Patent Office during the past few days.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

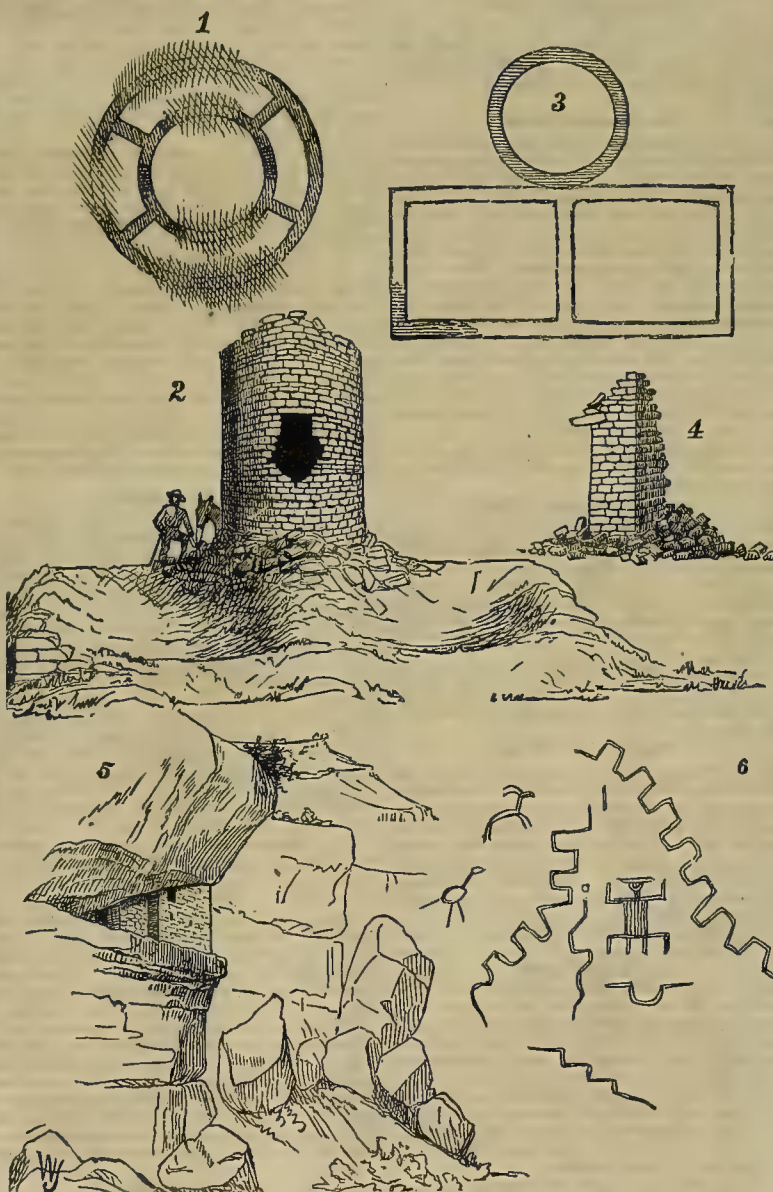
Telegram of the 20th from the Con. Virginia states that they made connection with the deep winze from the 1650-foot level on that morning,

the joint winze on Savage north line, thereby causing a good circulation of air.

The various ore stopes on the several levels of the California are yielding the desired quantity and quality of ore.

In the Justice the ore-producing stopes throughout the 400, 500, 600, 700, and 800-foot levels present their usual fine appearance and are yielding their uniform quality of milling ore. No. 2 cross-cut, 600-foot level, continues to look most promising indeed, and producing a good average quality of milling ore.

In the Caledonia the surface pump bob broke



ANCIENT RUINS IN SOUTHWESTERN COLORADO.

so that an improvement in the air has been experienced.

The Rough and Ready mill started up on the 24th ult.

The Eureka Con. mine still shows improvement in the character and extent of ore bodies. The 10th level drift is being run west near the hanging wall. The ore body is looking well and improving in quality and quantity. Have started raise in ore body and will continue same until making connection with 9th level; 9th level ore body is looking first-rate; are taking out 100 tons per day of first-class ore.

The object of the south drift, 1750-foot level, of the Gould & Curry mine, is to connect with

last week and the water raised 160 feet.

The ore in the Overman winze continues to assay high in gold.

The only work being performed in the Meadow Valley mine is that done by chloriders in the old abandoned levels and they have been worked over so often that what little ore remains to be extracted is of rather low grade.

The Hussey has commenced milling its ore. The Grand Prize mill started up on the 23d and is doing good work.

They have struck the north ledge in the main tunnel of the Vanderbilt, the ore looks well.

The prospects of developing an ore body in the Coso Con. are said to be very flattering.

Relocating Claims.

In our issue of the 17th ult. we published an article on the subject of annual expenditures on mining claims, explaining the conditions under which the claims would be forfeited and also those under which they could be taken up. Several cases have occurred lately where claims have been relocated by other parties because the original owners had forfeited their title by non-compliance with the United States laws in regard to the annual expenditure required. The relocators will be protected by the Courts in the ownership of property acquired in this manner, without doubt; so that it behooves all those who have claims which they intend to keep to either work them and spend the amount required or patent them. Failing to do this, the claims are subject to relocation by the first man who comes along after the claim is forfeited. It must be remembered, moreover, that the Commissioner of the Land Office has decided that the year shall commence from the date of location of the claim.

Another question of importance in this connection is with regard to the ownership of improvements in the mines thus abandoned. Of course a mill or any movable property does not come under the law and belongs to the original owner; but the shafts, tunnels, drifts, etc., which are part of the mine, become the property of the relocater, the same as the claim does. The Recorder of Tintic district, Utah, communicates the following to the Salt Lake Tribune, which explains itself, and gives an official opinion on this question:

"Having had much discussion upon the subject of working in abandoned tunnels and shafts, by relocators, and understanding that some of the best attorneys of Salt Lake held that a person, or persons, relocating a forfeited claim, could not take advantage of the work done by the former owners, but must sink new shafts or new tunnels, I wrote to the Commissioner. His answer is as follows:

Department of the Interior, Gen'l Land Office, }
WASHINGTON, D. C., Feb. 1st, 1877.
A. G. Sutherland, Esq., Silver City, Utah:
SIR:—Referring to your letter of the 17th ult., I have to state that where parties relocate abandoned tunnels or mines, they may continue the work already commenced or sink new shafts, at their option. Very respectfully,
J. A. WILLIAMSON, Commissioner."

The Sutro Tunnel.

First-rate work is being done in the Sutro tunnel and the progress is now very rapid. At the measurement on the 22d ult., it was found that 101 feet had been made during the week, the total length being 16,136 feet. About 91 inches of water is flowing from the tunnel. Two new passenger cars, to carry 12 men each, have been placed on the track. The flow of hot water continues. In an item on the work done in the tunnel the Independent says:

The first week of the present month the header of the Sutro tunnel was advanced 90 feet; the second week 80 feet; the third week, ending on the 22d instant, 101 feet. This looks as though the men who work in the header will receive a premium this month almost equally as large as last month, notwithstanding there being but 28 days to count on. This progress is unparalleled in the history of the Sutro tunnel. The number of men at present working in the header, directly and indirectly, is in the neighborhood of 60. The manner and rate the work is prosecuted speaks well for Foreman Bluet, the shift bosses, and the miners in particular. Ninety-four feet per week driven through the heart of the mountain, where, at times, the rock is almost of adamant hardness, by the number of men above mentioned, shows that in the Sutro tunnel are employed the hardest working miners on or in the neighborhood of the Comstock.

A GREAT many miners are leaving the Pennsylvania coal regions, on account of scarcity of work and low wages. We hear that many have emigrated to the Black Hills.

CORRESPONDENCE.

Mines, Sampling Mills and Smelting Works Around Salt Lake City.

[From our Traveling Correspondent.]

Utah abounds in the precious as well as in the baser metals. Her last year's gold product was \$75,000, copper, \$144,725, silver-lead ore nearly \$8,000,000, saying nothing of some 1,643 tons of iron ore, 20,000 tons of coal and a considerable quantity of coke, salt, sulphur, fire-brick, lime and similar products. As the mining and reduction of argentiferous galena ores occupy by far the largest share of attention in the vicinity of Salt Lake, it may be well to state at the outset that no lead ore, as such, can be shipped from Utah at present rate of freights. It must carry sufficient silver to pay for marketing the lead. The ore is sold as a general thing on the standard of from 30% to 35% lead. For example, if the ore carries 45% lead, 35% is deducted for which no pay is received, the remaining 10 units being paid for at the rate of 50 cents per unit, or \$5 for the lead contained in one ton of ore.

If it costs \$5 for mining and \$3.25 for freight to smelting works, the loss (\$3.25) must be paid from the silver contained in the lead. The cost of bituminous coal at the furnaces runs from \$10 to \$12 per ton, according to quality; charcoal, 19 cents per bushel; wood, \$16 per cord; and coke, costing only \$1.30 at Connellsville, Penn., cannot be laid down here for less than \$27.50 per ton; from which it will be seen that the great desideratum of Utah is cheap fuel and lower freights. But in spite of these disadvantages, sampling mills and reduction works, modeled after the very best patterns to be found in either continent, everywhere abound, in consequence of which a ready market is obtained by the miner at his own door, as it were, for every ton of ore sufficiently valuable to pay for its extraction and freight to the smelting works.

The Pioneer Sampling Works,

The property of Mr. R. McIntosh, of Salt Lake, are located at Sandy, on the line of the U. S. R. R., 12 miles from the city, and in direct communication by railway with the mines at Bingham Canyon, Alta and other productive districts. As they are perhaps the most extensive and best appointed in the Territory, a little description in detail may not be amiss: They are under the supervision of Mr. Fred. W. Day, whose fine business qualifications have contributed not a little to the success of the mill, which is said to be conducted after the same method as similar establishments at Swansea and Liverpool. The quality of the ore decides the quantity to be sampled; for instance, if it is very rich the whole is sampled; if it runs as much as \$100 per ton, one-fifth, and if worth only \$50 per ton, one-tenth is deemed sufficient. The ore first passes under a crusher, then is further lessened in size by means of a grinder, when it is thoroughly mixed and reduced in quantity sufficient for pulverization. After being perfectly dried, it is put through a 90-mesh sieve, when it is ready for bottling. The bottles are delivered to the owner of the ore, sealed and labeled with the name of the ore and the quantity sampled, which are now taken to custom assayers to determine the value of the ore. The usual mode of disposing of it, is by sealed bids from the smelters, the highest bidder securing the ore. In this way the poor miner or prospector, who finds good ore near the surface, is enabled to realize something immediately, and is not so dependent upon outside capital as those of many other mining districts.

Something of the Smelting Furnaces.

On the authority of the Salt Lake *Tribune*, to whose columns we are indebted for many valuable facts, many smelting companies have suspended operations here since the opening of the mines from ignorance or mismanagement, or more probably from both. But experience and skill have in a measure triumphed, and all the smelters in operation are represented as running at present with comparative success. In Salt Lake county there are 11 smelters, eight of which have been turning out, on an average, 70 tons of base bullion daily, of about \$14,000 value. With few exceptions they are managed by men educated in the theory and practice of reducing ores, and of sufficient financing ability to conduct the business on true economic principles, some of the most successful operators having acquired their skill from practical experience in manipulating the base and often rebellious ores of surrounding districts.

The Flagstaff Smelting Works,

Leased some time since by Messrs. Mathier and Geist, may be taken as a good illustration of what can be done in this department by careful management and through system, combined with an accurate knowledge of the character of the ores to be treated, together with the necessary skill for arriving at successful results in their treatment. The works are situated at Sandy station, on the line of the U. S. R. R., and have been put in thorough repair within the past few months. At an outlay of nearly \$40,000,

inclusive of improvements and all of the four stacks fixed up. Everything about the premises goes forward with the regularity of clock work. Each man knows his duty and performs it. Ninety men are employed about the works, and 120 tons of ore reduced every 24 hours, yielding three car-loads of base bullion daily. One of the most valuable of the recent improvements is an 80-horse-engine, the old one being still kept in place and condition in case of an accident to the other.

Fume condensers have been put in, the smoke from each furnace being forced through a series of chambers, where the dust, assaying about 35% lead and 24 ounces silver, is saved, and afterwards put through the furnaces with matte. A reverberatory furnace for roasting refractory ores has just been completed, and every preparation has been or is about to be made to grapple with any and every class of ores, however rebellious, that may be sent to the works.

The Galena Smelter,

The property of the Jordan M. & S. Co., is situated at West Jordan, on the Bingham Canyon railroad, and consists of seven stacks, three of which have been leased by Prof. Holden, of the Old Telegraph company, and recently rebuilt in good style and after the most improved patterns. The capacity of the four remaining stacks per 24 hours, inclusive of ores and flux, is about 25 tons each.

These works have a double vertical turbine wheel of 400-horse power, the water being supplied by a ditch nine miles in length. The last year's product amounted to 235 car-loads of base bullion, at an average value of \$1,600 per car-load. In connection with these works there is also a sampling mill, where some 300 tons of ore are sampled per month. Mr. A. Raht has charge of the furnaces, while the whole is under the charge of Capt. Selfridge, of Salt Lake.

The Sheridan Hill Smelter,

Immediately adjoining, turned out last year 193 car-loads of 10½ tons to the car, worth, according to Superintendent Rumfield's calculation, \$2,000 to the car-load, making a total of \$386,000.

The Germania Smelter,

On Little Cottonwood creek, six miles from the city, on the line of the U. S. R. R., is conducted with skill and energy, turning off some of the purest lead bullion produced in Utah. The machinery is of the best manufacture and does its work constantly and without stoppages. The engine is a very fine one of 40-horse power, with ample capacity to keep the blasts of both furnaces, while the pump, one of the neatest to be found, is capable of throwing 300 gallons of water per minute. Among the recent improvements, new refining works for separating the silver from the base bullion have been constructed. Leading rarely occurs, as the fume condensers catch the poisonous dust before it reaches the open air. Product of base bullion last year, 1,700 tons, with a total value of about \$262,500. A few cases have been selected as samples in this important and growing branch of industry.

Some of the Leading Mines

In the vicinity of Salt Lake will next receive attention. Within 50 miles of the city there are several mining camps, more or less flourishing, such as Parley's Park, Alta City, in the neighborhood of the two Cottonwoods, Bingham Canyon, Jacob City, perhaps better known as Dry Canyon, and others of considerable importance.

In the immediate vicinity of Parley's Park, 32 miles from the city, is situated one of the most noted and valuable mines of the Territory, the property of

The Ontario S. M. Co.,

A San Francisco incorporation and under the efficient management of Mr. R. C. Chambers, a gentleman of ability and widely known in mining circles on the coast. The strike of the vein is east and west, with dip to the north, and as it cuts the bedding of the country rock somewhat obliquely to the vertical axis of the earth, is pronounced by all versed in such matters a true fissure vein.

The general formation is pronounced a quartzite of the carboniferous age. A large feldspar, porphyry dyke cuts the country rock, parallel to the lode, distant from it about 30 feet. The width of ore vein varies from two to seven feet, with probably an average from two and a half to three feet. Over 15,000 tons of ore have been extracted from 1st and 2d levels, sample assay value \$84.60 per ton. The shaft has been sunk 200 feet deeper, making a total depth of 400 feet, and two other levels run (making in the aggregate about 4,500 feet). Opening up additional ground, estimated to contain about 30,000 tons, valued at \$2,238,000 in silver.

Preparations are now in progress to sink working shaft 200 feet deeper, so as to keep explorations two years ahead of the extraction of ore. A 40-stamp mill (dry crushing), complete in every department, capacity from 70 to 80 tons, has just been finished, 20 stamps employed in working the free ores, raw, the other 20 being engaged upon the base or rebellious ores of the mine, which are chloridized by means of a Stetefeldt furnace.

The mine has already added to the bullion product of the coast nearly \$1,000,000 within the past 15 months, the ore being worked in a mill leased by the company. This amount will doubtless be doubled the ensuing year, as the capacity of the new mill is more than twice as great as that heretofore used on the ores. The mine has thus far paid all expenses for develop-

ments and improvements, and is now in a condition to pay regular and handsome monthly dividends to its owners.

The Walker & Webster—a bed vein—the Hawkeye and a number of other locations, are looked upon as promising.

West Mountain Mining District.

The mines are situated along Bingham canyon from 25 to 30 miles from Salt Lake, and reached by railroad. They extend eight miles from southeast to northwest, and have a width of about six miles, divided into four great mineral belts for convenience of classification.

The junction of the quartzite and limestone occurs on the northwest side of the district. The general formation in this belt is quartzite and the character of ore gray carbonates of lead, frequently of high grade. A great amount of work has been done, with fine prospects for dividend-paying mines at no distant period.

The next belt southeast, lying mainly in quartzite and bordering on the granite, carries ore predominating in heavy sulphates of lead and running from 30 to 100 ounces in silver.

The third belt has a granite formation, veins often large and showing permanence. Many of the most promising and valuable mines are found in this belt.

The fourth belt, crossing Black Jack gulch and Butterfield canyon, borders on one side on the lime; veins usually small, but frequently very rich in silver ore and light in lead, generally free milling.

About 200 tons of ore are shipped daily from the district, and if the present price of lead ore is sustained, the amount will probably be more than doubled the ensuing season.

The Winnamuck and Dixon.

The property of an English company, are situated near the depot of the Bingham Canyon railroad. Greatest depth from surface nearly 1,000 feet. Four tunnels, the largest 1,400 feet. Vein of ore from 18 inches to six feet. Ores of great variety, carbonates, free milling and refractory, high grade in silver (50 to 300 ounces) and low in lead (10% to 30%). The product of the mines, mostly from the Dixon, in the last 18 months has been about \$200,000, the principal work being expended in making further developments on the Winnamuck, which is now yielding 600 tons of ore per month, with average gross value of \$45 per ton, or something upwards of \$25,000. During the three years previous it is said to have yielded as much as \$1,250,000.

The Dial

(Judge Kinny), in same vicinity. Incline 200 feet and cross-cut of 30 feet. A level at the depth of 100 feet shows a vein of a few inches in width with pockets of chloride ore (from two and a half to three feet), running from \$185 to \$400 in silver. At a depth of 130 feet some very rich chloride ore has been encountered, yielding \$1,000 per ton, lying mostly on or near the foot-wall. At the 200-foot level and 40 feet from foot-wall a four-inch vein was found worth \$200 per ton; walls, quartzite and black lime.

The Old Telegraph

Owens 10 claims, of a mile in length, which are worked by tunnels; the greatest vertical depth, 500 feet. The ore is found in bedded veins (walls quartzite) and principally in chimneys, and consists of carbonates and sulphurets of lead, running from 16 to 22 ounces in silver and from 30% to 40% lead. The mine is turning out at present not less than 1,500 tons per month, which is conveyed directly from the mine to the different furnaces for smelting, by the Bingham Canyon railroad. The whole is under the general control of Prof. Holden. The underground works are well timbered throughout with square sets, sawed at the company's mill, built on the ground for the purpose, and although the ore is far from being high grade, yet owing to its quantity and good economical management on the part of the officers, it has proved to be a very productive mine, and is looked upon as one of the best paying institutions in the Territory.

The Yosemite

(Johns, May & Merrill), has been steadily and profitably worked for the past three years. Greatest depth by incline, 400 feet, with four levels east and west from same. It lies in the quartzite and has an average width of 30 inches. Character of ore, carbonates with bunches of galena and crystallized lead, going about 65%, 16 ounces on the average in silver, and improving in character as depth is attained. The mine is systematically opened and worked. Very fine hoisting works have recently been erected, and everything seemed to be going forward swimmingly under the management of Mr. W. M. Nesbit, the foreman in charge at the time.

The Reverse Mine,

Owned by Messrs. Winsor, Randall, and Longstreet; incline shaft 680 feet, nearly 4,000 feet of levels, a bedded vein from five to 40 feet in width, foot-wall, lime; hanging quartzite. Monthly shipments of ore run from 300 to 600 tons of gray carbonate, carrying from 48% to 65% lead, and from 15 to 38 ounces silver. It is represented as having paid almost from the grass roots down; having produced within two years past \$129,000, during which time improvements have been made to the amount of over \$50,000.

The Jordan Mine,

Opened by tunnel 800 feet, striking lode at 200 feet from surface, showing at that depth a width from wall to wall of from 10 to 15 feet.

Ore, plumbiferous, 47% lead, and from 12 to 14 ounces silver. Number of men at present, 16, and for the past five months is understood to have been on a paying basis. Mr. Edward Couch, Superintendent at mine; Capt. Selfridge, of Salt Lake, General Manager.

The Glasgow

Mining company, Mr. G. A. Jackson Superintendent, has a tunnel on the Vulcan of 140 feet, running 60 feet on the vein, with width of ore of eight feet, four of which is first-class gray carbonate and galena; thought to average 35 ounces in silver, and 60% lead; foot-wall limestone; hanging syenite. About 1,600 sacks taken out the past three weeks. The same company have also a tunnel on the Gem 480 feet in length, with 100 feet more to run to reach a depth from surface of 350 feet. Lode four feet in granite, with one foot of ore—going 40 ounces silver and 50% lead.

The Miller, belonging to same, is three feet between granite walls and has one and a half feet of ore averaging about the same as last.

Owing to the length of this latter, detailed descriptions of many valuable or promising mines are necessarily omitted, such as the Last Chance, which has paid its dividends, the Neptune, the Ashland, the Spanish, Scorpion, Mountain Maid, Burning Moscow, Miners' Home, and many others. Sufficient, however, has been given to indicate its importance as a field for mining operations and the judicious employment of capital. A. C. K.

The Discoverer of the Chollar Mine.

EDITORS PRESS:—In your issue of December 30th, 1876, your article, "Comstock Papers," states that Mr. William Chollar "some seven or eight years ago, at the earnest solicitation of his brother, living in Connecticut, went home to that State, where he is reported to have since died."

It may interest some of his former friends and mining associates on the Pacific slope to know something of the present whereabouts of this famous prospector and miner. Mr. William Chollar returned from Nevada to Danielsonville, Conn., in the fall of 1873, and has made his home a part of the time with his son, William H. Chollar. During the past two years he has been engaged in prospecting in the towns of Eastford and Woodstock, in this State. He has located a mine of fair prospects in each of these two towns. The assays from both locations are considered flattering by himself and his associates. This winter he is with his partner, Mr. Brown, in Woodstock, engaged in sinking a shaft, and he is prosecuting his mining enterprise with his usual energy and enthusiasm. His postoffice address is Woodstock, Conn. He is confident that there is great mineral wealth in New England, and that all that is wanted to successfully develop it is enterprise and practical mining experience.

He is the same genial and confident person as of yore, when he discovered the famous Chollar mine, and certainly he has the best wishes of everybody for his success in his present mining enterprise. JOSHUA PERKINS.

Danielsonville, Conn., Feb. 12th, 1877.

Oregon Mines.

The *Mountaineer* has the following to say about the Grant county bonanza (Oregon): Mr. Chas. S. Miller has been four or five weeks in the mines of Granite Creek district, in Grant county, at work testing the rock taken from the different ledges partly developed in the Granite district, and he informs us that these are the richest mines he ever saw. Mr. Miller is a practical metallurgist, and an honorable, upright gentleman, and has probably had as much experience in such matters as any other man on the Pacific coast.

The principal mine in the district and the one that has the greatest amount of work done on it and is therefore the most developed, is the Monumental, which was discovered by Mr. Harry McCann in the year 1865. This mine contains a double shaft—four feet each in the clear—108 feet deep. At a depth of 50 feet a level running north 60 feet, connecting with an air shaft, and one running south 45 feet. At 108 feet, a level running north 40 feet and south 35 feet. The miners are now engaged in running a tunnel to strike the vein 300 feet below the surface. This mine contains 3,000 feet on the ledge, running 1,500 feet each way from the main shaft. The mine is now well prospected and all that is needed is machinery to work it. It is supposed that there is over \$1,000,000 of the precious metals—gold and silver—in sight, and a large portion of it already mined and ready for the reduction works.

Mr. M. showed us a small brick of silver, weighing over an ounce, that he extracted from one pound of rock, and also a piece of gold worth about one dollar, that he took from one ounce of rock. Mr. Miller tested the rock from the top down, having made some 70 assays. He has brought the rock with him from which he made the assays and has them all nicely labeled so that the same may be tested by some other scientist to corroborate the assays of Mr. Miller.

Mr. M. intended leaving for Portland this morning with his specimens, to lay the matter before some of the enterprising moneyed men of that city to see what he can do towards raising funds to work this mine.

MECHANICAL PROGRESS.

Looking for Defects in Boilers.

In reference to Cornish boilers more particularly, says the *Manufacturer and Builder*, first look at the bottoms to see that they are not damaged by being moved on common rollers. If such has occurred there will be hollows or flat places in the plates. Examine the man-holes; see that they have not been damaged by having "toggles" put across them for the purpose of moving or lifting the boiler. See that blocks or pieces of wood have not been left inside, between, or under the furnace or tubes. Examine all round the bottom flange of the steam-chest to see that it has not been cracked in the riveting; and examine the same inside the boiler to see that it has not been filled up with iron borings, which is commonly done by bad workmen to conceal a crack in the bottom flange of steam-chests, and will frequently enable them to pass unobserved under the water test, but generally gives way to some extent when steam is got up. Examine the angle-iron rings round the ends of the tubes, between the rivet heads, especially under the bottoms of the tubes, and see that there are not any cracks running from rivet to rivet. Next examine the gusset-stays at the ends of the boiler, and see that the rivets are not loose, also that they are not all of one size. It often happens that these stays are put in by boys or incompetent workmen; that the holes are unfair, that the riveters cannot put the proper sized rivets in the holes and therefore put in anything that will go in, thinking, as they are out of sight, that they are of no consequence. See that the water indicators are properly fixed, and that bits of red lead are not stuck in the holes. See that the bearing-bars are the proper length, and not likely to drop out when the boiler is at work. Further see that there is room for the fire-bars to expand when they become heated; and finally see that the blow-off cock does not leak, and that the safety-valve lever will lift up and down quite easily.

In looking for defects in marine boilers, examine very carefully all the plates exposed to the action of the fire. Next, look at the ends of the screwed stays; see that they are not put through a seam of rivets by mistake; sometimes a stay is screwed in a rivet hole but that does no harm. Examine the ends of the tubes and see if pieces of hoop-iron have been put round anywhere the holes have been bored too large, also see that the tubes are not too short—they should all project some distance through the tube plate (about one-quarter of an inch).

See that no pieces of wood or anything else has been left inside the boiler, and that the fire-boxes are not jammed against the shell at the back or under the bottom, or where the side of the shell begins to take a curved form. Examine all the internal stays, see that they are not bent to clear anything, also that they are not fractured where they have been welded, and that the rivet heads in them are all one size, and not loose, or if they are really riveted. Also see that all the pins are in the holes, and the keys in the pins, particularly in the bottom, and notice that the stays between the tubes are "fair between," and not straining on any of them; and that the stays appear to be all equally tight. If they are all slightly flexible when pulled with the hand, they will answer; but if some are quite rigid and others rather loose, they are not at all safe.

SALES OF WAR MATERIAL.—We read that both Russia and Turkey have for some time past been sending large orders for small arms and cartridges to the United States. A supply of Colt's rifle machinery has been sent to Russia, and is turning out large numbers of rifles for the Russian army. The number already manufactured in Russia by machinery purchased by General Gorloff from Colt's Rifle Company is estimated at 3,000,000. Russia has also during the past year imported from another American firm 100,000 pistols. There has likewise been perfected in America what is now called the Russian cartridge, 20,000,000 of which have been made in Bridgeport, Conn. Cartridge machinery has also been sent from America to Russia, and 400,000 cartridges are being manufactured daily at St. Petersburg and Moscow. The Turkish government has entered into a contract with the Rhode Island Company for the supply of 800,000 Martini-Henry rifles, of which 250,000 have already been shipped; 100,000 more are ready for export, and materials for another 100,000 are on hand at the works.

JOHN ADAMS BLAKE.—The *N. Y. Mining Journal* notes with a regret shared in by all who knew him, the death of Mr. John Adams Blake, for many years the active member of the Blake Crusher Company of New Haven. Mr. Blake's death occurred suddenly on the 3d inst, in his 68th year. As an inventor of one of the most important improvements in mining machinery that has appeared in this fruitful age, Mr. Blake's name has become quite familiar to the readers of this journal, and those who had the pleasure of his acquaintance will deeply regret to hear of the death of one who was held in high esteem for his private virtues as well as his public record. In the management of the firm of Blake Brothers, Mr. Blake is worthily succeeded by his son, who is a gentleman of high literary and scientific attainments.

Patents and Population.

The report of the United States Commissioner of Patents is at hand. It is interesting to note, says the *Iron Age*, that the number of patents granted in 1876 was greater than in any previous year, being 17,026, but it is also to be remarked that the number of applications for patents was not as large as in either of the two years immediately preceding, and only 1,000 larger than in 1873. The table showing the number of patents issued to residents of the different States and Territories is a very significant one, as it also shows the proportion of patents to the population. Most of the Southern States are but poorly represented. Alabama takes out but one patent for every 21,600 population, in round numbers; Arkansas takes out one patent for every 21,000 inhabitants; South Carolina one for 22,700; California one for 1,376; while Massachusetts takes out one in 918, Rhode Island one in 941 and Connecticut one in 730. The District of Columbia shows even better figures, namely, one to 668. Inventors will make their own comments upon the latter fact, and judging from those we have heard they will not be at all complimentary. The Territories are evidently too busy in developing their own resources to deal much with patents, although Wyoming has a pretty fair record, having taken out 10 patents during the year, or one to every 1,151 inhabitants. On the other hand, New Mexico took out but one for her 111,303 inhabitants. The number of patents taken out seems to be a very accurate index of the industrial activity of a State or Territory. Thus the South, with its limited industries, takes out but few patents, while the Northern States, with their very active industries, take out a very large number in proportion to their population.

American Enterprise.

A correspondent to the *Manchester Examiner* says: The Americans sell machinery better than we in England do. If they make a good tool or implement they introduce it with great ability to the man who wants or is likely to want it. A few years ago it was considered *infra dig* for a large engineering firm to advertise or publish circulars, and it has been said of a late firm that orders were only received on Wednesday from 11 to 1. When the Americans have a good thing to sell they let everybody know it; they have their machine merchants, and devote far more attention than we do to the discovery of a customer. The books of their mechanical tool makers are wonderful productions, and their catalogue literature I have not seen at all equaled by the tool makers of this country. Allow me to give one illustration of the advantages the Americans derive from their system of advertising. I know a man near Oldham who will make a small hand drilling machine for £5, and who sells a few occasionally! The same thing, only very much lighter, is made in the United States; it comes here heralded by an illustrated circular, a man is appointed who earns a living by selling such things, and in consequence of superior commercial enterprise the American one sells at £6 10s. The American tools which are being sold in this country are dear. Some of them are very good and many are worthless scrap, but all dear, and yet they sell well. It has filled me with astonishment to see lathes, drilling machines, chucks, slide rests and other goods command high prices, simply because the Americans take the trouble to let people know what they have to sell, nicely illustrate it and carefully give dimensions and prices. If you want to buy similar goods from English tool makers I can name, it takes as much trouble to get at prices and particulars as it does to extract an ancient tooth.

THE STEAM ENGINE OF THE FUTURE.—A lecture was delivered, says the *London Mining Journal*, in Greenock, in celebration of the anniversary of James Watt and the centenary of the completion of the first practical steam engine. Mr. J. Scott Russell was the lecturer, and the theme of his lecture took the form of queries as to whether we had discharged our duty as trustees of that valuable gift to mankind, whether we have during one century got out of the steam engine all the good to humanity which it was capable of producing, and finally, what was the work which James Watt had left us to do in the coming century? Mr. Russell, in answering these questions, was of the opinion that, as trustees of the steam engine, we had worthily discharged our duty; and that the duty left by Watt was, in point of fact, the invention of a new steam engine which would occupy less space, consume less fuel, and perform the work of the world at one-half the cost, and render all the elements of modern life cheap and abundant, instead of dear and scarce. But is such an engine possible? It is not impossible; and Mr. Russell's contribution to the solution of the subject gives hope that "the steam engine of the future" may become a great fact before the end of the present century.

THE LARGEST CLOCK.—The clock in the Crystal Palace at Sydenham, England, is said to be the largest in the world. The dial is 40 feet in diameter. The hands, with their counterpoises, weigh nearly a quarter of a ton. The minute hand measures 19 feet in length and moves half an inch at every beat of the pendulum. The distance traveled by the point of the minute hand is nearly four miles a week,

SCIENTIFIC PROGRESS.

A New Insect.

Mr. Fairfield presents in the *Phrenological Journal* a cut of a hitherto unknown insect, found in the brain and abdominal tissues of the common house-fly. He has in his possession, mounted for observation, six specimens out of more than 30 observed during a single dissection, besides a large number of ova and of embryos in different stages of development.

This little animal—the most minute of all the insects thus far discovered—is, in the mature state, about 1-500th of an inch in length, exclusive of the legs, by about 1-800th of an inch in breadth. That is to say, it is somewhat smaller than the larger animalcules found in stagnant water; but has four pairs of fully-developed, four jointed, insect legs; a pair of three-jointed antennae (feelers) terminating in minute hairs, and the usual permanent insect organs. It feeds by means of a couple of sucking disks, which appear to communicate with each other through a minute canal, each disk having, however, a special tube that leads backward to the minute digestive sac. This sac is scarcely larger than an ordinary white blood-corpuscle. The dorsal surface (back) resembles that of the *Argas Americana*, as figured by Professor Packard, and is an elongated convex surface of irregularly disposed cells, without definition into cephalic and thoracic sections. In its embryology the insect passes through a monad stage.

The egg first becomes granular and nucleated; then it puts forth a minute process. Presently it becomes double-nucleated, elongates and shows a disposition to propagate by self-division, exactly after the manner of a monad; but, at a certain stage, this tendency to division ceases, and the anterior cell becomes a center of development for the anterior organs of the animal, while the posterior becomes a hollow cavity, and gives origin to the first pair of legs. The tail, contemporaneous with these changes, thickens and shows a longitudinal striation, as if dividing into four tails, which, however, subsequently assume the consistency of two pairs of four-jointed insect legs. The anterior pair of the legs and the antennae are developed by budding. The animal has no eyes, but is copiously provided with minute hairs, after the usual manner of the insect type. I will not discuss that question in a mere note; but I believe that the entomologist has been the proper progenitor of that numerous family known as acaridae, of which the sugar mites are familiar representatives, and that the long-sought connecting link between monads and insects is at last discovered. The feet, not exhibited in the cut, consist of three claw-like processes, connected (I think, but am not yet certain) by their films of transparent tissue.

Lightning in Telegraph Offices.

At the late meeting of an English society of telegraph engineers, as reported by *Engineering*, it was shown by Mr. Preece that progress is being made towards arresting the damage sustained generally throughout the country, no less by the postal than by the various railway telegraph systems from the effect of lightning. It is at first sight a curious incident that in England, with the advantage of many years' experience, and with the application yearly of improved means for preventing it, telegraph apparatus should suffer to so much greater an extent than in other countries—even those in India—where electrical storms are so much more serious in their character and disastrous in their effects; but the reason is, as Mr. Preece remarked, to be found in the fact that telegraph wires and telegraph apparatus are with us as cobweb spun around and above the entire land. The consequence is that the most puny thunderstorm cannot approach our shores without embracing in its influence many miles of wire and many telegraph instruments, and when we realize the fact that this network of wire embraces some 170,000 miles of wire and some 20,000 instruments, the damage experienced, in comparison with other countries over which the wires and instruments are few and far between, will not appear so startling. It would appear that the experience of the postal telegraph system is to the effect that in 1872 some 1,200 faults, and from November 1st, 1875, to November 30th, 1875, some 442 faults arose from lightning. This is a very satisfactory diminution, and although it is possibly in measure due, as was pointed out, to the diminution in the intensity and frequency of the storms which passed over the country during each year, yet it shows plainly enough that its ravages are being grappled with, and we may fairly hope will in a reasonable time be brought within practicable bounds.

At the same meeting a model of a very simple protector was shown. It consisted of a plain metal base, which when fixed would be attached to the earth, a metal plate similar in size and shape to the base plate, but pierced with holes reduced towards their base so as to receive a number of loose points, which when the upper plate is lifted off will drop into these socket holes, and yet, when the plate is allowed to rest upon the earth, will in making contact with the lower plate be retained in their position, and make a sufficiently good contact with the plate itself to insure the passage of electricity of such a high potential as that obtained from atmospheric causes. Between the two plates is placed

a thick film of carbon, or a piece of thin paper, upon which the points referred to above are allowed to rest, not with sufficient force to make holes in it, yet so as to afford the arrangement all the advantages known to be derived from points as a means of discharge for electricity of high tension.

Conditions of Successful Scientific Work.

One hears a good deal talked now-a-days of scientific research, and among it a good deal of what I cannot but think mischievous nonsense about the peculiar powers required by scientific investigators. To listen to many, one would suppose that the faculty of adding anything whatever to natural knowledge was one possessed by extremely few persons. I believe, on the contrary, that any man possessed of average perseverance is capable, if he will, of doing good original scientific work. Any hardworking and commonly intelligent man, who likes his profession, will make a good soldier, or lawyer, or doctor, though that combination of powers which makes the general, or the great jurist, or the great physician, is given to but few.

So it is with the pursuit of science; assuredly not every one of her followers, very probably not one among us now present, will become a Linnaeus, or a Cuvier, or an Agassiz. It may not be given to any of us to make some brilliant discovery, or to first expound some illuminating generalization; but we can, each and all, if we will, do good and valuable work in elucidating the details of various branches of knowledge. All that is needed for such work, besides some leisure, intelligence, and common sense (and the more of each the better), is undaunted perseverance and absolute truthfulness; a perseverance unabated by failure, and a truthfulness incapable of the least perversion (either by way of omission or commission) in the description of an observation or of an experiment, or of the least reluctance to acknowledge an error once it is found to have been made. Moreover, this love of truth must extend to a constant searching and inquiry of the mind, with the perpetual endeavor to keep inferences from observation or experiment unbiased, so far as may be, by natural predilections or favorite theories. Perfect success in such an endeavor is, perhaps, unattainable, but the scientific worker must ever strive after it; theories are necessary to guide and systematize his work, and to lead its prosecution in new directions, but they must be servants, and not masters. I may, perhaps, seem to be insisting at too great length on a self-evident point; but the more one knows of scientific work and workers, the more does one realize the importance and the difficulty of attaining a perfectly balanced mind and of arriving at an unprejudiced deduction from observation.—*Professor Martin, in Popular Science Monthly.*

MOVEMENT IN TRILOBITES.—A second contribution to the subject of the nature of the legs of trilobites is published by Mr. C. D. Walcott, in the 28th report of the New York State Museum. From the evidence thus far obtained, he concludes that trilobites swam on their backs, and that they had a double row of appendages on each side of the central axis. "The central or axial series were either the attachments of swimming lobes or rudimentary, ambulatory legs. The lateral series were branched in their structure, the bars serving as points of attachment for their lamellae. It is probable that they were also used in swimming. Many sections show appendages beneath the head; but nothing satisfactory can be established from them. * * * A section of a partially coiled specimen shows fine branchial appendages on each side, brought into this position by the rolling up of the animal. These sections show that the axial are but one-third the length of the branchial appendages. The perfect state of preservation of the delicate branchial appendages and the ventral membrane precludes the idea of the destruction of anything of a stronger texture than fleshy swimming lobes attached to the axial appendages. The axial appendages could not have reached to the surface upon which the edges of the pleura rested, which negatives the view of their being in any way ambulatory, in case the non-presence of articulations in the appendages should be called in question."

"SIDEREAL PHOTOGRAPHY."—Mr. Huggins, F. R. S., says *London Iron*, made a very important communication to the Physical Society at its meeting on Saturday. For a long time he has been engaged with attempts to photograph the spectra of stars, and has obtained several partial successes. The chief difficulty to be overcome has been to follow the motion of the star with the telescope with sufficient accuracy, as a long exposure is requisite. This difficulty has been at last overcome, and there was shown on Saturday a clear photograph of the star *α Lyrae*. There is another interest attaching to this besides the fact that it is the first good photograph of the kind obtained. One of the calcium lines is wanting. Mr. Lookyer, some time ago, when experimenting on the dissociation of calcium, suggested that there were indications that the metal calcium as it exists on our planet is not an element. He pointed out that what was wanted was an examination of the calcium lines in the spectra of different stars, and for this their photographs were needed. Here was produced one such photograph as was wanted. Others will, no doubt, soon follow as atmospheric conditions permit. This first clearly strengthens the belief that calcium is not an element.

OLDERS' DIRECTORY.

ments in the Mining and Scientific Press and
F. Journals.]

THE LISTS OF THE BOARDS.

RED.	DELINE'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
	Mar 13	Apr 3	W Willis	309 Montgomery st
	Mar 13	Mar 31	C A Sankey	331 Montgomery st
	Mar 15	Apr 12	J W Pew	419 California st
	Mar 15	Apr 9	W Willis	309 Montgomery st
	Feb 19	Mar 14	J S Kennedy	419 California st
	Mar 23	Apr 17	J Crockett	419 California st
	Mar 15	Apr 3	R Wegener	414 California st
	Feb 14	Mar 7	J Newlands	419 California st
	Mar 19	Apr 9	J Kip	314 Montgomery st
	Mar 24	Apr 14	L Hermann	220 Sansome st
	Mar 20	Apr 9	W Willis	309 Montgomery st
	Feb 23	Mar 21	A K Dubrow	309 Montgomery st
	Mar 27	Apr 10	J F Richter	309 Montgomery st
	Apr 19	Apr 19	C A Sankey	331 Montgomery st
	Apr 2	Apr 30	B B Minor	309 Montgomery st
	Mar 22	Apr 14	F E Luty	567 Montgomery st
	Mar 26	Apr 17	W Willis	309 Montgomery st
	Mar 6	Mar 30	D A Jennings	401 California st
	Feb 27	Mar 17	D L Thomas	419 California st
	Mar 12	Apr 2	W R Townsend	Nevada Block
	Mar 23	Apr 16	J Maguire	419 California st
	Mar 18	Apr 3	J Kip	309 Montgomery st
	Mar 5	Mar 20	T E Atkinson	330 Pine st
	Feb 13	Mar 9	W R Townsend	Nevada Block
	Feb 23	Mar 20	E B Holmes	309 Montgomery st
	Mar 26	Apr 10	W W Wilson	419 California st
	Mar 7	Mar 27	J M Buffington	311 California st
	Mar 13	Apr 7	W E Dean	419 California st
	Mar 18	Mar 27	G C Pratt	309 Montgomery st

IN THE LISTS OF THE BOARDS.

	Feb 24	Mar 19	L Hermann	220 Sansome st
	Mar 23	Mar 19	J M Haven	420 California st
	Mar 15	Apr 5	T M Connor	30 Front st
	Feb 16	Mar 3	O H Bogart	402 Montgomery st
	Mar 24	Mar 24	D H Williams	Grass Valley
	Mar 26	Mar 24	T P Beach	Montgomery Block
	Mar 26	Mar 26	J W Connor	415 California st
	Mar 6	Mar 23	F J Hermann	612 Commercial st
	Mar 24	Apr 14	L Hermann	220 Sansome st
	Feb 23	Mar 17	P H Paynter	Grass Valley
	Mar 26	Mar 19	J W Clark	420 California st
	Mar 19	Apr 9	A Wise	210 California st
	Mar 3	Mar 20	C S Healy	Merchants' Exchange
	Feb 17	Mar 19	L Leavitt	309 Montgomery st
	Feb 7	Mar 5	O H Bogart	402 Montgomery st
	Mar 26	Mar 26	C G Funk	438 California st
	Feb 12	Apr 2	D Wilder	228 Montgomery st
	Feb 21	Mar 9	J D Thompson	401 California st
	Feb 15	Apr 14	T B Wingard	328 Montgomery st
	Feb 16	Apr 2	J T Wingard	528 California st
	Feb 6	Mar 1	J Greif	633 Washington st
	Mar 5	Mar 25	J E Foulds	535 Clay st

S TO BE HELD.

	120 Sutter st	Annual	Mar 1
	330 Pine st	Special	Mar 1
	OFFICE IN S. F.	MEETING.	DATE
309 Montgomery st	Merchants' Ex	Adjourned	Mar 1
309 Montgomery st	401 California st	Annual	Mar 1
		Annual	Mar 1

WITHIN THREE MONTHS.

	OFFICE IN S. F.	AMOUNT.	PAYABLE.
316 California st		2 00	Oct 1
Nevada Block		4 00	Feb 1

Nevada Block	20	Oct 2
426 California st	75	Dec 1
419 California st	1 00	Feb 1
Cor Cal & Mont'y st	5 00	Jan 1
309 Montgomery st	1 00	Feb 1
409 California st	30	Mar 1
534 California st	50	Feb 2

advance by spreading a want of confidence and throwing their stock upon the market. The *Enterprise* says further: "There is no earthly cause for the ruling low prices of stocks. They are not warranted in view of any condition of the mines. The opinion is general among those best posted in the present developments of the lower levels, and the prospects which attend them, that dividend-paying ledges will be uncovered before long both north and south independent of the big bonanza. The speculating portion of the community are, however, of an excitable order and ignorant, many of them, of the vast amount of work necessary to open up an ore-body after it has been discovered. The Comstock to-day promises as well as it did before the big bonanza was opened up, and some fine morning the world will again be astonished at the developments made and the public will be assured anew that there are millions upon millions still in the mountains surrounding us. If those who have stocks will but hold them and wait a little, till the mines have a chance to show their worth, they will have no cause to regret their course."

Belcher has at last levied an assessment of one dollar per share, aggregating \$104,000, delinquent March 29th. This is the first appeal of the kind to stockholders in nearly six years, and there is general regret that a mine which has since paid such liberal dividends should be placed back on the assessment list, though the Crown Point took the same course some time ago.

An adjourned meeting of the dissatisfied Lady Bryan stockholders was held on Monday evening. Dr. H. S. Stone presided, and J. Mcintosh acted as Secretary. A statement of the amount already expended was read, aggregating \$1,077.65, and the balance on hand was \$118.35. This amount was collected from the ten cent assessment levied upon the particular stock belonging to those who were dissatisfied with the old Directors of the company and which shares have succeeded in obtaining an injunction upon the collection of the last assessment. An appeal was made by Mr. Tarpey for more funds to con-

We are not able to chronicle any change in position of the stock market, everything remaining as for some time past, very dull. There is no animation whatever apparent. The *Enterprise* states as one of the causes of this continued dullness that very many who bought new stocks were at their lowest point saw fit to realize on the subsequent advance. There are many persons, both in San Francisco and Virginia, and in fact all over the coast, who wait for a big excitement before investing in stocks, and these are the ones who are the most frightened when a slight reaction comes and bid the bears in their attempts to break an

have succeeded in obtaining an injunction upon the collection of the last assessment. An appeal was made by Mr. Tarpey for more funds to continue the prosecution to a successful termination. Mr. Tarpey claimed that 87,500 shares had been sold at different assessments, and should be the property of the company. This, with the 21,000 shares in the hands of the company, gave an excess over the capital stock of 8,500 shares, which he said was most assuredly an over-issue to that amount. A motion was carried, extending the time for delinquents to pay their assessments ten days.

GENERAL DIAZ has been sworn in as President of the republic of Mexico,

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MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

THIS BACK.—Amador Ledger, Feb. 24: We visited this mine at Spanish gulch and were not a little surprised at the immense bodies of quartz cropping out all over the property. In one place the ledge is fully 80 feet wide. The former owners have put down several shafts a comparatively short distance, from all of which large quantities of gold have been obtained by simply pounding the rock by hand, and washing it in a rocker. They never attempted to work it on a scale commensurate with its magnitude. Six miners are now employed, who are running a cross-cut from the foot wall to the hanging wall. A pile of ore lay on the dump, all of which is full of rich lead galena sulphurets, a speck or so of free gold being occasionally visible. A reasonable estimate places the ore as good for at least \$10 or \$12 per ton. The ground is excellently situated for a mill, a fall of from 300 to 400 feet being easily obtainable. We believe it is the intention of the company to have a mill put up forthwith.

FORREST.—This is an old quartz claim located between the Liver mine and Plymouth. A shaft is down 170 feet, and from the hole upward of \$200,000 were taken. The rock paid handsomely from the surface down, which is considered by mining experts as a sure indication of a permanent mine. For many years this mine has been idle. Mr. Trelogan, formerly superintendent of the Governor, but now of the Tailman, is organizing a company to work the mine.

NEW QUARTZ DISCOVERY.—On Wednesday a Mexican named Caguelito brought to Jackson half a dozen pieces of surface rock which he says he broke from a ledge discovered by him about three miles from Jackson, in the direction of Volcano. One or two of the pieces showed specks of coarse gold. The discoverer says the ledge is four feet in width, and the gravel in the neighborhood quite rich. He thinks there is not a more valuable working within miles of this claim, and the information of the strike is a surprise to all.

SILVER TUNNEL.—This tunnel at Murphy's ridge is in 300 feet. Two small veins of quartz have been cut, one 10 inches and the other 20 inches in width. The rock is heavy and full of sulphurets, evidently containing a large percentage of iron. The workmen are pushing the tunnel head, to start the vein, which is supposed to be 50 or 60 feet further in the hill.

ACTIVITY AROUND NEW CHICAGO.—New Chicago, the latest candidate for admission into the list of towns in Amador county, moves along prosperously. It promises to be a very sprightly place this summer. Three or four quartz mills are running within a short distance of the town, and the work of prospecting for new leads goes on. **DIVERSITY.**—The California Mining company is maintaining its reputation for richness, pouring its dividends almost monthly into the pockets of the shareholders. There is yet plenty of rock in sight to justify the anticipation of regular dividends for months to come.

BUTTE.

THE MINER.—Oroville Mercury, Feb. 23: We had a call from L. A. Snow, of Little Kinshew, this week, who gave us many items in regard to the mines in the mountains. There is no winking the fact out of sight that the miners away up in the mountains, who depend on the snows of winter for their supply of water, will have a hard year of it. The miners of the mountains are not so much dependent on temporary help to them. Mr. Snow informs us that where the snow was from 15 to 18 feet in depth last year at this time, it is now only about a foot deep. A hot sun would soon carry it all off. Mr. Snow is working his claim on a small scale this winter, having only two pipes running and washing away but little dirt. When a good stream of living water is turned upon this ground through the improved sluice, the result is not to be doubted. The ground is rich and there is an abundance of it—enough to last for years.

HIO BAR MINING CLAIM.—We saw a letter from the President of the Big Bar company, saying that 150 feet of the flume had been laid, and that in ten days at most the rest of it would be completed and the water turned on. The grand trouble so far has been in waiting for a number of expensive articles that had not been ordered, and that only served to call for another assessment, much to the disgust of all of the stockholders. In a few days the water will be turned on and the mine thoroughly prospected.

MINING MACHINES.—Parties from all parts of the State are coming here every day to take a look at the novel mining machine that is now being run in the river. It works like a churn. The thing is so very simple that the only wonder is it was not discovered long ago. No one can tell how much gold is being taken out, as the boxes have not been cleaned up since the work began. One thing is certain, that it will work up everything clean from the bedrock.

CALAVERAS.

LAMPHEAR.—Calaveras Chronicle, Feb. 24: The work of freeing the Lamphear mine of water is completed, and as soon as the necessary timbers can be procured, active operations will be resumed. There is a good mill on the mine, levels run and stopes opened, and the rock averages well.

GRAVEL MINING OPERATIONS are unusually lively in this vicinity at present, miners being anxious to utilize the entire water supply while it lasts. All the hydraulic and tunnel claims are running full handed, and there is ready sale for every drop of water the ditch affords. It is the general impression that water will fail early this season, and miners are consequently putting in their "best legs" in anticipation of the approaching summer.

MOSER'S NEW HYDRAULIC.—Moser & Co., who for some time past have been engaged in opening a hydraulic claim on Tunnel ridge, nearly opposite Sport hill, have got everything in readiness and commenced piling. They found it necessary to run a bedrock tunnel 165 feet in length, through which to lay their flume. The shaft at the upper end of the tunnel, down which the gravel is washed into the flume, is 27 feet deep. The water for hydraulic has a pressure of 175 feet. The bank of gravel looks well, and we learn that the prospects of the mine are flattering.

RICK ROCK.—Mr. John Donnell informs us that rock of almost incredible richness is being taken from the Golden Hill quartz mine, located near Hill's ranch, on the San Andreas river. The mine has been worked for some time, and has yielded an average of \$36 per ton. All of the richest rock is taken out, however, and worked by another process. A stratum of the ledge, about six inches in thickness, is said to be absolutely cemented together with threads of gold.

WIN MINER.—Rapid progress is being made sinking the new shaft of this mine. It is expected to complete the sinking in about six weeks, when every thing will be in readiness for running the 1300-ft level. The batteries are kept in constant motion, an average of 100 tons of rock being crushed daily. The ore comes from the stopes of the 1200-ft level. A level has been run 300 feet north, at the depth of 1200 feet. The vein was found nearly the entire distance, but much broken up. The prospects are good for more gold, and the vein is richly mineralized.

UPPER COUNTRY JOTTINGS.—At West Point quartz mining is brisker than for some time previous. The main shaft in the Champion has reached a depth of 300 feet. The rock is now being stoped out. Work is progressing actively at the Field mine and good ore is being obtained. Everything is looking well at the Mina Rica. We hear it

rumored that a new shaft is to be sunk on the mine, but cannot vouch for the truth of the report. Messrs. Herbert & Marsh lately discovered a promising quartz lead near Sandy gulch, about half a mile from the West Point mine. The ledge prospects well. At Railroad Flat the Sunrise mine continues to yield good rock. Thirty tons of ore from the Chapman mine have been hauled to the mill. Griswold & Co., proprietors of the old Holmes mill, near Mesquite, have out a considerable quantity of good rock.

EL DORADO.

TAYLOR.—El Dorado Republican, Feb. 24: From the north side we learn that work on the 500-ft south level in the Taylor mine is progressing finely, with two to three feet of ore in the face. The work of opening the 500-ft level will soon be commenced, when things will be very lively at the Taylor. We learn that a clean-up was made at the Volcanville mine, on Saturday, which was highly gratifying to the owners.

RICH.—Mountain Democrat, Feb. 24: Kimball & Pugett are opening a rich quartz ledge on the face of the hill just west of the town of Gold Hill. Their ledge is large and well defined and gives fine prospects wherever it has been opened. On one recent occasion they took out \$500 in gold. The ledge is so rich that when fully opened they will have a very rich mine.

TRASKER.—The appearance of the amalgamators at the St. Lawrence indicates a yield from the run now in progress, which will far exceed the most sanguine expectations of the owners. It is quite certain that the entire crushing will average more than 865 per ton, and appearances indicate that it may nearly or quite double this figure. At this rate the grand total for the run will aggregate an amount so great as to be a tempting prize for highwaymen, and the owners do not consider it entirely safe to bring it over without a strong escort. Therefore a number of our citizens have consented to make the trip hence to the St. Lawrence, when notified of the clean-up, who will assist in escorting and guarding the treasure.

FRESNO.

COPPER.—Fresno Examiner, Feb. 24: The Ne Plus Ultra copper mining company started up their mine and their new machinery last week. The mine is under the superintendence of N. L. Bachman. It is now provided with steam-pumps and hoisting works and is for lifting the lower grades of ore. Work on the mine will soon be pushed forward vigorously and in a systematic manner, and it is now evident that it will yield a good return to its stockholders. By adopting the lixiviating process of working the lower grades of ore, thousands of tons of ore heretofore cast aside as worthless will be profitably worked.

INYO.

MINNETTA BELLE.—Coso Mining News, Feb. 24: Mr. James Mortenson, one of the Directors of the Minnetta Belle, came in from Lookout yesterday, and reports that everything connected with their operations are progressing rapidly. Mr. Jacobs is getting along finely with the mill.

COSO CON.—Chas. Purington, of the Coso Con. mining company, arrived here Sunday, and on Monday went out to look at the mine. Although he finds that a great deal of useless, but expensive, work has been done by the company, he thinks that it is not yet demonstrated that there is no ore body in the Bella Union. He has put to work a number of men, and is confident in finding ore soon; in fact, there is a fair pay-streak to commence upon at once.

DEFIANCE.—The third vein, now being worked on contract, is looking well and yielding considerable quantities of galena ore. The steam hoisting works were started last Saturday afternoon, and are working well, taking the rock from the 184-ft level. The furnace will be started about the 10th proximo, and Mr. Gorman expects to make an extended run.

LOS ANGELES.

COAL.—Los Angeles Herald, Feb. 24: The indications show growing that a coal ledge that a reliable coal vein has been struck in the Arroyo Seco. The discovery of coal in large quantities heretofore would simply revolutionize our city, and would make us a manufacturing center of considerable importance. Iron, copper and tin exist in large quantities within easy reach of Los Angeles. In addition, such a development would make us a smelting center for the ores of Arizona.

CRACKING.—Santa Monica Outlook, Feb. 24: Messrs. Heath, Eaton & Hancock are still "pegging away" hopefully at their coal mine in the vicinity of Santa Monica. One of the party informs us that the developments so far disclose thin veins of coal, bituminous slate, petroleum and gas. One of the workmen smelling the odor of gas, and suspecting its escapement from a small crevice, applied a torch, which he burned, thereby illuminating the way for some distance. The coal found is of an excellent quality, and is now only a question of quantity.

MONO.

MILLS AND MINES.—Cor. Inyo Independent, Feb. 17: The Comanche mine is next to perpetual motion, scarcely ever stopping, and every stage is laden with the precious metal. The Diana mill is making a very successful run, and shipped last week six bars of bullion, valued at \$7,000, the result of 13 days' work. The new shaft in the Diana mine is down nearly 400 feet, showing ore all the way down, and they have recently struck a large body of high grade ore with a better defined ledge than any ever seen in the Diana before.

NEVADA.

DEADWOOD MINER.—Grass Valley Union, Feb. 21: This mine is in Willow valley, above Nevada City. The valley is noted for numerous quartz ledges that have been but not worked in a miner-like style. The mine has been worked well even with poor working. The Deadwood has in times past paid \$95,000 in gold, and then work was stopped when good ore was close by the point of quitting. The mine was not kept open ahead, as is too often the case. A new company now has charge and the right kind of developments will be made. Only one crushing, as a trial, has been made, and the result was, and that yielded, by mill process, about \$21 to the ton.

BANNER.—Nevada Transcript, Feb. 21: The old Banner mine has been bonded to some parties in this city who have great confidence in the undeveloped wealth which lies in that ground. It is the general belief that it is a good mine if properly worked. The sale will probably take place in a very short time. The mine has been worked by the old Banner, and its neighbor, the North Banner, get well to going, when the Providence gets well down to business, when the New England, the Soggs, the Spanish, the Mountaineer, the Deadwood, the Gold Run and the Henhouse mines all get their levels well opened; when the Cold Spring, and the numerous claims on the old channel get under full headway, won't times be lively in this section? The work is being done in a very different way. Orosby & Mitchell have not yet decided where they will erect their sulphurets works. As soon as they get a place to suit them, their works will be in operation in about three weeks thereafter.

THE Oriental mill on Deer creek is kept in constant operation crushing quartz obtained from different ledges at Willow valley. **FOOTBALL TIDINGS.** Feb. 24: When this mine came under its present management it had been opened by shallow workings at several points and had one shaft down 100 feet. As very little was known in regard to the situation, it was thought best to pump out the deepest shaft and drift each way on the ledge to determine the number of ore shutters. The shafts were started up. When the old Banner, and its neighbor, the North Banner, get well to going, when the Providence gets well down to business, when the New England, the Soggs, the Spanish, the Mountaineer, the Deadwood, the Gold Run and the Henhouse mines all get their levels well opened; when the Cold Spring, and the numerous claims on the old channel get under full headway, won't times be lively in this section? The work is being done in a very different way. Orosby & Mitchell have not yet decided where they will erect their sulphurets works. As soon as they get a place to suit them, their works will be in operation in about three weeks thereafter.

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THE Soggs mine, over on Deer creek, it is thought, will soon be opened into a rich shaft again. The Soggs has long been a paying mine by spells. The owner seems to be full to comprehend the proper way to make it pay continuously—likes to pocket the profits instead of exploring ahead.

THE Alaska, down on the Colfax road, is turning out some very nice rock of late, showing free gold in liberal quantities. **ORLEANS.**—Nevada Transcript, Feb. 22: The Orleans is located on Gold Flat. It was worked some time ago as a lead mine, but it is now being worked as a silver mine, and has for some time laid idle. The owners are now opening out the drain tunnel and other necessary work preparatory to putting in heavier machinery at no distant day. The ledge is a large one and is heavily charged with sulphurets, and the rock taken from it when worked paid from \$14 to \$40 per ton. The revival of interest in quartz mining in this vicinity has stimulated the owners to go to work.

MINING SALE.—Ed. Carney and P. S. Goodspeed, of Hunt's hill, have sold their entire mining property to a corporation known as the Camden mining company. The sale was effected through John McAllis, Esq., of Smartsville, an experienced miner and a member of the Excelsior mining company. The property embraces nearly 100 acres of valuable mining ground, with fixtures, tools, and appliances, and immediate and practical work, and at \$25,000, the price said to have been paid, cannot but prove a profitable investment.

SOGGS.—The Superintendent of the Nevada mine, better known as the "Soggs," is about completing work that will open up a portion of the mine supposed to be very rich. At least on levels above the point being run for, in an early day, very rich rock was taken out. The Soggs is one of the oldest mines in the district, and if properly worked is one of the best. The great difficulty to be overcome in working it arises from the fact that the owner wants all the profits turned over as dividends and not used in necessary explorations. The dead work which has been going on for some time will soon enable the manager to prove that the outlay was judicious.

PLACER.

WASHINGTON.—Dutch Flat Forum, Feb. 24: The Elmore Hill, Polar Star, Southern Cross, Franklin, Star, Union and Summerset claims continue washing. The Baker Hill excluded 2,000 pounds of Judson powder on Thursday last, which is reported to have done the best execution of any blast in this section. The bank was composed of very hard cemented blue gravel. It was, however, favorably situated for blasting, being relieved in front and on one side. The effect was splendid. The entire mass was shaken and pulverized so that the boulders are almost entirely loosened from the cement, requiring but little labor to wash it off. It is now clear and the gravel is being removed with wonderful rapidity, the flames in the tunnel below being taxed to their full capacity with the passing gravel. The Central, Maryland Hill and Pacific claims continue washing.

AT Gold Run the Indiana Hill and Cedar claims, both of which are opening through 190 feet of gravel to a bedrock tunnel below, are making rapid progress.

SHADY RUN MINES.—The Wild Yankee company are making preparations to raise another shaft. The one now in use is in very deep ground, which is intermixed with pipe clay, and has kept up a continual sliding whenever they attempted to wash through it. The company also intend opening drift diggings immediately. The North American company are making good progress in breasting out. Mr. Davely, the superintendent, talks of prospecting the high ledge between Shady Run and Canyon creek, through tunnels, as croppings of a heavy wash are visible in places on both sides, thus showing splendid indication of the existence of an extensive channel.

LITTLE YORK.—The Empire and Christmas Hill companies are washing steadily with full heads of water. The Liberty Hill company have made a change in the working of their mine. The water in this mine is of very hard blue gravel, literally packed with boulders, and although rich, the delay in removing the same is so great that the further working of it will be postponed until water becomes scarce, as two hours' washing per day is sufficient to remove what gravel there is exposed by the continual removing of boulders. The upper stratum of gravel which they are now washing is easier worked, and the boulders which it contains are being removed in time, so that the washing is now progressing without interruption.

REMINOTON HILL.—As the weather at present is favorable for outside work, the Rhode Island company have resumed ground sluicing, which will be continued as long as the weather will permit, the working of the drift mines being also continued. The Wild West company are advancing their new tunnel, and although they have four feet of rim rock to contend with, the two feet of gravel found above it pays \$8 per day, including the time occupied in removing the bedrock.

SACRAMENTO.

TENNESSEE.—Folsom Telegraph, Feb. 23: The mining claim of Jarvis & Humphrey, of this place, situated on Richmond hill, is progressing finely, under Mr. Davis, the Superintendent. Workmen are running a tunnel in from each side of the hill and expect to meet each other in a short time, when drifting will begin in good earnest.

SIERRA.

ORO.—Mountain Messenger, Feb. 24: The rock being taken from the Oro mine appears to be of very good quality, and there is conclusive evidence that the hill contains a large body of pay ore. The mine has been lying idle for several years, but the tunnel appears to be in good condition.

LOCATIONS.—The following locations have been recorded recently: The North Fork company locates the waters of the North fork of Oregon creek. John Callagan, et al., have located the Moonshine gravel mine between the North and Middle forks of Indian creek, Plumas valley. A. Garibaldi, et al., have located five claims of 50 feet each on the M. M. Cristo, commencing 135 feet west of the Swallow company.

SONOMA.

COPPER DISCOVERY.—Russian River Flag, Feb. 22: The "Grizzly" copper mine was located in 1862 by a Healdsburg company. In that year G. P. Brumfield discovered the "Blue Buck," which he traded for the above mine. Mr. Brumfield has worked on it off and on ever since, at an expense of about \$5,000, mostly in money expended for labor, finding better and better deposits. One tunnel is now in 450 feet, another in about 30 feet, and work is progressing; a third has been commenced and is in 10 to 15 feet. Week before last a lode four feet wide of very rich yellow sulphurets of copper was discovered in the 90-foot tunnel, and is apparently inexhaustible. The mine is located on Pena creek, three miles from the mouth, and about nine miles northwest of Healdsburg by the road. It is easy of access, and there is every prospect for a rich mine in that section. Dr. Forsman has made three tests of the ore; the first, of best quality, showed a value of 30% copper; the test of second quality, 20%; the third quality, 10%.

TULARE.

CENTENNIAL DISTRICT.—Visalia Delta, Feb. 24: Mr. Sargent, who resides on Mill creek, about 40 miles northeast of Visalia, and near where the gold mines were discovered last fall, informs us that there are now between 60 and 70 miners in the district, which is named Centennial. There is sufficient water at present to work the claims in the bed of the creek, but that cannot be done for the gulches. The parties working what is termed the old claim are said to have sold seven or eight ounces of dust in Visalia. Other parties contemplate trying their fortunes in these mines shortly.

Nevada.

WASHOE DISTRICT.

TROJAN.—Gold Hill News, Feb. 23: The north winze below the 200-ft level is down 75 feet, all in ore which will mill \$40 to the ton. The south winze, 200 feet further south, is down 80 feet in \$32 ore. A large amount of good pay ore is developed in the 300-ft level, and in the

level above—the 240-ft level—the ore vein is 35 feet wide. These developments give good promise of a large ore body at the 400-ft level at which that shall be reached and opened. There is about 1,200 tons of good pay ore in the dump ready for milling.

DAYTON.—On the 220-ft level the ledge 500 or 600 feet north of the shaft was very badly broken up. The north drift, however, has followed the line of the ledge until it has concentrated and has the appearance of opening out into a fine body.

ALLEN.—Work in this old mine, between the Sierra Nevada and the Utah mine, is being actively pushed ahead under the efficient direction of James O'Donnell, who has been appointed Superintendent. Forty men are employed, and 50 tons of ore per day is being extracted, which is being reduced at the Western State mill. This ore comes from the 800-ft level, where there is a large amount of it in sight. The shaft is 1,000 feet deep, and the mine is not troubled with water, being drained by the deeper workings of the Utah mine near by.

OVERMAN.—Sinking the winze below the 1200-ft level is going steadily forward, the bottom still in good ore. The working station at the 1300-ft level is completed.

GOLD & CUREY.—The line of new pumps will be completed ready for use in a very short time. The mine never before was in as fine working condition as at present.

OPHIR.—Putting in the new pumps is completed from the 1000-ft level up to the 700-ft station. The old pumps have been taken out from the 700-ft level to the surface, ready to put in the new. While this is being done, the flow of water will be kept down with bailing tanks. The new pumps are of 14-inch diameter, and will be capable of draining an immense flow of water, should such be found on the lower levels. The putting in of the pumps will stop for the time being the use of the air compressor and blower, so that men will not be able to do much labor in the lower portions of the mine until the pumps can be started up.

IMPERIAL CON.—The connection of the north and south drifts on the 2135-ft level has greatly benefited the ventilation in that portion of the mine. The connection of the winzes and the south drift connecting with the Yellow Jacket, is furnishing as perfect a circulation of air as it will be possible to obtain until other winzes are sunk and connections made.

LADY WASHINGTON.—Sinking the winze below the 850-ft level is being pushed rapidly forward. The face of the north drift on the 850-ft level running toward the Overman, is in an excellent character of quartz and low grade ore.

BULLION.—The water from the east drift on the 1600-ft level has so decreased as to permit resumption of work in the face. The flow has been well taken up in boxes, in which it is carried through the Imperial mine to the Yellow Jacket shaft, through which it is taken by pumps to the surface.

BALTIMORE CON.—Sinking the north winze below the 1050-ft level has been suspended for the present on account of the flow of water. The quartz and ore in the face of the north drift on the same level is showing a steady improvement. The face of the main northeast drift on the 1400-ft level is showing some quartz and clay mixed. The flow of water from the face of the drift is steadily on the increase.

HALE & NOURCROSS.—The completion of the repairs to the main shaft on the 1900-ft level, connecting with the Savage, and the winze from the level above, has given a great impetus and greatly needed circulation of air through that portion of the mine. The water is being again gradually lowered in the main shaft.

KICKERBROCK.—The water in the shaft is being steadily reduced, and the 600-ft level will soon be reached if the machinery continues working as well as it has done thus far.

INJUN CON.—Sinking the north winze below the 1300-ft level is being fast progress, the quartz in the bottom being steadily on the increase in both quantity and quality.

SILVER HILL.—The new pumps are in and make the work of keeping down the flow of water at the bottom of the main incline much easier than it ever was before. Sinking the main incline has been resumed. The north and south lateral drifts on the 850-ft level are steadily advancing in a very favorable ground, running nearly parallel with the ledge.

YELLOW JACKET.—Both of the east cross-cuts on the 2040-ft level are steadily advancing, the face of each in favorable ground. Sinking the north winze on that level has been resumed, in order to reach and prospect the 2140-ft level. The new shaft is now down 530 feet. The face of the bottom is still in good ground.

WARD.—Sinking the shaft is being pushed vigorously, the bottom still in very favorable ground. The main south drift on the 1000-ft level of the Julia shaft is being pushed ahead with steady vigor, the face in soft porphyry, mixed with streaks of quartz.

JUSTICE.—Daily yield, 355 tons of ore, keeping the mills running up to their full crushing capacity. The output of 400, 600, 700 and 800-ton levels show but little change. The main southeast drift on the 1000-ft level has made but slow progress on account of the steady flow of water and bad ground encountered.

HOMESTEAD.—Good progress has been made during the past week in sinking the shaft. The formation in the bottom has changed to clay, intermixed with quartz of a fine character, which gives good assays in both gold and silver. It is the intention to soon commence the erection of hoisting machinery in order to expedite the sinking.

CHOLAR-POTOSI.—Daily yield, 100 tons of ore. This ore is taken from the stopes on the old upper levels of the mine. The east drift at the 1785-ft station is steadily advancing toward the ledge, the face in very favorable ground. Sinking the combination shaft is going steadily forward.

SIERRA NEVADA.—The prospecting drifts at the 1700-ft level, both north and south, are being pushed ahead with the usual energy. The south drift is showing more quartz.

MEXICAN.—Owing to the disarrangements caused by the putting in of new pumps at the Ophir shaft, the work in this mine has been confined for the past day or two to driving the east drift on the 1300-ft level.

BEICHER.—Daily yield, 125 tons of ore. Sinking the main incline is making steady progress. Sinking the drain shaft is making the best of progress. Opening the 800-ft station is also making good headway.

PROSPECT.—The water in the north lateral drift having subsided, drifting is resumed in that direction, following some excellent ore indications.

MINT.—Sinking the main shaft for a sump previous to starting the prospecting drifts on the 1400-ft level is nearly completed. Everything in and about the mine is in splendid working condition.

JULIA.—The main south drift on the 1600-ft level is steadily advancing, the quartz and ore in the face showing better and more favorable indications. The assays grow better as the ledge is prospected to the southward. The main south drift on the 1800-ft level is also showing better ore in the face.

LEVITIAN.—The face of the drift running north from the bottom of the incline below the 600-ft level shows streaks of ore, and is evidently nearing the ore vein descending from the ledge above.

CALADONIA.—Sinking the shaft below the 1400-ft level is being pushed vigorously forward. The north drift on the 1400-ft level is also making excellent progress toward the ledge.

SOUTH COMSTOCK.—Excellent progress is being made in sinking the shaft deeper, the work being pushed forward with a vigor and with a speedy practical development of the ore resources of the mine.

PHIL SHERIDAN.—The main east drift on the 400-ft level is steadily advancing toward the ledge.

NORTH CON. VIRGINIA.—The prospecting operations on the 1100-ft level are being prosecuted with all possible vigor.

ITAL.—Drifting for the purpose of prospecting the ore vein at the 1100-ft level has been commenced in good earnest. The pumps are all down to the 1100-ft station, and the mine is in excellent working condition.

Mica.

From Breslau, a city in Prussia, ranking in population next to the capital, Berlin, and an important industrial center, the *Alta* received the following communication:

"On several occasions your esteemed journal spoke of deposits of mica discovered in California and the Pacific States. Such discoveries are of considerable interest to many people here, owing to the extensive employment of this mineral in our city, where, for the last 15 years, Mr. Max Raphael has occupied numerous workmen in the manufacture of articles for ordinary and everyday use, as well as for scientific purposes, made either wholly of or combined with mica. He is doubtless the largest manufacturer in this particular branch in Europe. The peculiar properties of mica fit it for a number of purposes for which other substances do not answer. We learn from our townsman, Mr. Raphael, that formerly he imported large quantities of mica from the United States, but was compelled to cease on account of the constant increase of the price by Boston and New York dealers. Having found cheaper sources in other countries, he is now obtaining his supplies from them, though the mineral is inferior in quality to the American. He states his willingness to import anew from the United States, if it can be done at reasonable rates. In such event, and as soon as pending contracts with other countries expire, he will engage large quantities, to be shipped to him from any port of the United States, either Pacific or Atlantic, though he will require some guarantee as to steady supplies and at uniform rates. Many of the objects manufactured by him of mica can be likewise made of glass, especially of the recently-invented "tough glass," unless the price of mica is reasonable, it cannot exclude such competition. Once superseded by toughened glass, mica would no longer pay to be mined, and, except for a few scientific purposes, become valueless. A price such as several dollars, or even one dollar a pound, is out of question. It may be paid by a scientist, who needs a few pounds for making experiments and who requires select specimens for particular study. As for merchantable mica, even of the best quality, the waste in working it at the factory is from 33% to 75%, and the wastage is not worth a dollar per hundredweight. The price at which Mr. Raphael is obtaining his supplies at present varies, according to size and quality, from 10 cents to 75 cents per pound. To form a correct estimate of the quality and value and to enable him to contract for large quantities, Mr. Raphael requires sample lots of about 200 pounds of the raw material, just as it comes from the mine, only freed from coarse and stony matter. The pieces should be left in their natural shape, not trimmed or squared nor split up. Mica of good quality has the following characteristics: If the top layer or stratum, generally stained by foreign substances, is removed, the one beneath, when split off, should be of crystal-like transparency, while the body of the piece, in all its thickness, should show a reddish hue, with mirror-like smoothness of surface. To the touch it must feel hard; softish mica, though ever so transparent, does not serve for manufacturing purposes. Finally, the layers or strata, when separated, should be free from flaws or air-bubbles."

With reference to the above communication, any one interested in the mining or export of mica can be furnished with the full address of the Breslau manufacturer by calling at the office of the *Alta*.

The Mines of Owyhee.

The great want here at present, says the *Avalanche*, in order to effect a more systematic development of our mines, is capital. Judicious and economical management must also of necessity follow the investment of capital, otherwise the results will be, as has been too often the case in the past, most unsatisfactory to all concerned. Not only the miners of this camp have been serious sufferers by this mismanagement and failure to meet obligations, but the merchants and business men of the place here and in the vicinity have been directly and indirectly very heavy losers from the same cause. Reform, economy and vigilance should be the watchwords in all future operations. There is not a mine on War Eagle mountain but if worked judiciously would yield handsome returns to the owners. Experience, the opinions of men practically acquainted with the mines and past operations, fully justify this assertion. There is no reason why the Idaho mines should be in "bad odor" in San Francisco. If they are it is not the fault of the mines or the workmen. Better mines than those of Idaho exist nowhere in the world, and if the companies owning valuable works on the mountain have any doubt about it, that doubt ought surely to be removed when they see and know that rock has been taken out of nearly all of these mines recently none of which has yielded less than \$200 to the ton and much of it far in excess of that. This prejudice against our mines is the outgrowth of mismanagement, for which the people here are in no wise responsible. With the settlement of past indebtedness on a fair basis, and the resumption of work under competent and careful management, we feel justified in saying that there is no mining region on the Pacific coast that offers a more promising field for future operations than that of Owyhee. The subject is deserving of immediate and earnest attention at the hands of outside capitalists, who are inter-

ested in mining property here. What has transpired here during the past few months in the limited operations that have been in progress in some of the mines, and the movements that have been made in the way of relocating, by parties on the ground, constitute sufficient reason for immediate action. Our mines to be worked successfully must be developed systematically, and every practical man knows if a mine is worked by a few men taking out choice pieces of rock here and there it must be to the ultimate detriment of the property and not conducive to permanent benefits or profits.

A Well Appointed Gravel Claim.

The following is from the *Trinity Journal*: We last week visited the well-known claim of Chapman & Fisher at Arkansas Dam. We never visit this claim without a genuine feeling of admiration for the enterprise of its proprietors. We do not hesitate to say that it is the best appointed claim in the county, and that many of our miners could not fail to profit by a visit to it and inspection of the method in which it has been developed. The claim has been worked successfully for several years; last year the water held out so well that the yield was much greater than before, added to which it was in far better shape for successful working. Thus far this season the water supply has been light, but a considerable ground is already stripped and we do not doubt the claim will give a good account of itself in the spring.

The great obstacle to rapid work has heretofore been the number and size of the rocks which are found the whole depth of the bank. These large rocks are so numerous that a force of half a dozen men is kept constantly employed in blasting and breaking into pieces small enough to pass through the flume. The firm is now engaged in the erection of a derrick by which it is hoped that a great deal of this blasting and breaking will be avoided. The sweep of the derrick will have a swing of about 70 feet, and it will be set as close to the bank as possible. We understand the cost of this improvement will be in the neighborhood of \$2,000.

The claim is run night and day, the water being turned from one "giant" to the other or put on and shut off without leaving the bedrock. The reservoir is also opened and shut by means of a windlass, greatly simplifying night work. With a pressure of nearly 200 feet on the "giants" they do great execution in the heavy gravel bank.

We went into the bedrock ditch and flume, which are on a scale commensurate with the character of the mine. The flume is six feet wide and the principal under-current 24 feet. A new under-current was put in this year leading out of the upper flume. The yield from the under-current last year was in the neighborhood of \$3,000, most of which would have been lost without it. Starting from the main bedrock ditch the firm has run a bedrock tunnel the past summer which taps the bank 240 feet to one side. In this tunnel a flume is laid lined with rocks, ready for use as soon as the bank is washed away to where the "incline" comes through the rock.

FROM GOLD BEACH.—A letter just received from Big lagoon, above Trinidad, concerning the tests being made of the gold bearing sands of the beach at that point, contains information of a highly flattering character. Every experiment heretofore tried, and there have been several, looking towards the development of these mines and the devising of methods for saving the gold, which is almost of impalpable fineness, has been attended with indifferent success, yet every one has afforded more convincing proof that the sands are rich in gold, that the deposit is inexhaustible, and that the means and appliances for saving the gold are only wanting to secure the stores of wealth that exist there. Quite a number of our prominent citizens are interested in these mines and they have expended considerable sums of money in the attempt to develop them. It seems that, for some time past, the proprietor of a gold saving invention has been experimenting with his invention at this mine, and it is with reference to the result thus far obtained that the letter alluded to speaks. We are told, without going into detail, that the best anticipations are being realized, and that it is believed a sufficient test has been made, both of the appliances to save the gold, and of the richness and extent of the gold bearing sands, to warrant extensive operations for the development of the mine. We are certainly glad to hear this cheering intelligence, and hope the time is near at hand when those who have expended so much of their labor and means, will receive rich returns therefrom.—*Humboldt Times*.

MAKING MONKEYS USEFUL.—It will amuse and surprise our little folks to be told that these mischievous creatures can be taught to work; and yet they are tamed and made to work in two remarkable ways, in the East. First, in the tea-gardens of China, just as an experienced Chinaman works, picking the suitable leaves and letting the others be. In the second place, he has been taught, by the natives of Molacca and the Golden Chersonese, as far as Formosa to the East, to ascend trees, gather the fruit which is ripe, and either give them or throw them down to his master. It may be confidently asserted that in each of these cases the trained ape performs an office requiring more intelligence than that of a chimney sweeper or a crossing sweeper.

Salt Cave Discovered on the Klamath River.

Last week Ike Gayheart and Sam Williams discovered a great natural curiosity, in the shape of a salt cave in the bank of the Klamath river, about a mile north of the Oregon line. They were out hunting and following the tracks of animals and were led to the bank of the river, where close to the water's edge and at the foot of a high and steep precipice they saw an arched opening. Their curiosity prompting them to investigate and see what was on the other side of this "hole in the wall," they passed under the archway and found themselves inside a large cave, apparently round and with arched roof. The sides of the cave were covered with a substance of sparkling whiteness, while in the center of the cave boiled up a spring of water. Upon examining and tasting the substance encrusted on the sides of the cave, they found it to be salt, or very strongly impregnated with that article, and the waters coming from the spring were also found to be very strongly impregnated with salt. They broke a quantity of the white substance from off the walls and brought it away with them. Mr. Corpe, the mail carrier, brought some of it to town, and left a quantity at Dewitt's drug store. Dr. Robertson and Dewitt, who have tested it, declared it to be nearly pure salt, of very fine quality and with but little if any impurities in it. It is Dewitt's opinion that the water of the spring must be very strong in saline matter and that it is very valuable, as salt can be made from it with hardly any expense. The cave is situated on the south bank of the Klamath river, and Messrs. Gayheart and Williams describe the inside as a scene of grandeur and magnificence, and well worth going miles to see.—*Yreka Union*.

Origin of the Mission Grape.

Le Roy Gomez writes from the Sandwich islands to the *Bulletin* concerning the origin of the Mission grape as follows: Universal tradition among a people, if not history itself, must be accepted as the basis of history, and a residence of many years in Mexico, and a thorough inquiry relative to the origin of the grape in that republic, has resulted in the conviction that the Mission grape is indigenous and originated in the wild grape of northern Mexico.

The colonial policy of Spain prohibited the cultivation of the grape and the manufacture of wine in all of her American possessions. The vine was never introduced into Mexico during the colonial dependency from any part of Europe. Its cultivation was contraband, and the little that was carried on was done clandestinely by the priests in the more northern missions.

After the expedition of Coronado had awakened the spirit of adventure toward New Mexico, various military expeditions were sent out in that direction. One of these expeditions in traversing the vast region known as the Balson de Mapemi, discovered among the hills in which arise the springs that form the stream flowing into the Laguna de Los Pallas, a quantity of delicious grapes growing wild. From the trailing of the vines over the rocks and trees, they called the place Pallas. On their march northward they came to the source of the Rio Concha, which flows into the Rio Grande del Norte. There they also found grapes of the same variety growing wild, and they called the place Pallas, a name also significant of the trailing of the vines.

From these two sources spring all the grapes in Mexico, including the Mission grapes, which, according to tradition, were brought overland from El Paso del Norte to California.

LITTLE YORK.—This mining camp, although surrounded by rich and extensive gravel mines, which are worked on a large scale, and having numerous families in its locality, besides a large population of miners, the business part of town is nevertheless true to its name, being quite little; consisting only of one hotel and two saloons, in one of which is the postoffice. This is owing mostly to two causes, one of which has been remedied lately by the paying off of an \$85,000 debt, contracted by the company owning the mines, in running extensive bedrock tunnels, laying strings of iron pipe miles in length, building reservoirs, etc., which took two years to accomplish. During which time the money taken out of the mines was principally used in paying off outside indebtedness. The workmen did not receive sufficient to pay their board, nor the merchant enough to pay interest on what he sold; and to cap the climax on this gloominess, the business part of the town caught fire on the 5th of July last and was entirely consumed, from which it has not yet recovered. The parties owning some of the principal buildings declined, or were unable, to rebuild or furnish any more goods, until the mining company settled with them. This has been accomplished, but so recently that they have concluded not to rebuild before spring. The mining company have paid off all their indebtedness, and have a surplus remaining in their treasury. Their mines are fitted up in splendid condition, and are all now running. The miners receive their wages on the first of each month, and although York does look somewhat dilapidated at present, the business has again revived, the people are all feeling happy, and from her bright prospects in the future we expect to chronicle her among our liveliest mining towns for years to come.—*Dutch Flat Forum*.

The Great Eastern Quicksilver Mine.

The *Russian River Flag* says: Isaac Gum, President of the Great Eastern mining company, the office of which is located in this city, called at our office a few days since, and donated to our cabinet of specimens from the local mines, a piece of cinnabar that will assay about 30% of mercury. Upon inquiry we gained the following interesting information, which will encourage those who look upon the success of our local mines as all-important.

The first work of the company was devoted to the reduction of a class of soft cinnabar; but underneath this there was a vein of harder but much richer rock. Having got out enough of the first ore mentioned to keep their furnace supplied for some time, the workmen were directed to uncover the lower ledge. On a recent trip to the mine Mr. Gum found that an excavation 16x24 feet and 70 feet deep had been made, and the bottom was upon the ledge. He descended and procuring a chunk of about 80 pounds weight, had it sent up in the bucket. Upon breaking it into specimens he found that it would average 30%, as per one piece which he brought to this office. He says that the blast has thrown out pieces of 400 pounds in weight that would assay equally as well. This will explain the very handsome product which is now being regularly shipped from that mine.

While the rock run through the furnace does not average the enormous amount of 30% of quicksilver, he claims for the Eastern that its newly opened ledge has less barren rock in it, that the metal-bearing rock is in larger bodies, and is freer from seams, than any other mine in this part of the country. The ledge is near 100 feet in width (from wall to wall) and is longer, he believes, than any other ledge in the county.

Monte Diablo Coal Mines.

In a recent article we published the amount of coal that has been extracted from the Monte Diablo mines since 1860. Since the latter date two flourishing towns have grown up, Somersville and Nortonville. It now seems probable that the former will lose much of her former prestige, as we learn the contract between the Black Diamond and Pittsburg companies, under which the mines have hitherto been worked, has been cancelled. Eight years ago a contract was entered into by the parties mentioned to divide the products of the two mines into eleven parts, in the ratio of six to five, the Pittsburg to receive five-elevenths and the Black Diamond six-elevenths of the proceeds. The quality of coal for some time past extracted from the Pittsburg mines has been inferior to that of the Black Diamond, and the latter company objecting to its further use, on the 14th inst. an agreement was entered into between the parties by which the existing contract, which would not have expired until July 1st, 1877, is terminated. The result will probably be a suspension of work in the Pittsburg, at least for the present. While the effect of this agreement will have a tendency to depress business at Somersville, it will have a contrary effect at Nortonville. It will necessitate the extraction of about 2,000 tons of coal per month in addition to the present amount, which will increase the working force and consequently aid in the business prosperity of the town. The plan of running a tunnel to drain the surplus water of the mines is being considered, and should it be adopted no doubt it would give a new lease to the Diablo mining interests.—*Antioch Ledger*.

The New Stars of 1876.

The number of new planets discovered during 1876 was 12. We give the following complete list from the *Athenaeum*:

No.	Name.	Discoverer.	Date of Discovery.
158	Koronis.	Knorre.	Jan. 4th, 1876.
159	Emilia.	Paul Henry.	Jan. 26th, "
160	Una.	Peters.	Feb. 20th, "
161	Athor.	Watson.	April 16th, "
162	Prosper Henry.	Perrotin.	April 21st, "
163	Erigone.	Paul Henry.	April 30th, "
164	Eva.	Peters.	July 12th, "
165	Loreley.	Peters.	Aug. 10th, "
166	Rhodope.	Peters.	Aug. 17th, "
167	Urda.	Peters.	Aug. 28th, "
168	Sibylla.	Watson.	Sept. 27th, "
169	Zelia.	Prosper Henry.	Sept. 28th, "

No. 162 still remains nameless. Of the discoverers, Knorre resides at Berlin, Perrotin at Toulouse, and the Henry brothers at Paris. Peters and Watson have well maintained the honor of the country in this line of discovery during the year, and America still leads the world in the number of planets she has given to science.

THE SANTA ROSA COAL MINE.—Dr. Henry, a mining expert well known on this coast, has been in Santa Rosa recently, making an examination of the coal mine in Taylor or Cotate mountain, about three miles from town. He reports an excellent prospect. The vein measures 19 inches, with well defined walls. He pronounces it a true fissure vein of coal. Dr. Henry advises the company to follow the vein 100 feet further, and then start a level and cross-cut. He thinks the vein will widen to three or perhaps four feet, and the vein would then be of great value. The quality of the coal, he says, is not equalled on the coast, except from the Wellington mine in Vancouver. It is a very superior lignite, and it will coke a little, but not enough for a gas coal. For steam and domestic purposes it is not surpassed on the coast. This is a statement of the facts about the mine just as they exist.—*Sonoma Democrat*.

Educated Fleas.

We are supposed to know something about fleas in this State, but it cannot be doubted that our acquaintance with them is rather practical than scientific. We can perhaps supply our deficiency in one branch of flea science by reading a few paragraphs from an article on "educated fleas" which W. H. Dall writes for the *American Naturalist*. Mr. Dall is a member of the California Academy of Sciences, and was a resident of this coast for several years. He is now connected with the Smithsonian Institute.

Some weeks ago, when passing through Broadway, New York, not far from Union square, an accidental glance caught the sign over a doorway, "Exhibition of Educated Fleas." Past memories and present curiosity determined me to make an inspection at once. Half an hour later I had seen all there was to see, purchased a lively little pamphlet by—shall I say the inventor of the educated fleas? and decided that the small fee exacted was well expended. As it does not appear that the *modus operandi* of this exhibition has ever been explained, an attempt in that direction may not be uninteresting.

To make the explanation intelligible it will be necessary to begin with the conclusion, or in other words to first state the essential part of the explanation.

First, the fleas are not educated.

Second, all the performances which make up the exhibition may be traced directly to the desire and earnest efforts of the insects to escape. It is said that the constant raps which it receives, when attempting to jump and thereby hitting the sides of its prison, incline it to work. If this be true, and it might readily be tested by experiment, the flea's education is entirely comprised in it, and, so far as it goes, it is a species of training. I am not yet convinced of the accuracy of the statement.

It was noticeable that the surface over which the fleas dragged their burden was composed of compact blotting paper on which their hooklets took good hold, and that whenever the performance of any one individual was not going on, the particular object to which it was attached was laid on its side, or so that the insect was left, feet in air, where it could not exhaust itself by unnecessary efforts. I think that the absence of any proof of education in the above cases is quite plain.

In the second class of cases the efforts made by the flea to escape are precisely the same, but, being fixed itself, it must necessarily show its power by traction upon some movable object or by aimless gesticulations in the air.

Generally the insect is attached to a sort of style or wire in a perpendicular position, with the head uppermost and the limbs extended horizontally. Usually it will remain quiet, but if disturbed means employed to give an appearance of intelligent action to these struggles are sufficiently ingenious.

In the first place, each flea is attached to some object in such a manner that it cannot free itself, while the movements of its legs and feet are not hindered or embarrassed.

This was explained by the proprietor. The surface of the insect is so polished that no cement will adhere to it when dry, and should a soft or waxy substance be used the insect dies very soon. (A probable cause of this might be the obstruction of the stigmata.) He stated that by tying a single silk fiber around the flea and knotting it on the dorsal side, a bristle, fine wire, or what not, may be cemented to the knot. I was not able to observe exactly where the fiber encircled the insect. This part of the process is the most delicate and difficult to perform.

The first preparation for their task is stated to be as follows: The wild flea is put into a small pill-box with a glass top and bottom, revolving on an axis like a lottery wheel and forming a miniature treadmill. After a few days' confinement herein, the flea, which in a state of nature is, as we know, excessively inclined to jump, becomes broken of the habit, turbed by the vibration of its wire, as produced by knocking on the table, it will work its limbs about, seeking something to take hold of. If, then, segments of finest wire, fans of tissue paper, or other representations of objects in miniature are attached to its fore "feet," we shall have it apparently brandishing a stick or sword, fanning, performing on a musical instrument, etc., all of which is much more clearly seen with the aid of a lively imagination.

Two fleas furnished with segments of finest wire on their fore "feet," and placed with their ventral sides so near that the mimic swords can touch, but not the insects' feet, give a representation of a duel not much worse than that usual in most theaters. In their struggles to reach the adjacent objects, it would be strange if the little wires did not clash occasionally.

The most amusing and, at first, most incomprehensible of the various performances, is that of the dancing fleas. The orchestra are placed above a little music-box, whose vibrations cause them to gesticulate violently for a few moments, fastened as they are to their posts. Below them several pairs of fleas (fasten by a little bar to each other in pairs, those of each couple just so far apart they cannot touch each other) are apparently waltzing; an inspection shows that the two composing each pair are pointed in opposite ways; each tries to run away, the "parallelogram of forces" is produced; the forward intention, converted to a rotary motion, ludicrously imitating the habits of certain higher vertebrates.

USEFUL INFORMATION.

Rope Gearing.

We find in the *Hydraulic Engineer* a careful article by Mr. James Durie on the advantage of rope gearing for the transmission of large power in mills and factories in the place of the toothed gear which is in common use. We shall quote a few paragraphs:

In the case of rope gearing, the ropes by which the power is transmitted consists of an elastic substance, and their lightness, elasticity and comparative slackness between the pulleys are highly conducive to their taking up any irregularity that may occur in the motive power. This accounts for the slight attachments that are required for shafting driven by ropes from a grooved fly-wheel; and it is the same with all the bearings throughout the mill, the shafts in the various flats only requiring a light wall box, bracket, or the bearing may be carried on a column of the mill. The cost of fitting up a mill with rope gearing is considerably less than with tooth gearing, when the shafts to be driven revolve at a high speed, but the cost is about the same in other cases. It is, however, rather difficult to give exact figures for this comparison, one great saving being in the foundations of the engine, the wall boxes, and the extra strength of the walls required for upright shafts.

The great advantage of rope gearing, however, is the entire freedom from any risk of a breakdown; when a rope shows symptoms of giving way—and ropes always give symptoms of weakness long before they break, the weak rope can be removed and another put in its place at any meal hour or evening. The cost of the maintenance of ropes for transmitting 400 ind. h. p. has been found to be £20 per annum, or about £5 per 100 ind. h. p. per annum. This is made up of the cost of renewal of the ropes, and occasional wages for tightening them. Some ropes have been found to run ten and a half years, but as the general rule, the life of a rope may be said to be from three to five years, though even five years has been often much exceeded.

The friction of rope gearing has often been found to be, for high speeds, considerably less than that of toothed gearing; but the writer regrets not being able to give definite information on this point, which is a very important one to those contemplating altering their gearing or building new works. The reason why no definite reason can be given—beyond the universal impression of those who have adopted them, that ropes require less power to drive than toothed gearing—is, that in all cases where rope gearing has been substituted, other alterations have been made at the same time, or the engines were, after the alteration, driven at an extra speed of 10 or 15 revolutions per minute. However, every one who has substituted rope gearing for toothed gearing, also agrees in bearing testimony to the great improvement and steadiness of driving obtained after the alteration, and that they are enabled to turn off a greater amount of yarns from the machinery in the same time. The tendency at the present time, with the introduction of shorter hours of labor and foreign competition, being to increase the speed of shafting and machinery, to be able by this means to increase the speed of the shafts must be of great advantage to those who own old mills, the toothed gearing of which is generally driven as fast as it is safe to drive it.

The ropes used for rope gearing are mostly made of hemp, carefully selected; the qualification of good rope being that the fibers are as long as possible, and that the rope should be well twisted and laid, and yet be soft and elastic. It is also very important that the ends of the ropes should be united by a uniform splice—the splice should not be of a greater diameter than the other part of the rope; to effect this object the splice is made about nine or ten feet long.

PRESERVATION OF BELTING.—In order that belting of cotton or linen should have both strength and flexibility, together with increased adhesive power, they should be thoroughly soaked in linseed oil varnish. If the belting be new, the varnish may be applied with a brush until no more will be taken up, whereupon it may immediately be used without any preparatory drying. After having been in use for some weeks, a second application of the varnish should be put on. Cotton or linen belting thus prepared will neither contract nor stretch, and will always be pliable and unaffected by change of temperature. The adhesion of the belt to the pulley is likewise increased by the varnish, while steam and acid fumes have no effect upon the belting at all. —*Maschinen-Constructeur*.

NEW SUBMARINE CABLES.—The latest important addition to our stock of submarine cables which now link country to country, and perform their work in the recesses of the ocean, is a duplicate line down the Red sea, from Suez to Bombay, the first section of which to Aden, has recently been finished; while the second, from Bombay to that place, is in course of submersion. When these are completed there will be a double submarine communication all the way from Cornwall to India, saving the short land-line through Egypt, and the value of this to our Indian communication can hardly be over-estimated. —*Ryland's Trade Circular*.

Artificial Leather from Cuttings.

The *Bayerische Industrie und Gewerbeblatt* publishes some particulars respecting the utilization of leather cuttings for making artificial leather. According to the Bavarian patent of Soren Sorenson, of Copenhagen, the cuttings are first cleansed, and then put into a machine and worked up into a fibrous mass. This is mixed with fluid ammonia, and the gelatinous material which results from this mixture is pressed into molds, or rolled out into sheets and dried; it is now a very hard and firm material, but non-elastic and soluble in water. In order to make it elastic and impervious to water, it is mixed with india rubber. The india rubber is crushed and well washed in a washing machine, consisting of a couple of grooved steel rollers, on which a jet of water plays. The india rubber is then dried and cut into pieces and dissolved by means of oil of turpentine, benzine or other fluids suitable for the purpose. The quantity of the dissolving matter is determined by the quality of the india rubber. Para india rubber will dissolve with four parts of the fluid, Central American scraps with three and a half parts, Guayaquil with three parts and African with two and a half parts. The india rubber in this state is then mixed with ammonia water, and in a close-shutting kneading machine stirred up with the leather mass. The mixing proportion is governed by the proportion to which the manufactured stuff is intended to be put. For instance, if intended for soles, 25 parts of solid india rubber, 67 parts of ammonia water, and 67 parts of leather; if for heels, 25 parts of india rubber, 80 parts of ammonia water and 80 parts of leather; if for inner soles, 25 parts of india rubber, 75 parts ammonia water and 90 parts of leather. After the kneading, which is continued until the mass is thoroughly homogeneous, the latter is either pressed into molds or rolled out into lengths and then dried; while being dried, it is subjected to progressive pressure, the degree of which is determined by the use to which the material is to be put, the heaviest pressure being applied to that intended for soles. When thoroughly and sufficiently pressed, the leather is dyed or glazed, or otherwise manipulated to imitate natural leather as closely as possible.

It is not to be doubted that this artificial leather may have all the appearance of the real article, but it is highly problematical whether the resemblance extends to its firmness and durability.

A NEW SUBSTITUTE FOR GOLD.—The French have introduced a new substitute for gold. It consists of 100 parts by weight of pure copper, 14 zinc or tin, 6 magnesia, 3.6 sal ammoniac, 1.8 burnt limestone and 9 cream of tartar. The copper is first melted, then the magnesia, sal ammoniac, limestone and cream of tartar in powder are gradually added separately. The whole is kept stirred for half an hour, the zinc or tin being dropped in piece by piece, the stirring being kept up till they melt. Last of all the crucible is covered and the mass kept in fusion for 35 minutes. The scum being removed the metal is poured into molds. The alloy is fine-grained, malleable and takes a high polish. It does not easily oxidize.

PASTE FOR CLEANING METALS.—Take one part of oxalic acid and six of rotten stone; mix with equal parts of train oil and spirits of turpentine to a paste.

GOOD HEALTH.

Don't Dwell on One Idea.

It is the full, steady, equable exercise of every mental faculty which is the only infallible guarantee of mental health.

Let every man and woman mature this idea well, and steadily guard against one thought, one pursuit, one exclusive employment, one hate, one love, one grief. Blessed is that providence which seldom sends a single trouble! It is fatherly beneficence which often orders another, to tear the heart away from dwelling on the one great calamity. It is single troubles which craze men. It is not the general student whose mind becomes unbalanced. It is not the man who has a great many irons in the fire at a time; it is not the worker who has more business than he can attend to; it is the man who has leisure to do nothing, it is the man who nurses the one thought wholly, who makes shipwreck of the immortal part. It is the one idea man who is without ballast, and we patronizingly excuse him by saying, "on every other subject he is a sensible person."

Asylum statistics force upon us the unexpected truth, that of all classes of inmates farmers make the largest, in spite of the fabulous health-giving influences of a farming life. Such a result can in no way be accounted for, except in the sameness of thought and pursuit. Another fact, quite unanticipated, is, that in an equal number of New England men and slaves on Southern plantations, the proportion of lunatics is five times greater among the whites; there are five lunatics to one among the negroes; it is because steady concentration in a limited sphere is essential to securing plenty from the stony soil of New England, so barren, indeed, that multitudes are driven from agricultural pursuits, and in patents and inventions eat out their minds.

Our farmer readers will very naturally in-

quire what we would advise as the most perfect safeguard against so lamentable a close of life. Unhesitatingly we respond—scientific agriculture; for there is not a quality of the mind which, in its far reachings, it will not make up and energize; for to be properly and most profitably pursued, it makes almost every other science subservient to it. Thus followed it is the most ennobling of all human pursuits, because it perfects the body and refines and elevates the mind. What we have said, therefore, at the commencement of this article, we desire to repeat at its conclusion with most impressive emphasis—don't dwell on one idea. —*Hall's Journal*.

Importance of Good Water.

No question can be of more importance, from a sanitary point of view, than that of the supply of wholesome water. It is known that water does not in itself change in character, but it becomes noxious as it is made the vehicle for conveying injurious matter. Hippocrates appears to have been aware of the importance of pure water, and moreover of the places for its selection, or as it has been stated, "upon the aspect of its sources as well as upon its elevation." Mr. Simon, of the medical department of the Privy Council, in his last report of 1869, stated that "the doctrine in general terms, that a vast influence is exercised over the health of the communities by the quality of the water which they consume, is one which, as far back in literature as any reference to such questions could be expected to exist, may be seen to have universal medical consent in its favor; and during long ages of history the common instincts of humanity were even purer and stronger than undeveloped science. Of the many invaluable additions and improvements which medical knowledge has received within the past quarter of a century, scarcely any can, in my opinion, be compared for present practical importance to the discoveries which have given scientific exactitude to parts of the above stated doctrine, and have enabled us definitely to connect the epidemic spread of bowel infections in this country with the existence of certain faults of water supply. Not only is it now certain that faulty public water supply of a town may be the cause of the most terrible epidemic outbreaks of cholera, typhoid fever, dysentery and other allied disorders, but even doubts are widely entertained whether these diseases, or some of them, can possibly attain prevalence in a town except where the faulty water supply develops them." Such may be said to be the testimony of one of the highest medical authorities in England. Authorities in other countries have likewise drawn attention to the importance of the purity of water supplies, and moreover, Professor Pettenkofer has shown that there are in some cases certain definite relations between epidemics of enteric fever and cholera and the state of the level of the ground water.

Diet for Consumptives.

Consumptives must see that their bodies are properly fed. They should not take food as a medicine, but as nourishment. They should have the very best things to eat they can get, and, fortunately, the best things are not always the most expensive or difficult to obtain. If it agrees, a cup of cream may very appropriately be taken every day by those who are inclined to consumption. Brown bread, and milk and cream, oatmeal and cream, eggs, with a moderate use of beef and mutton, good butter and mealy potatoes, will, of themselves, constitute a perfect diet. They should avoid nicknacks and fancy foods, and live on things substantial and nourishing. Fruits should be used in their season moderately. Consumption is a constitutional disease showing poverty of blood and poverty of healthy tissue, and this poverty must be eradicated. It can be done partially by such foods as are needed to build up a strong healthy body and carry on all its functions. Many physicians think that the disuse of fat is a cause of consumption, and they prescribe cod-liver oil, not as a medicine, but as a food, and, in many cases, it has proved useful. We think, however, that it is the sedentary and unnatural life people lead that has most to do in causing so much consumption, and that with this sedentary life comes a feeble condition of body and brain favorable to the disease. A wise physical education and abundant wholesome nourishment would dissipate half the consumption in the world, and the other half would soon be banished by some other means. Consumption is a disease to be avoided, not cured. —*M. L. Holbrook, M. D.*

FLUIDS OF THE MOUTH.—Dr. Hodson wisely calls attention in the *Medical Record* to the fact that, in any illness involving a feverish condition, the fluids of the mouth are constantly as intensely acid, as respects the teeth, as in any medicine administered by the physician; and, moreover, from the high temperature of the buccal cavity at such times, the power of these acids for evil is greatly augmented. Further, a direct consequence of these conditions is the especially rapid fermentation and decomposition of all food lodged between and around the teeth, and the consequent elimination of other deleterious acids. Dr. Hodson recommends rinsing the mouth with lime water, diluted according to the sensitiveness of the mucous membrane, and flavored with a few drops of wintergreen or peppermint to make it agreeable.

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, March 3, 1877.

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Note on Retorting Quicksilver.

When it becomes necessary to retort the quicksilver in a mill, I insert in the top of the retort an S tube, made of a piece of half-inch gas pipe. A pan in the retort is not essential. The closure of the retort is well luted with a stiff paste of ashes and water, to which a little salt may be added, and the luting is thoroughly dried by a gentle fire.

A few flasks of quicksilver are now poured in through the S tube, which is furnished with a funnel fixed to its upper end, and the fire is increased till distillation proceeds, after which a steady heat is maintained, the quicksilver which passes over being replaced flask for flask, by means of the tube, till all is done, when the retort is allowed to cool, and the remaining lead or other metal taken out. The lower curve of the S tube remaining full of quicksilver during the operation, forms a valve which, while allowing the passage of the liquid quicksilver into the retort, prevents the escape of vapor, which therefore finds its way to the condensing pipe. When the retort is used for amalgam the S tube, in which some quicksilver remains, forms a good safety valve to prevent explosion in case of obstruction of the condensing pipes.

C. H. A.

The News says over 2,000 men have left Virginia City and Gold Hill during the past month. Work being very slack there, they were compelled to seek other places. A good many of them have come back to California, and quite a number have gone to prospecting, when they could not get steady work on the mines.

An Improved Quartz Mill.

Oliver Allen, of Forest Hill, Placer county, has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, a quartz mill of peculiar construction. The object of the invention is to provide a machine for crushing quartz and other substances by means of rolling weights. These rolling weights are applied and operated so as to avoid the objections to the Chile mill, or wheel system, in which connection the rolling weight principle has heretofore usually been attempted. These attempts, however, have so far failed to produce a crushing mill that will operate successfully and economically, principally because of the mechanical difficulties encountered in handling the heavy wheels required to do the work. In this machine the inventor operates the rolling weights by a direct or reciprocating motion, so that he obtains the benefit of direct action and reaction in the working effects of the weights on the ores in the batteries and he is also able to operate the weights by a direct or rectilinear motion. The batteries are a short distance apart and parallel with each other, and each one consists of a long box with the usual screens, etc. The rolling weights or crushers may be a wheel of the required weight and size or, preferably, a segment. Each wheel is made of the proper width to fit into one of the batteries so that its rim or circular face will rest upon the bottom of the battery. The circular face of each wheel is provided with suitable shoes, and the bottom of the batteries has dies, so that they can be replaced as worn out.

The chief novelty of the improved quartz crusher consists in imparting to the wheels a rocking motion inside of the batteries, so as to obtain the advantage, first, of operating them by direct application of power; second, by an increase of speed; and third, of subjecting the ore to the action and reaction of the weights, by which greater crushing capacity is gained. The weights are connected to each other by a shaft which passes across above the batteries and connects the central points of the weights about which the curved crushing faces are described. This shaft is permanently secured to the weights so that they may all move together. The machinery is so arranged that the rotation of the shaft imparts a rocking motion to the crushing wheels. A simple device prevents the crushing wheels from shifting their position, but allows them to accomplish a reciprocating, semi-rotary motion inside the batteries. This is necessary, as the centers of the crushing weights and consequently the shaft, are continually changing their position, and some device is required to hold the weights to their proper position inside of the batteries.

The battery is so constructed as to permit of an ore feeder being placed over it. To accomplish the feeding properly the upper or straight side of the crushing rollers is constructed with a central ridge and sloping side, so that the ore will be equally divided and fed upon each side. A scoop or round flange is constructed around the end and part of the sides of the ridged upper surface of the weights, so that the ore will be dropped at the center as the weights curve back, and not be fed over the end of the top. An arrangement is made so that as the faces wear away the weights can be lowered so as to preserve a uniform contact with the dies.

This machine can be used for crushing either by wet or dry process. For wet crushing the water is discharged under pressure into the battery so as to agitate the pulp while the crushing action is going on. In this machine the ore is subjected to the pulverizing action of rolling weights, and at the same time the machinery is capable of yielding to the necessary unsteadiness and inequalities of action required in a machine for crushing hard substances. The weights act and re-act upon the ore, thus accomplishing better results than when the crushing action is only given in one direction. The streams of water loosen up the pulp so as to present every particle to the action of the crushers and also assist in discharging the pulp. The rolling action of the crushers also assists in forcing the pulp against the screen. Ample means are provided for discharging the pulp as fast as it is reduced fine enough to pass through the screens. Grooves or channels will lead the pulp into the vessels or receptacles intended to contain it.

Mining City Lots.

There were a good many places in California where, in early times, the little mining towns were undermined in the search for gold. When it was found that the gravel channel ran under the town, the miners continued to follow the course regardless of town lots, streets or edifices. In many cases the towns were moved to one side on less valuable ground, leaving the miners the old town-site to work out. This, in any other country, would seem rather an anomalous proceeding. The idea of town lots being rendered more valuable for the contents of their soil than for their position or superficial area, seems somewhat strange. Under the circumstances mentioned, however, it is easily seen how such could be the case.

Although this digging up of town lots for mining operations was once more frequent than now, yet it is now by no means unfrequent. Only a few weeks since we called attention to

the fact that some one in Mokelumne Hill, Calaveras county, was mining in his garden and working on an old gravel lead. A similar circumstance is recorded this week in the *Mountain Democrat*, (El Dorado county), as follows: "The success of men who have been mining the Geo. Myers lot has gotten up quite an excitement in regard to mining city lots in central Placerville. Ed. S. Evans and S. J. Ford have set a line of sluices and made other preparations for working out the lot back of Culbertson & Co.'s furniture store. Another company has made a contract to work out the lot in the rear of Hunger's butcher shop, giving Hunger one-fourth of the gross proceeds for the privilege. George Myers, from the mining of his lot, will realize enough so pay for the new building he is about to erect thereon."

Although such circumstances as the above may appear improbable to people abroad, it is, as before stated, by no means a very uncommon circumstance in the mining towns in the interior of California.

The Sweetland Creek Mines.

We see by late London files that the Sweetland Creek mining company, whose property is located in this State, has concluded to wind up its affairs. This gravel mine is owned entirely in England, and of late they have been unsuccessful in their work. The mine has heretofore been worked at a profit, the last dividend of two shillings per share having been paid in June, 1876. It has paid altogether £3 10s per share on 150,000 shares. The owners have, however, known for some little time that they were apparently drawing near the end of profitable working. The directors, fearing a loss upon the last run, telegraphed out here to get an offer for the property. They were offered £2,000, which offer was afterwards increased to £2,400.

The side dirt, which the company looked upon as giving them a new lease of life for four or five years, disappointed them, as according to the Superintendent's report there was but very little chance of profit from it. A somewhat curious circumstance was that the manager of the property here, Mr. McLean, was willing to buy it and there was no competitor. The company tried to sell the outlet to an adjoining company, but they refused to buy. Very little money was spent on the plant by the company, although they bought the iron and made the pipe on the ground. Mr. McLean's idea in bidding was that, perhaps, if the price of water was reduced, he could work the side dirt at a profit, apart from which the mine was of no value. The general impression of the meeting held in London on the 1st ult. was that they were not justified in keeping up the organization. A resolution was offered and passed recommending the directors to dispose of the property of the company in California on the best terms possible and to call a meeting of the company to wind up, appoint a liquidator, and divide the assets. This being unanimously agreed to it was subsequently resolved to telegraph to Mr. McLean that the shareholders would accept an offer of \$15,000 plus the balance in hand (£600) subject to an immediate reply from him.

The Miners' Wages Question.

We understand that the miners' strike at Smartsville, Yolo county, still continues, and no changes have taken place since the first of the month, when wages were reduced. The miners still continue to refuse to work for two dollars and a half a day, to the hand, and they have formed an association of resistance to the action of the mine owners. The Grass Valley Union understands that the miners of the district will not allow any one to work at miners' work for less than three dollars a day. Both sides seem determined and the end is not difficult to predict. The mine owners have one big advantage in the matter this year. Water being scarce and the season promising to be very short, they say they can afford better now than ever to let their ground remain idle. Beyond preventing work by those who might do so for \$2.50 a day, the miners have exhibited no desire to use force to carry their point. At North Bloomfield, however, where wages were reduced on the first of the month, the Union says they have had no trouble whatever over the matter. It says: The miners are now working for \$2.50 per day, per man, and there are many applicants for work at that rate of wages. In fact, so far as Bloomfield is concerned, the supply of labor is much greater than the demand. We have heard nothing from French Corral for the last few days, but we understand that the reduced rate of wages still obtains in that place, and there are no hostile demonstrations by the miners who will not accept work at the lower wages. Chinamen down there are at work. At Bloomfield it is noticeable that the Chinamen who had their wages cut down, "all same Mellican man," did go on a strike for a day or two. At Smartsville the miners are still holding out, and the companies are also stubborn. The result is no wages and no work, and the water season running idly away. In quartz mining everywhere it is as it has been for years, the quartz companies paying regular wages at regular times.

The Pacific Machinery Depot.

The Pacific Machinery Depot, Messrs. H. P. Gregory & Co., has been removed from the old place on First street to new and much more commodious and convenient quarters in the fine new building on the corner of Market and California streets. The new locality is one of the best in the city. It is at the corner of the "money street" of the metropolis, and the principal thoroughfare—Market street. Close to the ferry lines, every one who comes to the city must pass the store. The quarters are commodious and attractive, and the goods are displayed in a tasteful style, and convenient for close examination. The new sales room is 46 feet front by 137 feet deep; the basement is the same size and is used as a store room. The ware rooms are spacious, light and airy, and afford an excellent place for the exhibition of samples of the articles dealt in by the firm.

Among these articles are the following: J. A. Fay & Co.'s wood-working machinery; Blake's steam pumps; Tanite Co.'s emery wheels and machinery; Bement & Son's machinist tools of all kinds; Sturtevant's blowers and exhaust fans; pure oak-tanned leather belting; Perins's French band saws; planers' knives; Nathan & Dreyfus's glass oilers; and mill and mining supplies of all kinds.

Messrs. Gregory & Co. are now sole agents for the New York Belting and Packing Company's line of rubber goods. This company is the oldest and largest of the manufacturers of vulcanized rubber fabrics adapted to mechanical purposes, in the United States. Among the articles manufactured by them are the following: machine belting, steam packing, leading hose, suction and test hose, wagon springs, billiard cushions, grain drill tubes, car springs, etc. The reputation of the New York Belting and Packing Company is too well known on this coast to require any comment from us. They have steadily adhered to their original policy on which they built their reputation—that of making a standard article which they could guarantee.

Among other articles, Messrs. Gregory & Co. keep several styles of portable engines. The Payne semi-portable engine ranges from two up to ten-horse power, and from \$250 up to \$850 in price for engine and boiler complete. These engines are intended for any of the uses to which portable engines are applied. Another new line of goods kept by the firm are the pumps made by the Gould Manufacturing Company. Innumerable styles of these pumps are made for hand or windmills, deep wells, ships, irrigating purposes, etc.

The new store of the Pacific Machinery Depot is certainly one of the handsomest in the city. The Messrs. Gregory started in a modest way only about two and a half years ago, on First street, in a single store. They then extended their quarters by leasing the store next door and throwing both into one. In time, for want of more room, they were compelled to increase their accommodations by laying a floor and making a two-story room of what they had. As their business has increased largely, however, and new lines of goods have been procured, they felt the necessity of moving to a better location with more spacious rooms. The present quarters are first-class in every respect, and the firm is to be congratulated on its success.

The Gravel Mining Season.

The supply of water in a good many mining ditches is failing, and the miners are again expressing fears of a very short season. This fear does not seem confined to any particular locality, but the state of the case is the same in all the gravel mining regions. Quartz miners never had more favorable weather, the season having been so open that work at mines and mills everywhere has progressed almost uninterruptedly. A large amount of prospecting has been done in various directions this winter—more, perhaps, than has been done for many years. Men who found no employment have gone into the hills prospecting, instead of sitting around growing about the hard times.

With regard to the scant supply of water for the gravel mines the Dutch Flat *Forum*, which is published in the immediate vicinity of many of these claims in Placer county, says: There is yet, however, ample time for a heavy deposit of snow in the mountains, which is the source from which our late water is received in the summer. Ordinary seasons the weather is so stormy during the months of January and February that but little profit is realized from washing. The various claims were in so much better condition for advantageous working than ever before, that with the water they have had since the season opened (Feb. 1st), they have been doing profitable washing, and not, as is usually the case, been obliged to spend thirty or sixty days on dead-work. Consequently, should we have late storms there is every reason to believe that it will prove one of the most profitable seasons we have had in many years in proportion to the number of days of water supply.

THE rates for telegrams from California to Europe have been reduced.

Comstock Papers.—No. 19.

Overdoing Matters at the Start.

Not only in the matter of mill construction did the pioneer miners on the Comstock greatly overdo things at the start. Their extravagant ideas about the mineral wealth of the country betrayed them into a variety of other equally fatal mistakes, such as the laying out of extensive cities at all supposed eligible points, the building of costly wagon roads over the mountains, the projection of gigantic tunnel schemes and the like, to say nothing of innumerable mining enterprises, backed by any amount of nominal capital. Within 18 months from the time that the Washoe excitement broke out more than a score of town sites had been surveyed at localities that were believed to possess such natural advantages as would speedily attract to them a large population, and render the lots there laid out exceedingly valuable. All the mineral and thermal springs within a hundred miles around had been seized upon under the impression that they could easily be converted into great sanitariums, whose wide-spread fame would at once attract to them swarms of invalids from every quarter. Through every pass in the Sierra Nevada between Sonora and the Downville buttes a toll road had been commenced and partially constructed, nearly enough money having been expended first and last on this class of improvements to have built a narrow-gauge railroad over the mountains. Before the end of the year 1861

Eighty six Companies, with an Aggregate Capital Stock of \$61,500,000.

Had been organized, the most of them having their headquarters in San Francisco, to open up and work the mines of western Utah, the era of excessively large capital and purely speculative mining having not yet been inaugurated. Only in one case, that of the Ophir, did the stock of any of these companies amount to as much as \$5,000,000. That of the Gould & Curry, next in magnitude, was fixed at \$2,400,000 and that of the Mount Davidson at \$2,000,000, none of the other companies on the list having reached the latter figure, the most of them having ranged from \$250,000 to \$500,000. Of all the companies incorporated during that period,

Only Nine Survive,
Viz.: Ophir, Gould & Curry, Sierra Nevada, Chollar, Lady Bryan, Hale & Norcross, Utah, Bullion and the Daney, the limits of some of these having since been so curtailed, extended or otherwise altered as to nearly destroy their identity. The claim of the present Ophir company, for example, covers but a fraction of what constituted the original Ophir ground, while the Sierra Nevada, the Chollar and the Daney embrace a good deal more ground than they did at first; the Chollar having absorbed what was formerly the Potosi and the possessions of the Daney having been extended for more than a mile north of their original location. On the other hand, a good many small claims have been aggregated, constituting one or more large ones, as in the case of the California, Consolidated Virginia, Empire-Imperial, etc. Some of these early incorporations, for one reason or another,

Enjoyed Quite a Fame in their Day.

The Burning Moscow, for instance, was for a time rendered conspicuous through the long and bitter contest which that company waged with the Ophir, the problem of the one ledge theory having for the first time come up for adjudication and forming the turning point in the fight. The Mount Davidson company, formed to drive a tunnel into the Comstock lode and open it up to the depth of 1,000 feet, was for several years a live and popular institution, the end proposed having been then considered a marvelous undertaking. The Latrobe was another incorporation gotten up for a similar purpose, both of these companies expecting also that they would intersect some valuable blind leads in the course of their excavations. In this, however, both were disappointed, though the Latrobe company did have the good luck to strike such an amount of water as afforded them for several years a considerable revenue, this being a very scarce commodity at that period about Virginia City. Before either of these tunnels had reached their objective point, the Comstock lode had been opened to such depths by other means that, their further prosecution being deemed unexpedient, both were abandoned, causing severe disappointment to multitudes who had bought the shares of these companies, believing them to be a safe and profitable investment.

"Vanished into Thin Air."

It was the case, indeed, that very few of the

many companies organized at this early day ever accomplished anything beneficial to the shareholders, nor did any considerable number of the other grand schemes then set on foot realize the fond hopes of the projectors. Not more than two or three of the many gorgeous cities lithographed and laid out ever advanced beyond that embryonic state. The medicinal virtues of the mineralized springs failing to be appreciated by the invalid public, these remained as before solitary Bethsheds in the desert. The most of the roads constructed over the mountains, being but little used, heavily burdened the slender finances of the counties and towns that had helped to build them, while of the mining claims located all over the country, not one in a thousand was ever able to make even a tolerable showing of mineral wealth. Of the multitudinous companies associated and incorporated, not more than a score or two have left any enduring record, all the rest having perished from lack of merit or sheer inanition during their earlier stages of development. The "Hope" gave up in despair; the "Excelsior" failed to get any higher; the "Sucker," having drawn scant sustenance from the pockets of the hapless shareholders for a while, succumbed to its fate; the "Scoria" turned out to be dross; the "Nescharama" perished from some unknown cause, probably lockjaw; the "Great Republic" collapsed, and "Congress" adjourned *sine die*, the doom of these companies having been seemingly foreshadowed by their names.

The Ups and Downs of the Past.

In January, 1862, a great flood occurring carried off many of the mills situated along Carson river, inflicting severe loss upon both the millmen and miners, the entire damage sustained by these two classes having been estimated at \$2,000,000. This event, in connection with the ill success that had attended the most of the prospecting enterprises engaged in, had a tendency to greatly depress the spirits of the mining community about this time. This despon-

River Mining.

The scene shown on this page is one which will appear familiar to many of our readers. It represents a view in the mining regions of the State, with the little camp of the miners nestled in a nook of the mountains near the river side. A flume has been built to carry the water of the river during its low state, so that the miners may be able to work the bed. The water wheel seen in the flume is for the purpose of affording power to pump, in order to keep the river-bed as dry as possible.

This system of mining was the principal one carried on for many years in California. But now it is confined to comparatively few localities. During the progress of ages the elements wore away the hills and carried them piecemeal into the rivers. The action of the water carried away the dirt but left the precious gold scattered over the bed of the river. Although the obstacles in the way of recovering it under these circumstances would seem almost insurmountable, yet the hardy miners found a way to get at the gold. As will be seen by the sketch, they built flumes large enough to carry the whole, or a large part of, the water of the river. Then they got down into the river-bed and worked it. When one part of the bed was worked out they shifted the flume and worked under the place where it was before. It must not be supposed that this was accomplished without great labor, trouble and expense. Sometimes the toil and trouble of months was lost in a single night. A sudden rise in the river would carry away the flume, the dam and all the costly works. Still in very many cases the miners who once succeeded in getting at the bed of the river made their fortunes in a very short time. Therefore this system has always been a favorite one where practicable.

Utilization of Sewage.

Although the American people introduce, experiment upon and perfect a great many thin which are afterwards adopted in the old world the experiments are not all upon our side. We are perhaps the best experimenters in the line of labor-saving machinery, etc., and seldom have to chronicle failure when once a start has been made. England, though conservative in many respects, also does her share in advancing the mechanical interests of the world, but is specially useful in proving the value and usefulness of "systems." She occasionally gives us the benefit of her experience in this direction, saving us much money and time by the thoroughness with which the investigations are carried out and reported on. In this way the two great nations help each other; the things proven valuable by either are adopted by both, and those which are failures with one serve as warnings to the other.

The latest lesson taught us by England is in connection with the very important question of the utilization of sewage for the fertilization of land. In this question the English people were very much interested, and exhaustive experiments, extending over a considerable period of time, with various systems and in many localities, have been tried. With this range of experience their conclusions are entitled to the utmost consideration. Inventors have had abundant opportunity to test practically their processes in this connection, as capital has been plentifully contributed to carry out the various systems proposed. Heavy joint stock companies were formed, thousands of pounds were invested; yet the verdict is now against the financial value of artificial sewage.

A commission has examined and reported on all the principal experiments now in operation, and its conclusion is that in no case has sewage yet been reduced to a marketable result capable of covering the cost of production. In the report the statement is made that "none of the manufactured manures made by manipulating town refuse, with or without chemicals, pay the contingent costs of such modes of treatment; neither has any mode of dealing with excreta so as to defray the cost of collection and preparation by a sale of the manure been brought to our notice. Town sewage can best and most cheaply be disposed of and purified by the process of land irrigation for agricultural purposes, where local conditions are favorable to its application; but the chemical value of sewage is greatly reduced to the farmer by the fact that it must be disposed of day by day, throughout the entire year, and that its volume is generally greatest when it is of the least service to the land."

After this report the numerous sewage-utilizing companies must soon fall into disfavor, although we see by the *British Trade Journal* that the shares of some of them are held pretty well up on the Stock Exchange, so there must be some source of vitality outside of the sewage business. This, however, only serves to illustrate the fact that the sale of shares without respect to the value of the property is not entirely confined to mining operations. The conclusions of the commission referred to above are of importance to us here, and the failure of the various schemes will serve our people as a warning against undertaking similar ones.

RICH STRIKE.—"H. C. C." writes us from French creek, Siskiyou county, that a rich strike has been made in the Hartstrand claim. Three Swedes bought an interest in the Hartstrand claim about two months ago, and commenced on a two-foot ledge in the old shaft. Sinking was continued until a depth of 60 feet was reached, at which point the rock had materially changed in appearance and prospected well. At the present depth of 70 feet the rock is said to be perfectly "saturated" with gold. The rock near the surface is white with spots of rust; they call it ribbon rock. At the present depth it is white and blue. The supposition of the owners now is that they have as good a claim as Cory & Ringery, when the same depth is reached. The latter claim is opened by a tunnel 180 feet below the surface.

THE STICKEEN MINES.—Advices from the Stickeen mines state that at Cassiar mining has been going on all winter, but that provisions are scarce. The Stickeen river is open for a distance of 150 miles from its source. The small-pox has broken out at Wrangel.

SIERRA COUNTY has a curiosity in the shape of a haunted mine—the Keystone.



MINING SCENE IN THE MOUNTAINS.

dency was, however, gradually removed by the developments that continued to be made on the Comstock lode, the mining interests of the country having been maintained in a prosperous condition for several years thereafter, when another season of depression and gloom ensued, to be followed in turn by an era of greater prosperity than ever before. From these events of the past a lesson of fortitude and patience should be drawn by those unfavorably affected by the stagnation now prevailing in the Comstock stocks, this ebb and flow of fortune appearing to be incident to the great Washoe lode.

THE SILVER COMMISSION.—The Silver Commission has finished its labors and a majority report by Senator Jones, and a minority report by Boutwell, will be presented to the Senate early next week. The majority report, which will be at once a statement, argument and information on the whole matter, will recommend the adoption of a double standard, making silver a legal tender for all amounts, and providing for unrestricted coinage. It will summarize all attainable facts in regard to the production and circulation of silver throughout the world. The actual product of the Comstock lode in Nevada will be tabulated from official reports, ranging back for years. The flow of silver to India and the Orient, and the amount of silver Germany has sold, and what she still has to sell will accompany the vast mass of statistical and political information to be offered in the majority report. The minority report will oppose the principal recommendation of the majority report, and will adduce facts in the history of the United States and foreign countries to sustain its conclusion.

FEBRUARY DIVIDENDS.—The mining companies represented on the stock boards paid out in dividends in February \$1,240,000, against \$1,368,000 paid in the same month last year. The Black Bear paid \$7,500; Consolidated Amador, \$7,500; California, \$1,080,000; Empire, \$10,000; Great Western quicksilver mining company, \$12,500; Idaho, \$22,500; Manhattan, \$50,000; and Northern Belle, \$50,000. The following companies paid dividends a year ago which did not this year: Alps, Belcher, Consolidated Virginia, Leopard, Lyon Mill, Redington Quicksilver and West Comstock.

The miners knew that nature had done for them what it would take a great deal of trouble and time to accomplish. She had separated in a great measure the gold from the debris and left them the comparatively easy task of gathering the precious dust. Many such scenes as that depicted in our engraving may be seen in mountain counties of California, although most of the practicable river-beds have been worked out. Now the miners have to wash away the hills themselves, and leave the rivers to carry away the debris only.

CLOSE MILLING.—The following from the Nevada Transcript will be appreciated by some of our mining friends: A party living 10 or 15 miles from here was the owner of a quartz ledge, which he supposed contained paying quantities of mineral. It was a large ledge and the foot and the hanging walls were as well defined as in any quartz mine in the country. He took out ten tons and had it hauled to this city to be crushed. Before starting it he bet \$20 with a neighbor that it would pay at least \$6 to the ton. To be sure and win his bet he came here while the rock was being crushed and bought of some one about \$30 worth of gold dust and put it in the battery. When the clean-up was made he obtained as a result \$6 less than he put in the battery. He lost his bet, lost the work of taking out the rock, the hauling, and was otherwise out of pocket. The joke was so good that he had to tell it, and now has a good time detailing the facts to admiring listeners.

THE "HARMONIC COMBINATION."—The "Harmonic Combination," just published by Gray, is one of the musical novelties of the age. It is the invention of Dominico Speranza, Director of the San Francisco Musical Institute of this city. We are informed that by the use of this work any one with a slight knowledge of music can compose airs of every variety, from a polka to a march. The system is simple and requires but little study to comprehend. Several beautiful songs, composed by Hector A. Stuart, are introduced as examples, being set to original airs. The work has been ably edited by a gentleman connected with the Italian consulate, and, on the whole, is an ingenious and elegant example of California skill, musically, poetically and typographically.

Hints on the Making of Bread.

As a most difficult branch of a housekeeper's duties, bread-making requires a generous stock of patience and a vast deal of experience. The skill of it is in no sense intuitive, but acquired through repeated failures and doubtful successes; and even the accepted recipe of many a housewife makes a poor apology for a perfect loaf of bread. The best of recipes gets hard usage in unskilled hands, and the indifference which much bread-making betrays would spoil any rule, and offend any table. Teaching is worth something, but in this, as in most other skilled employments, experience is everything. The Woman's Centennial Committee, who compiled the "National Cookery-Book," considered the chief evil of much bread-making to be the use of saleratus or other baking powder, and enjoin upon their sisters to do away with this vicious custom. Were there no such thing as saleratus, considering the uses to which it is often put, the dining tables of the present generation would perhaps offer a more wholesome diet, certainly more acceptable bread where such a powder is now used; and were the common and unhealthy biscuits, with their so frequently sulphur-streaked surfaces, which require special training of the stomach for even a passable digestion, driven away from every dining-room, the effect would be of immense importance.

Mr. Tegetmeier, in his "Handbook," explains the process by which bakers make their bread so light and spongy. They mix a little of the flour they are about to use with water and the yeast, and set it to rise some time before mixing up the mass of dough. In this way less yeast is required, and by this whole "sponge" acting as a ferment, the bread is much better and softer than is made in the ordinary way. The rising of the dough is quickened by adding to the sponge a small quantity of mashed boiled potatoes. To make half a peck of flour into bread on this system, mash three-fourths of a pound of well boiled mealy potatoes through a coarse sieve or colander, and mix with a pint of flour; mix an ounce and a half of German dried yeast, with a pint and a half of lukewarm water, and strain into the flour and potatoes; beat the whole into a batter; cover with a blanket and set by the fire to rise. In two hours, if kept warm, this will have risen considerably and constitutes the "sponge." Beat this with the hand very perfectly and mix with a pint and a half of nearly blood-warm water, (92° Fahrenheit,) and pour into half a peck of flour, which has already had one and one-fourth ounces of salt mixed with it. Knead the whole into dough and let rise in a warm place—two hours in warm weather, but longer in cool weather. Then turn out on a floured table, divide into pieces suitable for loaves, and knead lightly into proper shape with only flour enough to keep it from adhering to the table. For a still lighter bread a portion of the dough, when ready for the oven, should be well kneaded with flour enough to make it rather solid, divided into small loaves or rolls, place on a slightly greased tin, and set in a very warm place to rise again. Then wash over the loaves with a little milk, and bake for about 20 minutes. Upon taking from the oven cover with a cloth to prevent the outside from becoming hard. Stale bread, which is far more healthy than new, may be made soft and palatable by covering closely with a tin and placing it for half an hour in a very moderately-heated oven.

Chicory in California.

We are well supplied with drinkables in this country. If one's temperance principles restrain him from our gold medal wines and brandies he still has the choice of milk, buckthorn or chicory. The chicory resources of the State are little known. There have been a good many experiments in growing the roots, but the low market price, coupled with the fact that few know how to prepare the product for the market, has restricted the production. The only chicory factories of which we know in this State are at Stockton and Sacramento. The Stockton Independent has done the commendable service of interviewing the proprietors of the factory near that city, and we take pleasure in producing the facts for the information of our readers: The successful cultivation of chicory depends on having the right kind of soil. It must be a rich, mellow loam, with sufficient clayey texture to make it firm and moist. It should be plowed in the fall to a depth of 12 or 15 inches, and pulverized and rolled with as much care as is usually given to a flower garden. The seed is very fine, like the carrot or lettuce, and is put in in drills about 15 inches apart. Great care must be taken to put it in the proper depth, a half inch of soil over the seed being sufficient. The seed is sown the last of February and through the month of March, if the ground is moist enough. The seed is imported from Germany, it being found impossible to raise it in California successfully, as the plants from California grown seed all run to tops and produce a small, tough, gummy root of no value. The seed, however, is not expensive, costing, delivered here, about 32 cents per pound, and only one and a half to one and three-quarter pounds are required per acre. The roots of the chicory grow about the size of the average carrot, sometimes attaining a weight of four pounds and upwards. The yield is from 10 to 18 tons

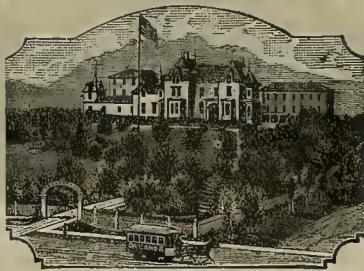
per acre if sown at the right time, upon proper soil and with thorough cultivation, but if sown too early the plant grows woody and runs into stalks and stems. The harvest begins about the first of August and runs through the month of September. It is desirable to harvest them when the sun is hot, as the chicory is best when sun dried. The roots are thrown out of the ground with a sub-soil plow, Chinamen following after to cut off the tops and throw the roots in heaps. Sheep, cattle, horses and hogs are very fond of the tops of the chicory and eat them with avidity. As the foliage of the top is very heavy, making several tons to the acre, its value for feed is no inconsiderable amount, although not usually calculated upon at all.

The roots are hauled to the factory or mill, where they are chopped into blocks about an inch square and spread on a board platform in the sun. Here they are exposed four or five days, being turned over every day. At the end of that time they are put into a revolving iron roaster, where they are baked to a crisp of dark brown color. From the roaster they are passed into the grinding mill, after cooling off, and ground to about the fineness of ground coffee. In the process of drying and roasting the chicory loses a little more than two-thirds of its weight, so that ten pounds of roots will make about three pounds of marketable chicory.

The cultivation of chicory, when rightly understood, is very profitable. It costs but about \$5 a ton to raise the roots, including seed, cultivation, digging and hauling, while the prepared chicory is worth from \$125 to \$250 a ton in the market. The net profits per acre is as high as \$300 to \$500, according to the market price. At present the market for chicory is dull on account of an overstock of the foreign article.

It is said that the chicory grown in California is superior to that grown in Germany. In the latter country, about the cities of Magdeburg and Braunschweig, an immense area of country is devoted to chicory alone, millions of dollars being invested in the manufactories. Very little, if any chicory is raised in the United States, outside of California. One of the sources of profit in the manufacture of chicory is the use of the residue or pulp from beet sugar factories to mix with the roots in the roasting pan. A large percentage of this inexpensive article can be put in without deteriorating the general quality. A large amount of unmarketable dust from the grinding mill is also made available by sprinkling it with molasses and water, by a secret process only known by the manufacturers.

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All who are entitled to receive this elegant and useful Premium can do so on compliance with the following conditions:—Send your name and post-office address, together with your express office, to the Union Silver Plating Company, Cincinnati, Ohio, together with the following Premium Coupon, and inclose with your order 75 cts., to pay cost of engraving your initials, express charges, boxing, and packing, and you will receive by return express (or mail, if you have no express office) a full set of extra plated Silver Spoons, free of any charge. All express and packing charges are covered by the 75 cts., and the Spoons will be delivered to you free. If you do not desire to have the spoons engraved, you are only required to send 60 cts., to pay expressage and boxing. The coupon must in all cases be sent, to indicate that you are entitled to this premium, as this very liberal offer is not extended to any one who is not a patron of this paper. The retail price of this set of spoons is \$4.00, as the following letter will show:

OFFICE OF UNION SILVER PLATING CO.,
CINCINNATI, OHIO.

We assure all subscribers that the goods contracted for are first-class in every respect, and that the usual retail price for them is \$4.00 per set. Our lowest price to jobbers is \$36.00 per dozen sets, and we will in no case retail them at any price, or send them in single sets to any one who does not send the required "Coupon," showing that the sender is a patron of this paper.

UNION SILVER PLATING CO.

Premium Silver Spoon Coupon.

PREMIUM

Silverware



Warranted Extra

SILVER PLATE.

To the Union Silver Plating Co., Cincinnati, O.: This is to certify that I am a subscriber of the paper from which I have cut this Coupon, and am entitled, under your premium arrangement, to a full set of extra plated Silver Spoons, with my initials engraved thereon. I inclose herewith 75 cts., to pay express, packing, boxing, and engraving charges.

On receipt of this Coupon, we hereby agree to return to the sender, express or mailing charges prepaid in full, a full set of six of our extra plated Silver Spoons, with the initials of the sender, or any other initials desired, engraved thereon. This Coupon will be honored by us for ninety days from the date of this paper, after which it will be null and void. [Signed]

UNION SILVER PLATING CO., Cincinnati, O.

As soon as the necessary stock can be manufactured, all who secure the above useful and valuable premiums, will be permitted to secure a full set of silver plated knives and forks, on the same liberal basis.

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Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing by this Process:

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Two firemen at \$4.....	8.00
1,500 lbs of salt at 14c.....	22.50
Wear of shoes and power.....	1.50
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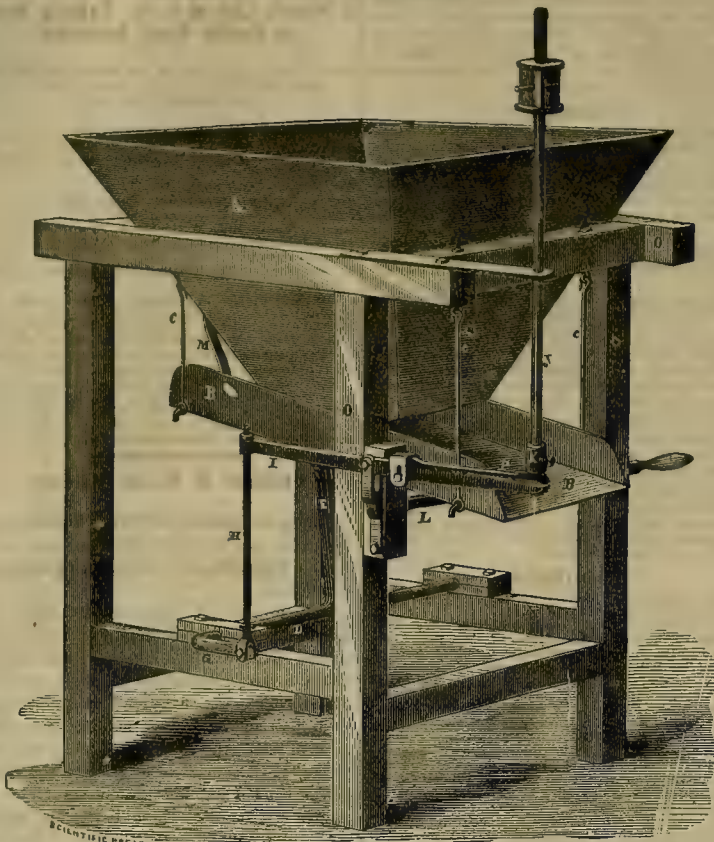
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We append a few extracts from the many testimonials which we have received from mill men and practical mining men, of the effectiveness and positive action of the Tulloch Feeder. We do not depend solely upon these testimonials, as we are aware that testimonials are easily secured for almost any machine, but the high character of the parties certifying to those herewith given, will establish their value and genuineness:

Mr. Jas. G. Fair has 28 in use; says: I regard them superior to any Feeder with which I am acquainted; I consider no mill perfect without them. Mr. E. R. Burke, Sunner mine, Kern county, has 16: They never get tired; no man living can feed a battery as well; they save us in labor alone \$48 a day. Mr. Green, of the Phoenix mill (12), Amador, writes: The first machine we had is working away; is as good as ever; have not spent a dime on it; in use 14 months; you need fear no competition on wet ores. Mr. W. H. Armstrong, of Consolidated Virginia mill: We are running 60 stamps with your Feeders; they give unbounded satisfaction; they have not cost the company one dollar since started up. Mr. H. C. Bidwell, Supt. Green Mountain and Gold Stripe companies, Plumas county, writes: From the start they have done splendidly; no trouble whatever; requiring but little attention; a boy can manage them; the saving in both labor and cost is fully one-half over the old style of feeding by hand. Mr. Preston writes: I have four of your Automatic Self Feeders, and my mill men each and all say they are the best they have ever used. They are an improvement on all I have ever seen, being simple in construction, and good for either wet or dry crushing; refer to over 40 mills using them; they are guaranteed to give perfect satisfaction. Send for circulars.

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All classes of mining properties reported on, consultations had on reduction of ores of all descriptions, plans for furnaces and reduction works furnished, and the construction of them superintended. Ore tests made at the office.

309 California Street, Rooms 8 and 9.

Continued from page 133.

LADY BRYAN.—Very good work has been done in setting the boilers and completing the brick-work. The connections are about finished and the pumping machinery will be started up shortly.

NEW YORK.—Good progress has been made during the week in raising the third or pump compartment of the shaft, although the rock is very hard.

AMAZON AND GLASGOW.—The north drift on the 300-ft level is still showing a fine character of quartz in the face.

FLORIDA.—Putting in the heavy lift pump at the 400-ft level is progressing finely.

SUCCESS.—The flow of water is light and is easily handled by the pumps.

CITY POINT.—Driving the east drift from the 2000-ft station in the main incline is making good progress. The rock is hard but blasts out well.

BEST & BELCHER.—The east cross-cut on the 1700-ft level is steadily advancing, the face in ledge matter of a favorable character.

SAVAGE.—The broken pump rod has been replaced and the pumps are again steadily at work draining the water from the shaft.

CONSTITUTION.—The pumps are kept going to keep down the water in the shaft, while the repairs to the hoisting machinery are in progress.

BUCKEYE.—The usual quantity of milling ore is being extracted from the stope in the north drift on the 350-ft level.

NORTH CARSON.—Prospecting operations are being pushed ahead as usual at the 500-ft level, with encouraging results.

ARABIA DISTRICT.

SOLD.—*Silver State*, Feb. 26: Deputy Sheriff Burns sold the Montezuma mine, in Arabia district, at public auction in front of the Court house today. The first bid was made by A. H. Elliott, who offered \$10,000 for the property. The next was by M. S. Bonfield, who went \$5,000 better. Elliott saw this and went \$5,000 harder, which brought Gen. Buckner to the front with a bid of \$21,500, at which figures the property was sold by the sheriff.

ELY DISTRICT.

RAYMOND & ELY.—*Pioche Record*, Feb. 17: Work is going on in this mine on the 8th, 10th and 11th levels, with fair prospects of striking ore. The water is 20 feet below the lower station, and is rising slowly. We hope before many days to be able to chronicle the finding of ore, as the indications that way are very favorable.

THE ALPS.—Mr. Theo. Hale, acting Superintendent of the Alps company during A. J. Blair's absence, informs us that an additional force of men has been put on the workings, and the company is now working both day and night shifts. Some very high grade ore is now being shipped to the mill. During the past week the Alps company shipped bullion valued at \$4,007. The Alps mill is running regularly with some 15 different lots of custom ore on the mill dump, and enough ore engaged for a constant run of 60 days. The Condon mill, recently leased by the Alps company, has been thoroughly overhauled and repaired and will commence operations tomorrow. The Alps company has at both of the mills and the mine are now employing 75 men.

JETT DISTRICT.

ENCOURAGING.—*Reese River Reveille*, Feb. 20: Accounts from Jett district are of a very encouraging character. The miners are working with an earnestness, feeling that they have valuable properties. At a meeting of the residents it was decided to name the town site Davenport. The district name remains the same.

PALMYRA DISTRICT.

REVIVING.—*Lyon County Times*, Feb. 24: The mines of this district are again coming into favorable notice. Some capitalists are about erecting hoisting works for the efficient working of some of the many mines known to be rich in gold and carrying a good average of silver. The Palmyra mine, located at the Aurora, is spoken of most favorably, the ledge being wide and well defined, assays from which have gone as high as \$4,000 to the ton. The old town site of Como has been, or is about to be, laid out, Charley Willard having left for Dayton on Tuesday, accompanied by a surveyor, for that purpose. When we have money plenty to work undeveloped mines, Palmyra district will come to the front.

TUSCARORA DISTRICT.

SHUT DOWN.—*Silver State*, Feb. 26: The new mill built by the Grand Prize company in Tuscarora has been shut down. The alleged cause is a derangement of the engine bed; but the real cause is supposed to be a bear movement of the owners.

WARD DISTRICT.

TROUBLE ANTICIPATED.—*Eureka Sentinel*, Feb. 25: On the 23d inst., 14 men working in Matt. Gleason's mine at Ward, were driven off by an armed force of men from the Martin White company. The Gleason men subsequently armed themselves, returned to the mine and drove off the interlopers. Serious trouble is anticipated. Eugene Blair, the messenger of Wells, Fargo & Co., corroborates the above and furnishes us with the following further particulars: The trouble arises over the late suit between the Martin White company and Matt. Gleason. The attacking party were from the Paymaster mine, who, heavily armed, went to Gleason's mine—the Ward Consolidated—and the men at work there not being prepared to resist an armed force, allowed themselves to be driven off. They, however, quickly returned prepared to take possession of the mine at all hazards, and succeeded in doing so, the Paymaster crowd withdrawing at the appearance of a band of determined men, all heavily armed. The Ward Consolidated crowd still hold the ground and keep themselves in readiness for an emergency.

Oregon.

GOOD CLEAN-UP.—*Bedrock Democrat*, Feb. 14: Messrs. Borman & Co., who have been taking out rock at the Virtue mine for about three months past, made a clean-up last Saturday. About 30 tons of rock were crushed. The bullion assayed last Monday and amounted to \$2,054.68. Other companies are now at work at this mine and they feel decidedly encouraged over their prospects.

BOUVIER.—The Sleeper mine, at Connor creek, in this county, was sold at Sheriff's sale last Thursday. It was bought by S. G. Reed & Co., of Portland, who will immediately commence work on the same.

Arizona.

MINING NOTES.—*Arizona Enterprise*, Feb. 19: In Tiger district Riggs and Hammond have their tunnel in on the first south extension of the Tiger about 40 feet and have some very high grade ore. The general impression seems to be that the ore should be roasted or worked by the leaching process. Riggs has four men at work on the Shelton mine in the Basin, and is getting out some very good ore. In Humburg district, Robert Groom and John McDermott are at work upon the Pearl, one of the best mines in the Black Canyon region. Poland, Gavin and Robinson are at work upon a small but very rich vein and have out over four tons of ore that will go over a thousand dollars. On the Tip Top, Moore & Co. have out over 120 tons of ore. Work is being kept up steadily and the mine is improving in appearance all the while. Jack Swilling has some very rich ore in his mine, the Swilling. Humburg district is getting to be a center of attraction and is proving itself to be one of the best mining regions in the country. The great want of the district is a mill for the reduction of ores. At the old Humburg camp, Ed. J. Johnson and others have been extracting some gold rock and have made it pay well, some of the rock working up to as high as \$100 per ton. From Mohave county we learn that work is being steadily carried on upon the Silver Glance, and that the company will start up their furnace at Montezuma next week for its second run. The first run made by the furnace has satisfied the company both as to the fact that the furnace is a good one and that the output is a bonanza. On the McCrackin 150 tons of ore per day are being taken down in the mine. The mill is running to its full capacity and is turning out an average of

\$1,500 in bullion per day. Mr. McCrackin has gone to California. The latest proposition with regard to the mine is to build a railroad from the mine towards Fisher's springs, four miles from Greenwood. There the company proposes to put up a 40-stamp mill. In Cedar district, Bob Orr and the Kimball brothers are working upon the Arnold, and are getting out some ore that goes about \$500, and reports are working around the resumption of the French and Hackberry Clark are working on the first north extension of the Magendie mine. They are sinking a shaft which is to go down 100 feet. They have some \$300 ore, carrying some gold, and their mine bids fair to equal in richness the original location.

Idaho.

OWYHEE MINES.—*Idaho Advocate*, Feb. 24: Operations at the Golden Chariot are progressing very favorably. There is every indication that the vein at the 13th level will prove unusually rich. The ground is quite soft and presents a varying appearance as the work progresses. The drift is in 164 feet, and as the cross-course is approached the pay streak improves in quality and no doubt is now entertained of the existence of a rich ore body in the immediate vicinity. The cross drift from the 9th is now in 50 feet with good ore all the way through. Considerable rich rock has been taken out during the past few days from the 5th and 6th levels, and there are several hundred tons of ore at the mine awaiting shipment to the mill. Those who are expecting rich developments in the Chariot will not be disappointed. The workmen at this mine were paid off on the 20th instant, the amount expended for this purpose being nearly \$10,000. The Belle Peck is looking well as usual. The workmen continue sinking the shaft and the yield of rich ore promises to be more abundant than ever. Developments continue to be quite satisfactory also, at the Potomac. The prospects of the Empire mine are brightening. We learn that there is to be a reorganization of the old company, and that active operations will be carried on the coming season. Since it has been ascertained beyond question that the Empire embodies a magnificent bonanza, the old owners of the mine have woken up to the necessity of prompt action. Recent reports relative to the resumption of work in the Potomac are very favorable. Judicious work and good management will demonstrate the fact that there is not a better mine on the Pacific Coast.

Montana.

DAVIS MILL.—*Butte Miner*, Feb. 13: Nearly \$7,000 in crude bullion was shipped from A. J. Davis's mill today to the Government assay office at Helena, and another shipment will be made during the week. The pans in use will test a little quicker, which has been the greatest defect in the works since starting up, but this trouble will soon be overcome. The process now used in the reduction of ores was questioned by many before the starting of these works, but a trial of three weeks has demonstrated the fact that it is all and even more than has ever been claimed for it, as silver to over 70% has been saved, and also a large percentage of gold—something that was unexpected. Notwithstanding the fact that the mill, with a knowledge of the above facts, we pronounce the mill a decided success, not only in the treatment of the ore but also in a financial point of view, as it is paying a handsome profit upon the cost of mining and milling, although running on second-class ore.

CRUDE BULLION.—The amount of \$2,500 was shipped today from the Centennial mill to the U. S. assay office at Helena. Shipments from the mill can now be looked for regularly.

FIVE BARS OF SILVER.—Representing a coin value of \$5,400, were shipped from the Dexter mill on Friday last. The mill is still running on ore from the La Plata mine, the average assay of which so far has been 183 ounces silver and \$66 gold.

THE YOUNG & ROUBIDUSH MILL was in operation for five days and two nights last week. The mill is still incompleting, but is now running and not making any loss. During the time it was in operation it was demonstrated that five tons of ore can readily be crushed per day.

TIZ LITTLE ARABIA at the head of Yankee Doodle gulch has been successfully working since the accident some weeks ago, though the amount of ore crushed has only been about one-half its capacity, owing to the present low stage of water. But the percentage of bullion saved has been higher than was at first believed to have been possible. Upon a lot run last week 91% of the assay value of the silver in the ore was taken out.

Utah.

STOCKTON MINES.—*Cor. Salt Lake Tribune*, Feb. 23: Our mines are looking better than they have ever looked, and much ore is being shipped to the Chicago and Waterman smelters, the latter of which has been buying ore outside for some time past. First in rank of our mines is the Silver King No. 2, west extension, owned by L. D. Davis and superintended by Thos. McCarthy. They have a shaft sunk 500 feet and levels east and west on the vein 100 feet below a continuous and immense body of ore. The track is being straightened and repaired, preparatory to furnishing the Chicago smelter with all the fluxing ore it requires. This is a valuable property. The Muscatine, Quandary and Iroquois, worked mostly by J. P. Ostrom; the Rustler and A. W. Atkins and Old Business come next, producing from 80 to 100 tons of ore monthly, which is purchased by the Chicago smelter. These mines for a long time have had, but through the energy of the parties named have been made profitable. The Legal Tender is being worked by Sampson & Stevenson, who are about to erect a whim, which will enable them to ship 50 to 75 tons of ore monthly. Many strangers are amongst us, who have succeeded in getting leases on reasonable terms, and appear satisfied that they have good wages. The prospects of this place are bright, and although we were sorely shaken and badly rattled by the failures of last fall, we are satisfied with the lesson learned and feel cheerful and happy.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

DONALD G. & S. M. Co.—Feb. 26th. Location, Nevada. Capital stock, \$10,000,000. Directors—C. B. Jellison, F. H. Farley, Daniel Kaplan, D. H. Percy and John Ward.

FLORA M. Co.—Feb. 26th. Location, Utah territory. Capital stock, \$2,000,000. Directors—F. McDermott, David Porter, Thos. R. Hayes, E. P. Connor and Henry Toomy.

FARREL M. Co.—Feb. 26th. Location, Amador county. Capital stock, \$10,000,000. Directors—Thos. Burke, A. Wason, Wm. O'Connell, W. F. Burke and Geo. W. Hayes.

SILVER GLANCE M. Co.—Feb. 26th. Location, Arizona. Capital stock, \$5,000,000. Directors—E. M. Walker, J. P. Rankin, D. B. Gillett, Jr., B. W. Mudge and Daniel Buck.

CALIFORNIA WIRE WORKS Co.—Feb. 26th. Object, the manufacture and sale of wire goods. Directors—A. S. Halliday, W. R. Morse, James G. Dewitt, J. P. Bering and H. T. Graves. Capital, \$100,000.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Northern Belle, February 20th, \$10,824.96; Comanche, 20th, \$3,614.25; Northern Belle, 18th, \$17,026.50; California, 20th, \$150,285.86—total to date, \$669,635.85; Modoc, 20th, \$5,570; Manhattan, 22d, \$11,000; Con. Virginia, 20th, \$24,237.29—total to date, \$191,314.08; Leopard, 27th, \$5,300; Manhattan, 24th, \$10,200—total to date, \$33,900; Modoc, 20th, \$10,240—total to date for February, \$41,000; Northern Belle, 25th, \$15,900; California, 24th, \$166,416—total so far on February account, \$1,045,408.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING FEBRUARY 20TH, 1877.

TIP-CUPS FOR UMBRELLAS.—Lewis Cutting, S. F. **METAL WHEELBARROWS.**—Calvin Nutting and Calvin Nutting, Jr., S. F.

REFLECTORS.—Emil Boesch, S. F.

CHURNS.—Rebecca Sara Brusio, Sonora, Cal.

UMBRELLA RUNNERS.—Adam Good, S. F.

SLOP-HOPPERS.—Miles M. Harvey, S. F.

SPEED AND DISTANCE INDICATORS.—Gustavus M. Jensen, Portland, Ogn.

MANUFACTURE OF TEA-KETTLES, ETC.—Azarad J. Lowell, Alvarado, Cal.

SPRING MATTRESSES.—Alexander C. McMains, S. F.

QUARTZ MILLS.—Allen Oliver, Forest Hill, Cal.

METHOD OF CONNECTING LUMBER FOR TRANSPORTATION IN FLUMES, ETC.—William H. Thurman, Borden, Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO. in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

TEA-KETTLES.—A. J. Lowell, Alvarado. This invention relates to certain improvements in tea-kettles, some of which improvements are also useful in the manufacture of other articles of tinware. The top of the tea-kettle is made perfectly flat, and instead of making the opening through which the kettle is filled in the center of the top, it is made at one side of the center, so that the flat top is braced on its under side to give it strength. These braces are made of tin by first forming a strip or piece of tin into a square tube and then soldering it to the under side of the top. The cover or lid is made with a depression in the center, across which is a wire. By making the top flat it can be used for setting dishes of cooked victuals upon in order to keep them warm. Two handles are provided which can be separated and turned down. A detachable shelf is arranged to be attached to one side of the kettle on a plane with its top. One edge of this shelf is supported on the edge of the top, while its opposite edge is supported by an angular brace. This platform is also useful for supporting any article which it is desired to keep warm. This inventor has also devised a protection for the inside angle which is formed by the junction of the sides and bottoms of tin vessels, where they are most liable to rust, and a protecting base or continuous foot for them to rest upon, the object of which is to prevent the bottoms from wearing through by friction. Tin tea-kettles are worn out soonest at the corner of the bottom, directly below the spout, owing to their being frequently tipped forward. To protect this point a patch is placed over this edge to receive the wear. These improvements enable the inventor to produce a superior tea-kettle or article of tinware.

SLOP-HOPPER.—Miles M. Harvey, S. F. This invention relates to an improved slop-hopper and stench trap for outside drains, and it consists, first, in constructing the hopper with a bell-shaped attachment to its bottom, which not only forms a part of the trap but serves also as a foot or base for the hopper to stand upon when it is lifted off of the trap; secondly, in a simple manner of connecting the hopper with the trap, and, thirdly, in an improved trap. This device is very simple and can be cheaply constructed. The hopper can be readily removed to be cleaned out and as readily replaced, while the trap arrangement is self-cleaning and forms a perfect water-valve, which will prevent any gases which may be generated in the drain or sewer from being discharged through the hopper into the open air.

REFLECTOR.—Emil Boesch, S. F. This invention relates to improvements in that class of reflectors on which silvered glass is used for a reflecting surface. The improvements relate to the manner of constructing the frame and mounting the glass sections therein. The method patented protects the silvering of the glass from damage and it does not sweat and spoil. The invention provides a strong durable glass surface reflector, which is protected from damage and which is also light and ornamental.

UMBRELLA RUNNER.—Adam Good, S. F. The patent covers an improved runner for umbrella handles, and the invention consists in a novel arrangement for connecting the ends of the wire braces which spread and strain the ribs of the umbrella when it is open, with the upper end of the runner, so that they can be easily attached to or detached from it when desired. This runner will be both convenient and ornamental, and by its use the owner of an umbrella can easily relax the parts by releasing the brace wires, so that any part of the umbrella can be readily repaired.

Farmers vs. Miners.

EDITORS PRESS:—In a late issue of the PRESS appeared a letter from Mr. George Ohleyer, criticising an article published by you not long since in regard to the differences that have grown up between the farmers and the miners. In view of the opinion expressed by Judge Sexton in the case of Atkinson vs. the Sacramento and Amador canal company, recently tried before him, it is hardly worth while to discuss the legal questions involved in this controversy, as that opinion concedes to the miners about all that they claim in the premises, and if sustained in the higher courts will effectively dispose of the entire matter. There are, however, one or two other points in Mr. Ohleyer's letter that it may be well to notice. He states, for instance, that the injury complained of first manifested itself in a decided way in the year 1862; and in this he is right, for although great quantities of this mining debris had before this been run off, the most of it had lodged in the beds of the ravines and rivers in the foothills, and there remained until the floods of that year brought it down and deposited it upon the alluvial bottom lands below.

As early, then, as 1862, these farmers were made fully aware of the danger to which they would be exposed were this business of hydraulic mining suffered to go on unimpeded, and yet not until within the past year did they institute legal proceedings against the miners or otherwise signify their intention to interfere with the further prosecution of this industry.

Now, in 1862 hydraulic mining, in so far as the investment of money is concerned, was still in its infancy, few of the present expensive works designed for its furtherance having as yet been constructed. Then the extensive ditches, reservoirs, bedrock tunnels and other costly auxiliaries to the business, now everywhere seen, had no existence, and that was the time for these parties to have appealed to the courts for protection, or in some other way publicly protested against this continued invasion of their rights if they ever intended to do so. For fifteen years they have suffered poor, hard-working men to spend their time in acquiring and opening up this class of properties and capitalists to invest millions upon millions in providing the improvements necessary for operating them, and yet taken no concerted action calculated to question the right of the miners to dispose of this debris in the manner they had been accustomed to do; having, in fact, by their silence and inaction virtually conceded the right of the miners to so continue this custom. The farmers knew that the miners claimed under their local regulations the privilege of running their tailings into the adjacent streams—knew that the courts recognized the validity of these regulations, and that Congress had declared by law that they should have all the force of statutory enactments; and yet they failed to oppose or at least took no effective measures to defeat them. That it is too late now to seek to reverse these laws and long-established usages by recourse to litigation will be made apparent when they come into the courts. As suitors the farmers will find that equity and fairness are against them, wherefore they had better accept the invitation so often extended to them by the miners and co-operate with the latter in securing such legislation as will be best calculated to afford them relief.

Your correspondent thinks it would be practicable to conduct the mining debris upon the tule marshes, and thus reclaim them, while diverting it from the bottom lands along the rivers, were it not that these marshes are required to receive the surplus water on the occurrence of floods, which would otherwise inundate the great inland valleys. The answer to this objection, if it really has any force whatever, is that it would require from fifty to a hundred years to fill up these swamps in the manner proposed, a period so remote that we shall probably be able to find means for obviating this dreaded evil, through the extensive storage of water in the mountains and otherwise, long before it arrives. The conducting of these tailings upon the tule swamps is entirely feasible, and there they will have to be carried unless it shall be concluded to let them go on lodging upon the alluvial bottoms and filling up the rivers as heretofore, inasmuch as any attempt to put a stop to hydraulic operations is almost sure to fail. For reclaiming large portions of vast and low-lying swamps this waste material from the mines would be of incalculable value, since without filling them up in some such manner they can never be worth much for agricultural purposes.

H. D.

EUREKA VS. RICHMOND.—Dispatches from Eureka say that the Eureka Consolidated mining company has again commenced suit against the Richmond company by an application for injunction. Judge Cole issued a restraining order returnable March 17th. The London corporation of the Richmond company having been declared by the Court not to be the proper defendant, the counsel for plaintiff has made the Richmond company of Nevada, Thomas Wren its President, Joseph Potts, foreman, and 100 others, defendants in the action. The amount sought to be recovered is not mentioned in the complaint. The papers were served on the 24th ult. and work was stopped in the celebrated Potts chamber of the Richmond mine. It will not interfere with the workings of the other portions of the mine, and the five furnaces will continue in operation.

Mechanical Ore Concentration and Separation—No. 24.

[Written for the Press by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.]

I have thus designated all that should be gathered for treatment in the shape of slimes in all mineral dressing establishments, and this collection should invariably be effected, whether further mechanical separation or direct reduction be subsequently applied. It is here befitting to describe the mode of collecting slimes out of water. They may be collected and passed into further treatment as pulp, or the pulp may be allowed to dry, as it readily does in dry climates within a very short space of time, without the help of fire and heat.

In case of a direct reduction by roasting, etc., the dry and solid pulp requires a squeezing, effected best by rollers, (even hard wooden ones are adaptable,) in order to recover the state of powder or dust.

Introductory to the description of the collecting apparatus, I must draw the reader's attention to a material modification of action, the result of practice, which takes place in treating slimes, from what is invariably maintained in treating the coarser sizes. Coarser sizes, without any exception whatever, are first thoroughly classified by size and then separated by quality. For finer sizes (slimes) this course would be also correct if it were feasible to the same full extent; but screens will not classify below a certain size, say one-third of a millimeter, and therefore other means of classification must be resorted to. These means are the exposure of the particles to the effect of a horizontal water stream.

Such streams can be made to classify material of equal specific gravity to perfection. Thus quartz particles so classified may be collected in lots of perfectly equal sizes, but if amongst the particles of quartz there are heavier particles, for instance of galena, then smaller particles of galena will be gathered with larger particles of quartz (one-eighth inch particle of galena will gather with one-twentieth inch particle of quartz, and other sizes in the same proportion). Such particles of different material, which will simultaneously fall or be kept in suspension or be deposited in an upward vertical stream of water, are called "equal falling," and the action being certainly in part, and evidently the predominant part, that of classification, is considered in practice as such. Thus the difference is constituted between

1. Classification by screens, and
 2. Classification by streams of liquid (or air).
- The collecting apparatus now to be described is also and at the same time a classifier of the second class. The subsequent action of separation varies according to the previous mode of classification.

In Number 10 of this series, alluded to before, we have stated the principles on which separation is based when classification of the first mode is applied, and hereafter we also will find the proper place to state the mode of operation for separating material classified by the second mode.

General News Items.

DR. TEMPLE, pioneer of homeopathy, and founder of the Homeopathic College, Missouri, died last week, aged 70.

A MADRID special announces that the Spanish Minister of Foreign Affairs is engaged upon a draft of a treaty of commerce with the United States.

HESTER, Tully and McHugh, the Molly Maguires on trial at Bloomsburg for the murder of Alexander Ray, near Centralia, Penn., have been found guilty.

The printers of San Francisco are making arrangements for a picnic to be given at Damon's Grove, Sausalito, on April 15th, in aid of the cemetery fund.

SECRETARY ROBESON says if the proposed reduction is made in the appropriation for the pay of officers and men of the Navy serving abroad, the ships and crews will have to be brought home at once.

The probability is that Rear-Admiral John Rodgers, now in command of Mare Island Navy Yard, will be ordered to the command of the Naval Observatory at Washington, in place of Rear-Admiral Davis, deceased.

SALINAS CITY, Monterey county, has a sensation; a defalcation of \$20,000 having been discovered in a county official's office. The court house was burned a short time since, and it is believed that the records were burned to destroy proof of the defalcation.

PETITIONS are being circulated throughout this city calling upon the Board of Supervisors to raise the license fee of liquor saloons, in the belief that the low dens and dives which abound in certain districts will thereby be compelled to give up business.

A BELGRADE dispatch says: All day Saturday and Sunday wagon trains have been transporting a large quantity of small and large ammunition from the fortress of Belgrade to the quay, to be taken down the Danube this morning. This movement contrasts with the peaceful news from Constantinople.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

METALS.

[WHOLESALE.]

THURSDAY, M., February 28, 1877.

IRON.—		
American Pig, ton.....	30 00	@
Scotch Pig, ton.....	29 00	@ 30 00
White Pig, ton.....	30 00	@
Refined Bar.....	41 00	@
Bolter, 1 to 4.....	41 00	@ 94
Plate, 5 to 9.....	51 00	@ 84
Sheet, 10 to 14.....	51 00	@
Sheet, 16 to 20.....	51 00	@
Sheet, 22 to 24.....	51 00	@
Sheet, 26 to 28.....	51 00	@
Horse Shoes, keg.....	6 00	@
Nail Rod.....	91 00	@
Norway.....	84 00	@ 94
Roller.....	74 00	@ 9
COPPER.—		
Copper Tinned.....	37 00	@ 40
Sheathing, lb.....	27 00	@
Sheathing, Yellow.....	21 00	@ 224
Sheathing, Old Yellow.....	10 00	@ 11
Composition Nails.....	21 00	@
Composition Bolts.....	24 00	@

STEEL.—		
English Cast, lb.....	14 00	@ 25
Anderson & Woods, ordinary sizes.....	16 00	@
Drill.....	16 00	@
Flat Bar.....	15 00	@ 20
Plow Steel.....	84 00	@ 124
TIN PLATES.....		
10x14 1 C Charcoal.....	10 50	@
Banca Tin.....	24 00	@
Australian.....	18 00	@ 184
ZINC.—		
By the Cask.....	11 00	@
Zinc Sheet 7x1 ft. 7 to 10, lb.....	11 00	@
7x1 ft. 11 to 14.....	12 00	@
8x1 ft. 8 to 10.....	12 00	@
8x1 ft. 11 to 10.....	12 00	@
Assorted sizes.....	3 50	@
QUICKSILVER.....		
By the lb.....	45 00	@

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY M., February 28, 1877.

RAGS.—Jobbing.....		
Eng Standard Wheat, 8 @ 94.....		
Neville & Co's.....		
Hand Sewed, 22x36.....	9 00	@ 94
24x36.....	9 00	@ 10
23x40.....	10 00	@ 104
Machine Sewd, 22x36.....	9 00	@ 94
Flour Sacks, halves.....	9 00	@ 11
Quarters.....	6 00	@ 7
Eighths.....	4 00	@ 5
Hessian, 60 inch.....	11 00	@ 12
45 inch.....	8 00	@ 9
40 inch.....	7 00	@ 8
Wood Sacks, 34.....	55 00	@
4 b.....	55 00	@
Standard Gunnies.....	11 00	@ 12
Bean Bags.....	7 00	@ 8
CANNES.....		
Grant's.....	18 00	@ 164
Mitchell's.....	18 00	@ 20
CANNED GOODS.....		
Assorted Pie Fruits.....	2 75	@ 30
Table do.....	3 75	@ 25
Jams and Jellies.....	4 25	@
Pickles, 1/2 gal.....	3 50	@
Sardines, 1/2 box.....	1 50	@ 1
Hf Boxes.....	3 00	@
COAL.—Jobbing.....		
Australian, ton.....	8 50	@ 9 00
Coos Bay.....	8 00	@
Bellingham Bay.....	8 00	@
Seattle.....	8 00	@ 9 00
Cumberland.....	14 00	@ 17 00
Mt Diablo.....	5 75	@ 7 00
Lehigh.....	7 50	@
Liverpool.....	8 50	@ 9 00
West Hartley.....	14 00	@
Scotch.....	7 50	@ 9 00
Scranton.....	13 00	@ 10
Vancouver Id.....	10 50	@ 12 00
Charcoal, sack.....	75 00	@
Coke, bbl.....	60 00	@
COFFEE.....		
Sandwich Id, lb.....	21 00	@
Costa Rica.....	22 00	@ 224
Guatemala.....	20 00	@ 214
Java.....	24 00	@
Manila.....	25 00	@ 21
Ground, in.....	25 00	@
FISH.....		
Sac'd Dry Cod.....	5 00	@ 7
Bonell's.....	8 00	@ 10
Eastern Cod.....	7 00	@ 74
Salmon, bbls.....	9 00	@ 10 00
Hf bbls.....	4 50	@ 5 00
2 lb cans.....	3 00	@
Pk'd Cod, bbls.....	22 00	@
Hf bbls.....	11 00	@
Mackerel, No. 1.....	15 00	@ 16 00
Hf Bbls.....	3 00	@ 3 25
Ex Mch'd.....	3 00	@ 4 00
Pk'd Herring, bx.....	3 00	@ 3 50
Boston Smkd Hg.....	40 00	@ 50
LIME, Etc.....		
Lime, Sta Cruz.....	2 00	@ 2 25
Cement, Rosen- dale.....	2 75	@ 3 50
Portland.....	4 75	@ 5 50
Plaster, Golden.....	3 00	@ 3 25
Gate Mills.....	3 00	@ 3 25
Land Plaster, tn 100.....	12 50	@
NAILS.....		
Ass'ted sizes, keg 3 25 @ 4 00.....		

OILS.....		
Pacific Glue Co's.....		
Neatsfoot, No. 1, 100 lb.....	25 00	@ 30
Castor, No. 1.....	25 00	@ 30
Baker's A.....	12 00	@ 13
Olive, Plagniol.....	5 25	@ 75
Possel.....	4 75	@
Palm, lb.....	9 00	@
Linseed, Raw.....	77 00	@
Boiled.....	80 00	@
Cocanut.....	80 00	@
China nut, ca.....	68 00	@ 70
Sperm.....	60 00	@ 65
Whale.....	60 00	@ 65
Polar, refined.....	60 00	@
Lard.....	1 10	@ 15
Oleophine.....	40 00	@
Dewar's Bril.....	30 00	@ 40
Nonpareil.....	32 00	@ 38
Eureka.....	32 00	@
Barrel kerosene.....	32 00	@
Downer Ker.....	50 00	@
Elaine.....	48 00	@ 50
PAINTS.....		
Pure White Lead.....	94 00	@ 104
Whiting.....	14 00	@
Putty.....	14 00	@
Chalk.....	14 00	@
Paris White.....	24 00	@
Ochre.....	34 00	@
Venetian Red.....	34 00	@
Avoril Mixed.....	34 00	@
Paint, gal.....	2 00	@ 40
White & tints.....	2 00	@ 40
Green, Blue & Cyan.....	3 00	@ 35
Yellow.....	3 00	@ 35
Light Red.....	3 00	@ 35
Metallic Roof.....	1 30	@ 60
RICE.....		
China No. 1, lb.....	54 00	@ 64
Hawian.....	5 00	@ 64
SALT.....		
Cal. Bay, ton.....	13 00	@ 14 00
Common.....	5 00	@ 8 00
Carmen Id.....	10 00	@ 10 00
Liverpool fine.....	20 00	@
SOAP.....		
Castile, lb.....	10 00	@ 104
Common brands.....	44 00	@ 6
Fancy brands.....	7 00	@ 8
SPICES.....		
Cloves, lb.....	45 00	@ 50
Cassia.....	22 00	@ 25
Pepper Grain.....	15 00	@ 17
Pimento.....	15 00	@ 16
Mustard, Cal.....	1 50	@
1 lb glue.....	1 50	@
SUGAR ETC.....		
Cal. Cube, lb.....	134 00	@
Circle A crushed.....	134 00	@
Powdered.....	134 00	@
Five crushed.....	13 00	@
Granulated.....	13 00	@
Golden C.....	11 00	@ 114
Hawian.....	10 00	@ 11
Cal Syrup.....	72 00	@
Hawian Molasses.....	25 00	@ 27
TEA.....		
Young Hyson.....	35 00	@ 50
Country pek'd Gm.....	30 00	@ 35
powder & Im.....	50 00	@ 60
Hyson.....	30 00	@ 35
Lo-Chow.....	35 00	@ 50
Japan, 1st quality.....	25 00	@ 35
2d quality.....	25 00	@ 35

LEATHER.		
[WHOLESALE.]		
WEDNESDAY M., February 28, 1877		
Sole Leather, heavy, lb.....	25 00	@ 29
Light.....	25 00	@ 29
Jodot, 8 Kil, doz.....	48 00	@ 50 00
11 to 13 Kil.....	68 00	@ 70 00
11 to 13 Kil.....	84 00	@ 94 00
Second Choice, 11 to 16 Kil.....	47 00	@ 74 00
Cornellian, 12 to 15 Kil.....	57 00	@ 67 00
Females, 12 to 13 Kil.....	63 00	@ 67 00
14 to 16 Kil.....	71 00	@ 76 50
Simon Ulmo, Females, 12 to 13 Kil.....	58 00	@ 62 00
14 to 16 Kil.....	72 00	@ 74 00
Simon, 18 Kil.....	61 00	@ 63 00
20 Kil.....	65 00	@ 67 00
24 Kil.....	72 00	@ 74 00
Robert Calf, 7 and 9 Kil.....	50 00	@ 60 00
Kips, French, lb.....	1 00	@ 1 35
Cal. doz.....	40 00	@ 60 00
French Sheep, all colors.....	1 00	@ 1 25
Eastern Calf for Racks, lb.....	1 00	@ 1 25
Sheep Roans for Topping, all colors, doz.....	9 00	@ 13 00
For Linings.....	5 50	@ 10 50
Cal. Russet Sheep Linings.....	1 75	@ 4 50
Best Legs, French Calf, pair.....	4 00	@ 4 75
Good French Calf.....	5 00	@ 5 25
Best Jodot Calf.....	5 00	@ 5 25
Leather, Harness, lb.....	35 00	@ 38
Ex Brd, doz.....	48 00	@
Skirting, lb.....	33 00	@ 37
Welt, doz.....	30 00	@ 30 00
Buff, ft.....	18 00	@ 20
Wax Side.....	17 00	@ 18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

LEGAL TENDERS in S. F., 11 A. M., 95 1/2 @ 95 1/2 SILVER, 54 @ 66.		
GOLD in New York, 104 1/2.		
GOLD BARS, 800 @ 930. SILVER BARS, 7 @ 10 1/2 cent. discount.		
EXCHANGE on New York, 50 @ 55-100 cent. premium for gold; on London bankers, 49 1/2; Commercial, 49 1/2; Paris, five francs @ 50; Mexican, 100 @ 100; 97 @ 98 1/2.		
LONDON CONSOLS, 86 1/2; Bonds, 102 1/2.		
QUICKSILVER in S. F., by the flask, @ 1b, 45c.		

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served by the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisements in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Aetna Tunnel Company.—Location of principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of January, A. D. 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
O G Sawyer.....	17	10	\$ 30
O G Sawyer.....	18	10	30
O G Sawyer.....	59	5	15
J A Van Pelt.....	19	10	30
J A Van Pelt.....	47	5	15
P Casson.....	67	750	22 50
P Casson.....	68	750	22 50
P Casson.....	69	100	3 00
P Casson.....	70	150	4 50
P Casson.....	71	175	5 25
J B Cooper.....	74	50	1 50
B O Cutter.....	77	25	75
B O Cutter.....	78	25	75
B O Cutter.....	79	25	75
B O Cutter.....	80	25	75
B O Cutter.....	81	25	75
B O Cutter.....	82	25	75
B O Cutter.....	83	25	75
B O Cutter.....	84	25	75
B O Cutter.....	85	25	75
B O Cutter.....	86	25	75
B O Cutter.....	87	25	75
B O Cutter.....	88	25	75
B O Cutter.....	89	100	3 00
B O Cutter.....	90	50	1 50
B O Cutter.....	91	50	1 50
B O Cutter.....	92	50	1 50
B O Cutter.....	93	50	1 50
B O Cutter.....	94	50	1 50
B O Cutter.....	95	50	1 50
B O Cutter.....	96	50	1 50
B O Cutter.....	97	100	3 00
B O Cutter.....	98	100	3 00
B O Cutter.....	101	100	3 00
Miss Mattie Guion.....	48	5	15

And in accordance with law and an order of the Board of Directors, made on the second day of January, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room No. 6, No. 420 California street, San Francisco, California, on Monday, the nineteenth day of March, A. D. 1877, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.
Office, Room No. 6, No. 420 California street, San Francisco, California.

Dolores Consolidated Mining Company
Location of principal place of business, San Francisco, Cal. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of February, A. D. 1877, an assessment, No. 1, of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 418 California street, San Francisco, Cal. Any stock upon which

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,
SAN FRANCISCO, CAL.

Established for the Manufacture of

RAILROAD AND OTHER IRON

—AND—

Every Variety of Shafting,

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

—ALSO—

HAMMERED IRON
OF EVERY DESCRIPTION AND SIZE.

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. Box 2032, San Francisco, Cal., will receive prompt attention.

The highest price paid for Scrap Iron.

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Iron and Locomotive Works,

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CAPITAL.....\$1,000,000.

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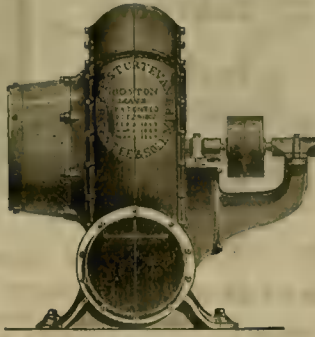
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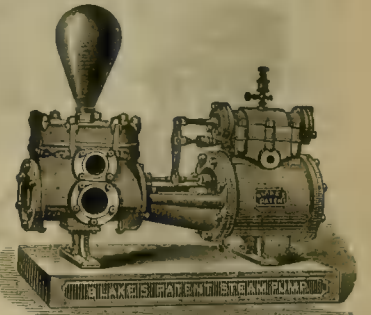
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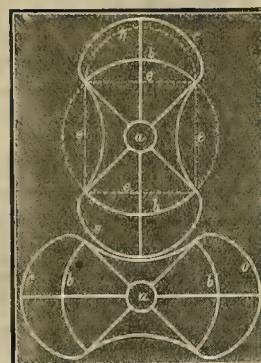
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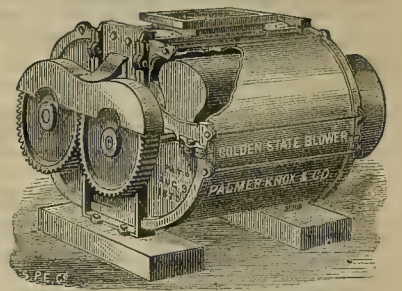
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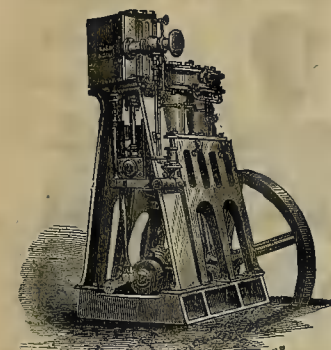
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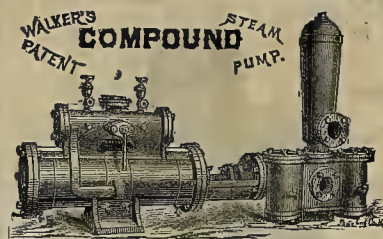


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Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroehne's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

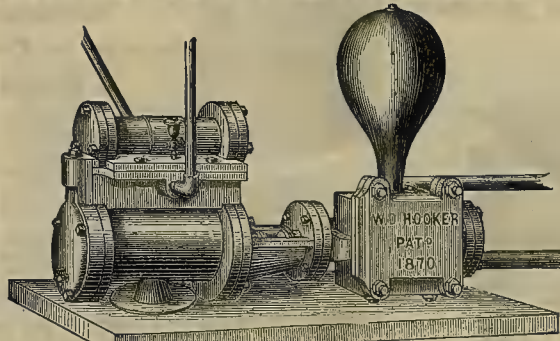
In speaking of amalgamators, the author describes a cheap amalgamator, grinding the directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc.

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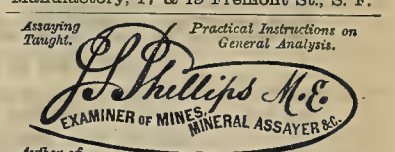
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SAN FRANCISCO, SATURDAY, MARCH 10, 1877.

VOLUME XXXIV.
Number 10.

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Mechanical Ore Concentration and Separation—No 25.

(Written for the Press by FRANCIS M. F. CAZIN, M. E.,
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The best apparatus adapted to collecting slimes from water is called *spitzkasten*, and may be designated as "funnel box," because it is a row of square funnels, diminishing in size and depth. The principle on which the funnel box is constructed is as follows: In a horizontal stream of water of sufficient depth but of diminishing velocity (widening out in space for the same quantity of water), of one kind of material the coarser particles will sink first and those next in size will sink next, the finest particles sinking last. A study of our river and creek valleys will illustrate this law very impressively. Boulders, gravel, sand and clay have been deposited by this rule and continue to be wherever water is flowing. Water the velocity of which is sufficiently equalized and diminished will deposit the very smallest and finest particles of solid and heavier material after the particles of greater size have been deposited before.

The importance of this apparatus to all who work ores, jointly with the fact that lumber and skilled carpenter work is all that is required to make it, induce us to give working drafts of the most effective and most easily made variety.

The funnel box represented in the diagram (on a scale of one-quarter inch to the foot,) rests on eight frames (St. Andrew's crosses), each frame having a special sill and plate. All eight frames rest on four sleepers. The intersecting point is higher in each frame than in the previous one. They are arranged on the sleepers so as to bring the cross-points into one (inclined) line, and the insides of the top angles are then boarded up with tongued and grooved lumber of the thickness of one and one-half to two inches, the boards running parallel with the inclined bottom line; the boarding is then cut alongside the outside frames. Sides and bottom are then put in between strips in the zigzag shape shown by the draft. Thus three funnels are formed, with a hole, *c*, near the bottom of each, through one of the sides, with a syringe to shut them. The gutters, *d*, receive the pulp, and the boxes, *e*, either conduct it to concentrators, of which we shall speak hereafter, or reserve it for the purpose of becoming dry. The inlet, *a*, is for the muddy water carrying the slimes, and *b* is the outlet for the clean water.

In case the water escapes from this apparatus still muddy, it would be of little benefit to conduct this escaping water to another apparatus of the same description, but the water flowing into the apparatus should be diminished, or part of it should be conducted to another apparatus of the same description, because in order to deposit the finest particles the velocity of the water should not exceed a certain limit, which by repetition with the same amount of water cannot be attained but by a diminution of quantity.

Although this apparatus is intended, first, to collect the finest sands and slimes, it answers to the other purpose of imperfect classification, as heretofore explained. As sizing (classification) is required in order to prepare the proper conditions for separating grains and sands by their difference in specific gravity, so the separation according to quality of slimes requires the preparatory act of assorting according to sizes (classification), and this requirement is as much more preeminent with slimes than with grains and sands, as the difference in sizes is greater among the finer classes than among the coarser ones, as they vary from one-half millimeter down to microscopical sizes. The apparatus here described acts, as stated before, as a classifier also, and with such perfection that the much complicated Wengler classifier for slimes alone has no preference, but it will work coarse and fine sands in a greater quantity, and if serving for the classification of sands will by necessity have to be supplied by the addition of

simple funnel boxes for collecting and assorting the slimes.

Though the funnel box acts as a classifier, and as such acts with perfection, one exception must be again mentioned, and this is that the classification is perfect only for one and the same material, but that finer particles of heavier material (metallic ore parts) will sink and gather simultaneously with the coarser particles of lighter material. As a simple consequence thereof, the material once classified by funnel boxes would be separated by the simple action of another classification by screens, but this method has practically proved applicable to sands only and to the coarsest of slimes, but as impracticable for all sizes below one-third millimeter (one-seventy-fifth of an inch). Nevertheless, it is exactly on the assortment thus obtained of larger and lighter particles of one material and smaller and heavier particles of another material, that almost all successful appa-

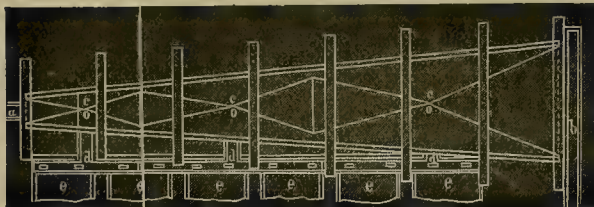
Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city. Considerable of this news is later than that procured from the interior journals:

Good progress has been made in cleaning out the cave in the incline of the Hale & Norcross, and they expect soon to remove this obstruction and be able to lower the pump and free the mine of water.

The Superintendent of the Gila says: The vein as far as prospected, 70½ feet in the winze and 26½ feet in the drift, has been very regular, and I think its permanency cannot be questioned; it carries in both places a little good ore and looks very encouraging.

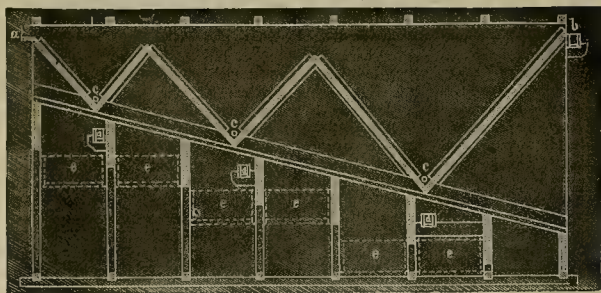
The developments made in the Eureka Con-



PLAN OF FUNNEL BOX.

rat for concentrating slimes are to work, and it may be fairly asserted that none of them will work to full satisfaction unless the material fed to them be collected and assorted in the before-described method, or unless a more perfect classification, even, has been applied. It is thus evident why screen assorting is applied for jig-

solidated are looking well and still show signs of improvement in the extent of ore deposits. etc.; 10th level, face of drift in ore and looking well, with very encouraging prospects of developing a larger body of ore. The furnaces are running well and yielding an increased product of bullion.



FUNNEL BOX FOR COLLECTING FINE ORE-SANDS AND SLIMES.

ging and funnel box assorting for all machinery separating slimes.

BULLION SHIPMENTS.—Since our last issue have been as follows: Leopard, Feb. 26th, \$5,359.99; Hussey, Feb. 26th, \$1,600; Northern Belle, Feb. 25th, \$15,979.70; Con. Virginia, March 1st,



Section of Funnel Box.

\$55,420.41—total to date, \$274,141.40; California, 1st, \$74,673.19—total to date, \$1,120,081.22; Northern Belle, Feb. 27th, \$10,881; Comanche, Feb. 27th, \$3,017.74; Tybo Con., Feb. 25th, \$9,999.59—total to date, \$54,461.15; Washington, Feb. 28th, 590 ounces; Modoc—total for February, \$51,315; Con. Virginia, March 3d, \$53,945.38—total for February, \$328,086.78; Northern Belle, March 1st, \$8,806.67; Grand Prize, March 4th, \$11,028; Empire (G. V.), March 3d, \$17,500; Tybo Con., Feb. 28th, \$9,836.60—total to date, \$64,297.75.

Mining Accidents.

Quite a chapter of accidents in mines are recorded this week, occurring in different parts of the coast. Several of the accidents were fatal.

On the 2d inst., as the men were about descending to work in the Rising Sun mine, Colfax, Placer county, John Eddy stepped into the tub, when the wire rope parted and he was precipitated to the 500-foot level. His remains, when found, were a shapeless mass. Several men, who were at the bottom of the shaft, narrowly escaped death from the falling bucket.

On the 3d inst., Scott Ward, a young man employed in the Brush Creek quartz mine at the Mountain house, while oiling the machinery, was accidentally caught by the fly wheel and killed. His body was cut in two and his left arm torn out.

By the accidental caving of a lot of rock in the header of the Suro tunnel, on the 6th inst., a miner was almost killed.

Last Saturday while Sol. Rogers was at work with his partners in the face of the drifts, on the 815-foot level of the Florida mine, on the Comstock, a cave occurred by which Rogers was quite severely bruised and cut. He was severely injured on the right side, where a piece of rock made an indentation which apparently extended to the cavity within the short ribs, appearing to be broken. He was also badly bruised about the left side and in other places.

Thomas Wilson, a miner in the Imperial, on the Comstock, was killed on the 2d inst. He was working in a hot place, and came up to the station to cool off, when he was killed. Deceased was a native of Scotland, 38 years old. Muldoon, a man working with Wilson, and who came up the incline with him, says he saw Wilson try to climb up on the station, and also saw him when he fell back. When the man fell, Muldoon started to his assistance, but before he could be reached he had partly risen, and in trying to gain his feet he fell over the next set of timbers. In this way he continued to struggle and fall until he had gone down between thirty and forty feet. At one time Muldoon got hold of him, but his body was covered with perspiration, and it was impossible to retain the grasp upon him. As is usual with miners working in hot places, Wilson was stripped to the waist. Finally Muldoon managed to get below the man, and putting his knees on the timbers stopped his further progress downward. Wilson then clutched the guide of the giraffe and held on with the grasp of a man who is struggling for his life. It was with difficulty that he was gotten loose from the guide. Muldoon says Wilson did not faint but fell back from mere weakness, and was unable to regain his feet. The declivity of the decline is not very great, and Wilson was not hurt by his descent. He had simply remained in the heated atmosphere longer than he was able to endure. There were three new men on the shift, but all who were accustomed to the heat got out all right. Thomas Oliver, who came up with Wilson, was a new hand in the mine, and was working his first shift. Wilson was in a semi-conscious state for nearly an hour after the time when he fell, but was unable to explain his sufferings intelligently. The jury returned their verdict in accordance with the facts, and exonerated the company from all blame.

THE PROSPECTS IN IDAHO.—"A. B. R." writes us from Boise City, Idaho, as follows: Our winter is far advanced and as yet we have had but little snow, and grave apprehensions are entertained relative to the prospects of our placer mines in the surrounding camps for the next season. It is true, however, that there were heavy rains during the preceding fall and early winter, which made the ground quite wet and may help out the light fall of snow. We hope that March and April will make up the lost time in quantity of snowfall. The ground in the valleys being well saturated by the fall rains, we have hopes for good crops. There has not been to exceed two inches of snow at any time this winter in the valleys. Stock of all kinds are rolling fat. The thermometer has not at any time this winter been below 7° above zero. There were only two days this winter when the sun did not shine clear and warm.

The Empire mine, Grass Valley, cleaned up \$20,000 from a 24 days' run last week.

The water in the Succor shaft is getting less every day.

The letter of the 4th from the Con. Virginia says: The west drift on the 1650-foot level, from the C. & C. shaft, was connected with the drift from the California deep winze on Tuesday of last week. Since that time have been enlarging and retimbering some 150 feet and repairing the track and putting in switches so as to run north; also south to connect with the Con. Virginia deep winze. This work will be completed in some eight or ten days. We shall then commence breasting out ore. This drift is now cool and pleasant, as the ventilation is perfect.

At the Frost shaft of the Manhattan the foundation pits for the engine are completed and the work of laying the foundation completed.

The Superintendent of Best & Belcher finds it necessary to put in larger air pipes. Up to this time they have relied solely on the Gould & Curry for air, and by putting in 15-inch pipes they can do more work and have a better supply of air.

In the California they have connected the south drift on the 1600 and the drift from the deep winze on the 1650-foot level with the drift from the C. & C. 1550-foot level, and have secured excellent ventilation.

The Chollar turned out 679 tons of ore last week valued at \$25 per ton.

In the North Con. Virginia they are using Burleigh drills in the bottom of the shaft and are making good progress in sinking.

They have now control of the water in the Comanche main shaft, and the work of sinking is going on again.

The Grand Prize new mill is working 20 tons of ore per day.

CORRESPONDENCE.

Mines, Sampling Mills and Smelting Works Around Salt Lake City.

[From our Traveling Correspondent.]

So much has been written and so well in regard to the beauty and wonders of this great inland city, that little is left to be added. It numbers at present about 25,000 inhabitants. It is apparently as quiet and orderly as Indianapolis, the so-called "city of churches," besides bearing a striking resemblance to it in some other respects. What has been said of its rising temple, its tabernacle of mammoth proportions, its theater, hotels, public buildings, broad and well laid out streets, lined with shade trees—the side-walks everywhere bordered with streams of pure mountain water—and its wide blocks planted in fruit trees at short intervals throughout the whole extent of the city, need not be repeated. What is of the most interest to the miner or mechanic, is to know that he can obtain the necessary machinery and facilities for his operations at cheap rates and without delay.

In addition to the extensive works of the railroad companies, there are at least two large foundries, with boiler and machine shops attached, not to mention other establishments, confined to particular branches of the business. The Salt Lake Iron Works, T. Pierpont, Manager, situated near the Utah Central depot, seem well prepared for a large business in manufacturing and repairing engines, boilers and every variety of mining, milling and hoisting machinery. A good substantial building has also been erected in the city for dry concentration after the Krom process, but the works are not yet in running order; and besides several furnaces at convenient distance, the Pascoe smelting works are located near the somewhat celebrated Warm springs, within the city limits. They have been running regularly and successfully, producing last year 190 car-loads of base bullion, valued at \$380,000. Several novel and ingenious appliances were seen here, among them a partially constructed concentrator, the invention of Mr. Pascoe, with some new and promising features in the way of wet concentration, the details of which he prefers withholding from the public until after its completion, when they can be made much clearer by wood-cut illustration.

Some of the Mines of Little Cottonwood.

Alta City is in the very heart of the mines, 28 miles from Salt Lake by rail. It is situated in a deep gorge, 8,000 feet above sea-level, surrounded by lofty mountains covered with snow, and not without danger from snow-slides; but such is the richness of the surrounding mines that it is populated by many hundreds of brave men and women, not a few who dare spend years where your correspondent was not particularly anxious to prolong his stay.

The Lavinia Mine,

Situated near the head of Little Cottonwood, and the property of Salisbury Bros., is worked by a tunnel 1,800 feet in length. The ore is found in chambers from eight to ten feet wide, (occasionally from 15 to 20 feet). The amount extracted per month is governed somewhat by the season, and varies from 300 to 1,000 tons, averaging \$45 silver and running from 45% to 50% lead. It is represented as one of the paying mines in the district, and gives employment to a large number of men.

The Utah Mine,

500 feet south of the Lavinia, and the property of Mr. M. T. Gisborn, of Salt Lake, is under the superintendence of Mr. A. J. Phillips, and is also on a good paying basis. Tunnel 300 feet on the vein; winze No. 1, 150 feet from its mouth, 90 feet deep; winze No. 2, 200 feet from mouth of tunnel, is 125 feet.

The main incline is now being sunk 350 feet westerly from the mouth of tunnel, and at present 80 feet on the vein, from which point a level is being run that will reach a depth from surface of 315 feet. It has a vein of at least two feet of good pay ore, carrying 45 ounces of silver, 30% lead and about 20% of oxide of iron, making it a very desirable smelting ore.

The Celebrated Emma Mine,

About which there has been so much litigation, lies but a few hundred yards above Alta, on the north side of the canyon, and is in charge of Mr. J. Scrimgeour. Everything is in first-class order and events are believed to be shaping themselves in such a way as soon to lead to the resumption of work.

The Equitable Tunnel & M. Co.'s

Works are located next west and near the Emma. Office in San Francisco. Resident Superintendent, Mr. J. P. Courter. The work, both mining and mechanical, is done in the most economical, substantial and workmanlike manner, and everything about the mine and works wears an air of neatness and discipline. Their principal work is a main tunnel, 1,500 feet in length, located 100 feet lower on the mountain side than the Emma works, while the exploration

of discoveries already made is carried forward simultaneously with the further extension of the main enterprise.

The ore at present being extracted, although not in large quantities, is looking remarkably well, and owing to the fact that it contains a large percentage of iron it makes it of a character much sought after by the smelters. Some small lots had some time previously been shipped as tests, that ran as high as 75% in lead and 80 ounces in silver.

The Phenix Tunnel,

J. P. Courter, Superintendent, is located in a gulch just east of the Emma mine, and has reached a depth of 800 feet, cutting in its course, it is said, several large strata of vein matter, and the prospects for the company are represented as flattering. There is a large number of tunnels running into Emma hill, and other mountains in the vicinity, which would require too much time and space to allow of a description.

The North Star Mine

Is the oldest location on the hill, 500 yards west of the Emma, and has made considerable shipments. Owing to company difficulties it is at present idle, although the ore is represented as being of high grade, \$50 to \$250 per ton.

The Alta Consolidated,

On same belt, further west, has recently started up anew, under the management of Mr. Chas. Read, who has engaged 25 men, with the expectation of requiring the services of as many more within a month. It is stated that the mine has an exceedingly prosperous past history, having netted \$300,000. One of Hallidie's wire-rope tramways was seen in operation here, extending from the mine the distance half a mile, to the ore-house in Alta.

The South Star and Titus,

One of the oldest locations on the hill, comes next in order, with tunnel 600 feet in length, and reaching a depth from surface of 500 feet; an incline also from tunnel 200 feet. The ore is found in deposits—the gangue of lime and iron in sufficient quantity for flux, second class being in demand for the iron it contains, besides running 5 oz. silver, \$5.00 gold, 15% lead; first class 40 oz. silver, \$5 gold and 35% lead; nearly \$400,000 realized in the gross and paying something over working expenses.

The Flagstaff Mine,

Of Utah (limited). A London incorporation and at present worked by Mr. A. G. Hunter, who has leased it for ten years. It is one of the prominent mines of the district and Territory having been worked steadily for the past five or six years, and turning out an immense amount of valuable ore. It was first opened by a shaft 400 feet and by tunnel tapping the bottom of shaft. Another shaft has since been sunk 500 feet from tunnel level and explorations made right and left, showing well-defined walls, with veins of ore and ledge matter between from 50 to 250 feet. Character of ore, argentiferous galena and carbonates, carrying a considerable quantity of oxide of iron (gold-bearing); value of ore ranges from \$40 to \$50 per ton. Number of tons sold for January, something upwards of 1,800. The ore is conveyed by a double track tramway the distance of 1,300 feet by the force of gravity to the ore-house.

The machinery consists of two large air compressors, near the ore-house and 1,700 feet from hoisting engines inside of the tunnel, which supply the power not only for engines and pumps, but also for a couple of Ingersoll drills, which are doing good service in this mine. It is well opened and systematically worked. Mr. Moses Hirschman, formerly of Gold Hill, Nev., has charge of the mine and the oversight and guidance of the labor of some 90 or 100 men. The prospects for fine returns were, perhaps, never more encouraging. Many large ore bodies are in sight, and all the arrangements are such as to facilitate the work of extraction and shipment, and a good time to come may be confidently anticipated.

A Few Mines of Big Cottonwood,

And only a few were visited, owing to the depth of the snow and the height of the mountains. The account of

The Reed & Benson

Was kindly furnished by Mr. H. C. Goodspeed, of Salt Lake, and is submitted without change. This mine is located in Big Cottonwood, just over the divide from the Flagstaff mine in Little Cottonwood. It was located early in the summer of 1870 and is owned by H. C. Goodspeed, Franklin Reed and others. The altitude of the discovery is said to be the highest in the Territory—a little over 11,000 feet above the sea-level. The position of this mine was very inaccessible and made a large outlay of money necessary to build roads, trails, tramways, etc. The tramway is one of the greatest enterprises of the kind in this, and perhaps, any other country, being 1,700 feet in length, on an angle of 37°, and going over a perpendicular bluff 400 feet high the rest of the distance. The road is all housed in to be available in winter. It is a double track, and the loaded car down takes the partly loaded car up.

The developments on the mine consist of a tunnel, which they are now using, 500 feet in length and about 300 feet below their upper workings. Below this tunnel there have been extensive explorations in inclines, drifts, shafts, etc. The vein is a true fissure and the ore high grade; the four qualities assaying, say, first quality, 69% lead and 250 ounces of silver; second quality, 40% lead and 90 ounces of silver,

and the third quality, 30% lead and 65 ounces of silver. As a flux it is one of the strongest found in the Territory, as it carries no silica, and the gangue being peroxide of iron.

For the past two years there has been some disturbance in the vein and the ore seemed to be confined to cross-cuts and pipes, but at a depth of about 1,000 feet from the surface the vein seems to have been recovered, and the ore and the direction of the vein agree with the upper workings, where the vein was regular. The production of ore for the past year has been small but the present prospects of the mine are exceedingly flattering.

The Antelope and Prince of Wales,

The property of Walker Bros., Salt Lake; location, near the head of Silver fork, Big Cottonwood canyon. This mine has been continuously worked about seven years, during which time developments have been made to the extent of nearly four miles in aggregate of shafts, winzes and tunnels, stopping to the amount of several thousand fathoms not included.

Piloted by the Superintendent, Mr. W. E. Hall (who, by the way, is entitled to much credit for the admirable system displayed throughout—it could not be better), one long tunnel (2,360 feet) was passed through, following the vein through the limestone from its mouth on one side of one of the highest ridges in Utah, till daylight was seen on the other. The main shaft in the center, also following the vein, is 1,030 feet deep, over which the hoisting works are placed, said to be at the greatest elevation of any in the known world, the altitude, 13,300 feet above the level of the sea. The vein (pronounced a true fissure—why not? with similar characteristics in slate or granite it would be so called,) varies from one to three feet, in places from seven to ten feet, and carries in the best chimneys ores of high grade. The number of men at present employed is about 65, and the daily product of mine will run about 250 sacks, or from 10 to 12 tons of ore, with assay value for first-class of about \$200 per ton, and for second, from \$75 to \$100. The machinery is of the very best, and consists of two 40-horse engines, the hoisting engine having a capacity of about 200 tons per 24 hours, also one very large air compressor (Bowers's), one 20-horse engine, two Ingersoll drills, of three cylinders—the compressor running the engine and drills and said to be adequate to the driving of half-a-dozen more if required. In summer, water is supplied to the mine by means of a Knowles steam pump, No. 6, situated a mile distant, and is conducted in a two-inch iron pipe. From what has been said, it is scarcely necessary to state that the property is remunerative.

A. C. K.

Difficulties of Mining on the Comstock.

The great difficulties met with and overcome by the miners in the development of the lower levels of the Comstock, says the *Gold Hill News*, can never be fully understood or appreciated by the outside public. For instance, how many are there who understand the force exerted by swelling ground, that will crush timbers 16 inches square to splinters in a single night, and close a drift as effectually, during the absence of a single shift, as before its excavation? Yet such is often the case, and the men are compelled to work continually for weeks to keep a drift open sufficiently for use or to conduct air.

In other places the miners are often compelled to labor in a suffocating atmosphere of superheated steam, ranging from 110° to 140° Fahrenheit. In such places there is always more or less water, almost hot enough to scald the flesh, seeping from the roof, sides and faces of the drift, which creates vapor so dense that the lights used by the men can only be distinguished at a distance of a very few feet. Yet men must dig, blast and burrow their way through it all without ever a thought of turning back.

In many places the miners are obliged to sink shafts for weeks at a time, without ever seeing the bottom of the shaft—the drilling, blasting and excavating of the rock all being done below the surface of the water. There are many places on the lower levels where the heat is so intense that the miners take turns of from five to ten minutes in the face of a drift, and then, dropping their tools, seek a cooling room, made tight enough to contain the fresh air sent from the surface, where they rest the same length of time, and then return to take the place of their exhausted comrades. Thus they labor during a shift of six and sometimes eight hours. Men at work on the lower levels in these hot places, never wear more than one pair of drawers made of some light material, and a pair of shoes to protect the feet. The rest of the body is perfectly nude.

Blowers of immense power are employed to drive the air from the surface down through long pipes into the mines. This volume of air when started is a perfect whirlwind, which gradually dies out as it traverses the heated pipes and loses its force until, when it reaches its destination, it hardly has a cooling property left. Many tons of ice are used daily in our mines, winter and summer, in order to furnish a palatable drink for the miners.

It is necessary to use engines and pumps of a power and capacity that astonish engineers from other portions of the world. In a large proportion of our mines it is necessary, after extending the heavy pumping machinery to the bottom of a perpendicular shaft 1,200 and sometimes 1,500 feet, to then carry it down an incline shaft 45° 1,000 or 1,500 feet further. The

hoisting machinery in use for raising and lowering the workmen, has been strengthened, improved, and made as secure and safe as the mind of man can contrive, but is often run at a rate of speed, in hoisting and lowering, that to persons unused to such swiftness of motion, creates, when descending into a mine, the impression and feeling of an actual fall—a check sufficient being made, just at the last critical moment, to land them safe at their destination.

In mines like those of the Consolidated Virginia and California, where large bodies of ore are mined, the space left vacant by the extraction of the ore is filled with solid timbers 14 and 16 inches in size, leaving only narrow passage ways for the workmen and cars used in the conveyance of the ore to the shaft. This, although very costly, is a necessity in order to secure the mine against caving and protect the lives of the laborers. All such mines are obliged to employ watchmen, whose business it is to see that no miner shall accidentally or carelessly leave a lighted candle where it can start a conflagration. A fire in a mine creates a suffocating, deadly gas, which will in a minute's time asphyxiate the strongest man.

Floods of water often burst suddenly into drifts, completely flooding a mine, and sometimes adjoining mines, as was the case a few months since in the Hale & Norcross and Savage mines. Immense caves are liable to occur, hoisting works may take fire and burn up, sudden explosions take place, and a thousand other casualties and mishaps are likely to occur, which make the life of a miner one of continued danger and hardship, and the cost and risk of mining investments one of the most hazardous occupations followed by civilized man.

RESTING SPRINGS DISTRICT.—We have for a long time endeavored to find out something in regard to this district, but have, until a few days ago, been unable to obtain anything reliable. Mr. J. P. Taylor, general agent for the Kern and Inyo Stage Company, has kindly furnished us with the following information: The distance from Mohave to Resting Springs, by the new road laid out, is 135 miles; from Resting Springs to San Bernardino the distance is 190 miles. The district has heretofore been reached via San Bernardino, but as a distance of 55 miles will be saved by taking the Mohave route passengers and freight will, as soon as the new road is completed, go in via the latter. The Kern and Inyo Stage Company, in conjunction with citizens of Mohave, have raised funds and sent out men to make surveys and complete the road. The greatest difficulty encountered is on the first 50 miles out from Mohave, where natural streams or springs have not yet been found. Wells, however, will be sunk in several places, so that that obstacle will be overcome. It is an excellent route for the entire distance, and teams will soon be running over the new road. In a short time this stage company will put on a line of coaches, and from the favorable reports received from that section no doubt there will soon be considerable travel to that district. A furnace has already been started under the most favorable auspices for success. The ledges are said to be large and well defined, and carry high grade smelting ores. Mr. Anson Cross, who is well known, is one of the leading men. We shall expect to have to chronicle some interesting and favorable reports of this new and almost unknown district.—*Coso Mining News*.

BANKERS AND BROKERS.—A telegram from the East gives an important and interesting opinion by the Commissioner of Internal Revenue on the liability of brokers to be taxed as bankers. Referring to a letter addressed to him on this subject by Senator Stewart, the Commissioner writes that relative to the proposed assessments against certain brokers of San Francisco who had been reported as liable to internal revenue taxes as bankers, 72 of said brokers have forward affidavits on printed forms and prepared for the use of individuals and firms; that, admitting the statement sworn to in these affidavits to be true, there appears to be no ground for assessments on any business done during the past 15 months in cases of 69 in the 72 brokers above referred to, and no assessments will be made. The affidavits of the other three and of still another not on a printed form will be returned with leave to amend, as it is believed that certain informalities and omissions noted therein may have been the result of oversight or inadvertence. This view of the case will meet with considerable approval from our brokers in this city, to whom it is especially interesting.

IONE AND ELLSWORTH.—From Stubbs, of the Ione and Ellsworth stage line, we learn that the mines at Ione are looking and yielding well, and that the new mill now in course of erection will soon be completed. In addition to the daily yield of the mines, 500 tons of ore have accumulated at the mill, which will thus start up under very favorable auspices, and with a certainty of a prolonged run. At Ellsworth the indefatigable Wm. H. Raymond, formerly of the renowned Raymond & Ely mine, is hard at work developing the mines in that vicinity, with the most satisfactory results. He is running 10 stamps at present, and is shipping about \$20,000 worth of bullion per month, some of which passes through this city. Dame Fortune is again smiling on this fine old gentleman, whose industry and energy are far superior to those of many young men, and after passing through many vicissitudes he is in a fair way of again being numbered among the powers who rule the financial world.—*Reese River Reveille*.

MECHANICAL PROGRESS.

Setting a Planer.

To set a planer so that there may be no "wind" in its work is an item of great importance. Professor Sweet, of Cornell University, tells the *Polytechnic Review* of his success in this matter: Planing machines vary in size; some take work a foot square through the housings, that is between the side frames; others will plane work 12 times that size. In the following argument, imagine my referring to one about two feet between the posts, as there are probably more of that size in use than any other. It is not possible, at least not practically possible, to construct a frame for such a machine that will not spring by its own weight. If made heavier, then there is more weight to spring it, and if made of any of the ordinary forms and rested upon either two diagonal corners, the frame will spring winding; if supported by the opposite corner it will wind in the opposite direction. If the bed of a planer is winding, nothing can prevent its making the work done upon it winding to exactly the same extent also. To prevent the winding of the bed, assuming it to be first made true, there are two methods.

One is to set it upon a substantial stone or brick foundation. To set the machine is a delicate operation, and the foundations are so costly that but one in a hundred of this size are ever placed upon them. The other plan is the one I have adopted, and with the very best success. It is supporting the machine upon the single support at one end—in other words, resting the machine on three points. I can hardly conceive it possible for any one to have a better test than our surface-plate work; for before this was done we could plane them winding either way at will by simply loading the floor on which the planer rested, while now it is seldom that we detect the slightest difference. If there is any one thing that I think I know better than another in regard to machine construction, it is that all machines likely to be set upon a floor, which cannot be supported upon a single column, as our milling and shaping machine, should be rested upon three points. As certain as a surface-plate cannot be made true unless rested upon three points, so certain is it that a machine cannot be kept true unless supported on the same principle.

Mechanical Progress in France.

Regarding the progress made in the industrial arts in France, taken from a census recently made of the working and material developments, it appears that the total machine force of the country is at present 1,500,000-horse power, representing a force of 4,200,000 draft-horses, or 31,500,000 men—that is to say, ten times the valid industrial population of France. This substitution of machine-work for hand-work has produced an economical revolution in French industry, which it is interesting to compare with the industrial state of France in 1788 before the introduction of machines. The first steam engine that appeared in France was set going in 1789. It came from the manufactory of Boulton & Watt, at Birmingham, and was used for the water supply of Paris. Unfortunately, from the great revolution of 1815 machinery industry in France almost disappeared, and it was not until 1825 that the French began to manufacture steam engines, and many of their manufactories now rival those of England. In 1852 France possessed only 6,000 steam engines, representing a force of 75,000 horses. In 1862 the number of engines had risen to 22,500, and the horse power to 618,000. From this year the increase was extraordinarily rapid, until, as stated above, the horse power of the steam engines in France attained 1,500,000 last year. In 1788, of one milliard of manufactured products 60% was workmanship and 40% raw materials. To-day the proportion is exactly the reverse; the workmanship is 40% and the raw materials 60%, and yet it must be remembered that workmanship has increased 40% during the past 20 years. To-day the annual production of France is about twelve milliards, of which the raw material is seven milliards, and the workmanship five milliards, whereas in 1788 the workmanship would have cost eleven milliards. It results from this, that the introduction of machine work has led to a saving of six milliards in the workmanship.

A NEW KALEIDOSCOPE.—An improved form of kaleidoscope, by M. Thomas, of Paris, has been reported on favorably by the *Société d'Encouragement*. The two mirrors are, as usual, put in a tube; but the objects employed to produce the images are enclosed in a transparent case, which is separate from the tube. This case, almost flat and with its two faces formed of watch-glasses, is supported by a rod, which is fixed to the tube by a hinge. It can also receive a movement of rotation round its axis of suspension. In this way it can be inclined in any direction to the axis of the tube. A button, manipulated with the hand, enables one to turn it about its center, so as to change the positions of the objects within. A pasteboard disc, white on one side, black on the other, is placed behind the case. Transparent or opaque objects may thus receive light on one or the other side of the case and be detached on the white or black background of the disc, according as it may be desired to observe them by transmission or reflection.

The Advantage of Good Tools.

A trade is not generally well learned until we can take care of the tools—at least not until one knows what is the matter with bad tools and how it should be remedied. The poor workman cannot always do this, but he should take care that his tools are looked after by some one who knows how. Good tools pay. The *Iron Age* says: We have in mind two brands of tools, so much alike that the eye could find no difference, yet when at work the difference in temper and material is such that the high-priced tool will pay for its extra cost every day it is used. Good tools help to make good and careful workmen. If any of our readers doubt this statement they have only to go to the bench and undertake a job of any kind, using first the poorest tools they can find in the shop, and then doing their work over again with good tools. The nervousness and dissatisfaction caused by a poor tool is in itself almost fatal to good work. Take the case of a foot-lathe. With loose spindles, center out of line and an uneven bed, we are so troubled and annoyed that we have very little attention to bestow upon the work in hand. We are, in fact, always fighting hopelessly with our "environment." We do not wish it to be understood that we think boys and apprentices should have the best tools that money can buy, but we do think they should have tools which are perfectly suitable for the work they have to do, and with which a good workman could not find fault if set to do the same class of work.

In learning to use tools, the old hand as well as the young one should not forget the fact that the natural way is seldom or ever the right way. Skill is not natural, and the right way is the result of the skill. Hence, we find that the beginner attempts to do work very differently from the experienced hand, and it is not altogether wrong to allow him to work in what he finds to be the most convenient way at first. As he gains skill he can change his method of work. His tools may be suited to his lesser experience.

Strength of Metals.

The Ashtabula disaster is calling forth anew all experiments which are on record concerning the strength of metals when under tension. The *Manufacturer and Builder* calls attention to the labors with which Prof. R. H. Thurston, of the Stevens Institute of Technology, Hoboken, N. J., has been occupied during the last few years.

These experiments show that metals may be divided into two classes, of which iron and tin are the types, the first of which offers greater resistance to slowly produced strain and distortion, while the latter, on the contrary, offers greater resistance to rapid than slowly produced strain. This difference of behavior depends on the ability of wrought iron to "flow"—a property which lately has attracted considerable attention, and consists in an interior hidden molecular movement which rearranges the internal adhesions and releases internal strain, being a phase of that viscosity which Vicat supposed might in time permit rupture of metal subjected to stress nearly approaching its original ultimate resistance. Two pieces of tin, from the same bar, were broken by tension, the one rapidly and the other slowly; the first broke under a load of 21,000 pounds and the latter of 14,000 pounds. Alloys of copper, such as brass and bronze, behave in a manner similar to those which belong to the tin class. It is the contrary with iron, and records of Prof. Thurston's laboratory illustrate the proposition that metals which gradually yield under a constant load offer increased resistance, with increased rapidity of rupture.

COMPETITION CHEAPENING ENGLISH HARDWARE.—The *British Trade Journal* says: The new year has not up to the present brought about any noticeable improvement in the hardware trade, which experienced an anything but good time of it during 1876. The official returns show that shipments fell off to the extent of £783,474 in the year, and the only country that took goods on a larger scale than in the previous year was Spain. The Argentine Confederation bought less than half the usual quantity of hardware, and shipments to the United States, British North America and the Spanish West Indies were 35% to 40% less. The great American market is slipping away, and manufacturers beyond the Atlantic are entering vigorously into competition with British houses in the Canadian market. Especially is this competition felt in locks, bolts, butts and hinges, gas and boiler tubes, electroplates, scales, polished steel goods and various kinds of hollow-ware.

CAPTAIN EADS'S SUCCESS.—Captain Eads has received the first installment, \$500,000 in U. S. bonds, on account of the payment for his Mississippi jetties, which have proved, as we always predicted they would, a grand success. The U. S. ship *Plymouth* has passed through the line of jetties at low water, and is the first war vessel to traverse the new channel. She drew 17 feet of water, and the least depth found by the lead was 18 feet. The passage of the upper jetties was made by the ship under full steam power in eight minutes and 17 seconds. Between the jetties there is a channel 24 feet deep and 200 feet wide. At the head of South pass there is a minimum depth of 27 feet. On the charts of 1873 the last mentioned sounding was but 16 feet; and at the mouth of the pass, at mean low water, the lead showed but three, four, and seven feet.

SCIENTIFIC PROGRESS.

Analysis of Fungi Poison.

L'Imparziale has an article by Professor Schiff, late of Florence, in which the author remarks that it has been commonly thought that each species of poisonous fungus produced its own special symptoms. An analysis of the phenomena observed, however, shows that such a distinction is inadmissible, since all the differences can be reduced to varieties in the degrees of action on different systems of the organism. It is, indeed, probable that there is in all poisonous fungi one fundamental deleterious principle, and this is probably muscarine, discovered by Schmiedeberg, of Dorpat, in the *Amanita muscaria*. Other noxious principles which may coexist, and vary in different species of fungi, account for the differences which may be presented in the symptoms of individual cases of poisoning.

Animals (dogs and cats), poisoned by muscarine suffer the following symptoms: Abundant salivation; marked slowing of the heart's action; nearly corresponding decrease in the number of respirations; increased contraction of the intestines, the contractions being more tonic than peristaltic in character, and the evacuations containing more mucus, and occasionally blood, and fibrillary movements of the muscles.

The symptoms enumerated are opposed to those produced by belladonna, datura and other solanaceae, and Professor Schiff has investigated the capability of these to act as antidotes to poisonous fungi. In the four experiments he had been able to make, datura stramonium was administered to animals poisoned with a mixture of fungi and fat.

Although daturine produced cerebral phenomena resembling those caused by poisonous fungi, and also a remarkable diminution in the excretion of urine, as regards all other symptoms of poisoning by fungi, paturine and the alcoholic extract of stramonium are antagonistic.

Two distinct toxic substances probably exist to poisonous fungi, viz.: muscarine, the action and antagonism of which to stramonium and belladonna have been mentioned, and another, whose effects on the system are analogous to those of atropia and datura.

Schiff recommends the treatment first proposed by Dr. Lauder Brunton, and based upon the experiments of Schmiedeberg, viz.: the use of atropia, datura, or stramonium in substance, or as an alcoholic extract.

THE FORMATION OF PETROLEUM.—The formation of petroleum has been explained by Mr. H. Byasson upon experimental grounds, as follows: If a mixture of vapor of water, carbonic acid and sulphureted hydrogen be made to act upon iron heated to a white heat in an iron tube, a certain quantity of liquid carburets will be formed. This mixture of carburets is comparable to petroleum. The formation of petroleum can thus be naturally explained by the action of chemical forces. The water of the sea, penetrating into the cavities of the terrestrial crust, carries with it numerous materials, and especially marine limestone. If the subterranean cavity permits these new products to penetrate to a depth where the temperature is sufficiently high, in contact with metallic substances, such as iron or its sulphurets, we have a formation of carburets. These bodies will form part of the gases whose expansive force causes earthquakes, volcanic eruptions, etc. Petroleum is always found in the neighborhood of volcanic regions or along mountain chains. In general it will be modified in its properties by causes acting after its formation, such as partial distillation, etc. Petroleum deposits will always be accompanied by salt water or rock salt. Often, and especially where the deposit is among hard and compact rocks, it will be accompanied by gas, such as hydrogen, sulphureted hydrogen, carbonic acid, etc.

SPOT ON SATURN.—On December 7th, 1876, Prof. Hall, of Washington, observed a small white spot on the planet Saturn. It was on the dark belt, just below the ring, and crossed the central line at 6h. 18m. Washington mean time. It was between 2" and 3" in diameter (i. e., between 8,000 and 13,000 miles) and very well defined. Notice was immediately sent to different astronomers, and during the next week, in spite of the unfavorable weather, it was observed on two evenings by five observers at various stations. These observations give a very good determination of the planet's rate of rotation, which comes out almost exactly 10h. 15m., with a probable error of not more than a minute or two. The result agrees very nearly with that obtained by Sir William Herschel, in 1793, viz: 10h. 16m.; but is quite different from that stated in most of the school and college text-books, which is 10h. 29m. The latter is undoubtedly wrong and it is not quite clear how the error first came to be made.

THE GREAT GRECIAN EXPLORER.—Dr. Schliemann, whose archaeological discoveries in Asia Minor and Greece have made the world ring with his fame, is a naturalized American citizen. He was for some years in the banking business at San Francisco, whence he removed to Indianapolis, where he was naturalized. The bulk of his property consists of American securities and some considerable real estate in this country. He left the United States only eight or ten years ago to undertake the archaeological enterprise he has so successfully pursued abroad.

The Earth Drying Up.

One of the most curious and we believe well substantiated inferences, drawn by those geologists who have devoted attention to the chemical metamorphoses which the rocks composing the crust of the earth are subjected to, says the *Polytechnic Review*, is the conclusion that the earth is gradually losing its water, or drying up. It is generally assumed that the evaporation of the water from the surfaces of our oceans, lakes, rivers, etc., is practically balanced by the various forms of precipitation, rain, snow, hail, etc., from the clouds, by which it finds its way again to the earth. This is strictly true in the sense that not a particle of water passes beyond the limits of our atmosphere, and all that finds its way into the atmosphere by evaporation sooner or later is returned again. Nevertheless, the water supply of our earth is slowly but steadily diminishing. It is not destroyed, but is so modified as to be no longer available for the sustenance of animal or vegetable life; since it is absorbed and bound up in the rocks. This disappearance of water is to be accounted for partly by mechanical absorption, partly by the hydration (or binding of water), which is generally one of the phenomena attending the superficial weathering of the rocks, and partly by the crystallization and recrystallization of the constituents of many of the rocks, and the extensive chemical changes going on at unknown depths within the bowels of the earth, as manifested in the phenomena of volcanoes. In the course of time, though happily many ages from the present, the combined result of these several causes of desiccation must be the complete absorption of all the water, and its disappearance from the surface of the earth.

The estimate has been made that about one-seventeenth of the original quantity of water the earth was provided with has already been bound up in the rocks or absorbed beyond the possible reach of the organisms living upon her surface.

AUSTRALIAN EXPLORATION.—The Australians are diligently exploring their great country. We learn from Queensland that the Northwest Exploring Expedition, which arrived at the Falls, Leichhardt river, on the 19th of October, all well, reports that the country from the Cloncurry gold fields to the head of the Southern branch, and thence tracing the course of the Diamantina to the South Australian boundary, and onwards to the 27th parallel of latitude, has been thoroughly examined. The party returned round the western boundary of Queensland. A connection was established between the furthest point reached by Captain Sturt, in 1846, and the extreme southern point attained by Landsborough, where a large area of pastoral country awaits occupation. The Herbert river, after running a short distance into South Australia, re-enters Queensland, and joins one of the principal heads of a large river, named the Mulligan, flowing through Queensland territory to the 26th parallel of latitude. The country is superior to the Diamantina. It possesses fine lakes and an ample supply of salt, with a splendid herbage. It is flanked on the western side by a sandstone range named after Governor Cairns. The extreme drouth caused much suffering to the men and horses, and three of the latter perished. It being impossible to reach Cloncurry depot direct, the party crossed the northern watershed, and followed down the Gregory, thence over to Leichhardt falls, from whence they were making for the depot through settled country. They came via Normanton to announce their safe return, and complete their instructions by traversing the Gulf shores. The most amicable relations were preserved with the natives throughout the course of the expedition.

ENGLISH FISH CULTURE.—The pisciculturists of England are making strenuous efforts to improve declining or nearly ruined fisheries and render them of value as food producers. The *London Times* of the 9th ult., says: A large and very healthy consignment of salmon and trout eggs from the Rhine, Lucerne and Geneva have lately been received in London. The salmon eggs were all gathered from Rhine fish, collected and packed under the advice of Herr Haack, of the famous fish culture establishment at Hunningue. The process of packing is described as very simple. The eggs are counted out into thousands (an extra hundred being given in for losses). They are then carefully inclosed in gauze and lightly packed in some well cleaned soft moss. The boxes are tied up all together in handy parcels and sent off to their destination, great care being taken in transit to prevent the eggs from being shaken. In the present instance the ova received by Mr. Buckland arrived in fine condition.

STILL WORRYING THE SUN.—M. Mouchot is continuing his experiments in utilizing the heat of the sun. He has lately shown to the Academy of Sciences a small still, in which the sun's heat was applied to the processes of distillation. With this still, the mirror of which was 20 inches in diameter, the inventor succeeded in distilling a quart of wine in half an hour. With a mirror five times as large, the inventor believes he will be able to distill 20 quarts in the same space of time. The seasons make but little difference in the working of the solar still, provided the sun's rays be not intercepted; and M. Mouchot has brought water to the boiling point in January, in a boiler standing in the open air and covered with ice and snow.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

Mechanics.—*Amador Ledger*, March 3: The old Downs mine of Sutter Creek has been running on rock from this mine for the past two or three weeks. Some 150 tons have been put through and a clean-up will be made next week. A large proportion of the rock crushed is from the boulder, and not from the regular ledge. The men are now running a tunnel at the 500-ft level.

COMET.—This claim is situated on the hill between Sutter Creek and Amador City. Years ago a shaft was put down 90 feet, when the mine was abandoned. Later the mine has been bonded by Mrs. John Mahoney to H. Rees and Jerry Mahoney for the sum of \$10,000, \$1,000 down and the balance at the expiration of the term. Men are now at work sinking a new shaft. The rock prospects well, some of it yielding as high as from \$20 to \$30 per ton.

ITALIAN QUARTZ LEAD.—This property is near Drytown, between the Seaton and Loyal mines, and is thought to be a continuation of the lead now being worked in the Dover. For the past three months the claim has been worked by three men. A shaft is down 30 feet, and the other day a ledge four feet wide was struck. The ore is of good milling quality.

There is a stretch of country along the line of the great mother vein, between the Drytown mine and Plymouth, some three or four miles in extent, over which prospecting is going on at a lively rate, with gratifying results. Not a patented mine exists in all this mineral region, but the labors of the prospectors are proving it to be as rich in auriferous treasure as perhaps any part of the main lead. The Centennial mine, near Dry Creek, is as likely a prospect as there is in the county. It is owned by a number of Italians. A shaft is down 35 feet, the ledge, which is from 10 to 15 feet wide showing, unbroken appearances from top to bottom. The ore is of high grade, and all the indications point to a permanent mine being developed in this locality. We are informed that a new town site is being surveyed in this neighborhood, and it is not at all unlikely that a flourishing mining camp will spring up during the coming summer.

Cart Box.—A prospecting party has started this side of the Beck mine. He has started three men to work in running a tunnel.

BUTTE.

Dry.—*Oroville Mercury*, March 2: The present winter has been one of the driest in the history of the State. While we have had frequent rains, but very little snow has yet fallen in the mountains. Where it fell to the depth of 20 feet last year, only about two or three feet can be found now. Everything indicates that spring is near. The days are warm and sunny, the birds have begun to build their nests and the trees are budding or in full blossom earlier than last year. These things leave us no hope for heavy storms this spring. By the middle of June, at furthest then, the snow that usually feeds our rivers will all be gone. The river, at the present time, is about as low as in July, during ordinary seasons. Starting in March with very little water, and with no snow of any consequence in the mountains, the river has kept up the usual stream, with little to prevent our river—the Feather—from dwindling down to a very small, insignificant stream before the 1st of August? We call particular attention to this for the reason that parties have been waiting for years for just such a season during which to mine the bed of this river. Now they will have an opportunity not met with. Already the matter is being talked up by those who have not been able to do a stroke of work in the mines along the foothills on account of the lack of water. We hear, too, that parties are making arrangements with Messrs. Hedge & Walker to put an engine and derrick on the bank of the river and mine the bed of it as far as the arm of the derrick will reach. This kind of mining can be done easier and cheaper this year than ever before. Already the effect of the dry season is beginning to be felt here in Oroville. During the winter months nearly every man about town who has nothing to do takes his pick and pan and goes to his mining claim with the intention of taking out some gold. Most of them are successful, and return with a few hundred dollars' worth of dust. All the small claims in the foothills are worked by their owners and more or less gold taken out. It is usual at this season of the year to see a dozen men standing at the counter in the bank with gold dust ready for sale. But this year all is different. Only now and then does a miner make his appearance, and then only with a small lot. "No water," is his reply to the inquiry as to how he has done. It is true that many claims will be worked this year the same as last, because they have an abundance of spring water brought in from a long distance by means of ditches; but it is also true that nearly one-half of our golden harvest will be cut off by the present dry winter.

CALAVERAS.

Struck the Lead.—*Calaveras Citizen*, March 3: We learn in the Pioche mine, at Sheep Ranch, owned by W. E. Norman and W. H. Clary, a lead several feet thick has been struck in the tunnel. As this is the extension of the Ferguson and Wallace lead, there is a good prospect that it will develop something of value.

Lamphear.—*Calaveras Chronicle*, March 3: Things are going on swimmingly at the Lamphear mine under the superintendence of Mr. Staples. The mill is running and there are 150 tons of ore on the dumps. The new management is starting in right and we expect the Lamphear to flourish like a green bay tree.

Upper Country Jore.—Work is progressing on the Zacher mill at West Point. Stopping out ore continues at the Champion. The company owning the Mina Rica have commenced operations upon an adjoining mine. Sixty tons of ore have been hauled from the Chapman mine to the mill. Clark's hydraulic at Independence is in full operation.

Hughes's Quartz.—We understand that the ore from Hughes's quartz mine, in Chile gulch, lately crushed in the mill owned by the company, paid well. The work of mining ore is progressing actively.

EL DORADO.

Richness.—*El Dorado Republican*, March 1: The product of the 25 days' run at the St. Lawrence mine was brought over to town yesterday, and was a sight to behold. It consisted of four lumps, as retorted, of pure gold, the largest of which weighed between 50 and 60 pounds, but it is not to be weighed when we went to press, but it is estimated to weigh between \$30,000 and \$35,000—the whole clean-up.

We notice a greatly increased inquiry of late for partially developed quartz lodes in this county. The fact that most of the capitalists who have for years been operating exclusively in mines on the Comstock lode, are now investing heavily in California mines, is opening the eyes of our people, and they are soon expected to see California stocks taking the lead in the boards.

From reliable authority we learn that at the 500-ft level a fine ledge was struck last week in the Taylor mine, and that everything was looking well. There can be no doubt of the Taylor's being a good mine, if worked for all it is worth; and that the Rosekrans is just as good, and that either is worth \$50,000 at least, any day, to a company with a little money, if properly worked for just what there is in them.

This river claim owned by Col. Wm. Jones & Co., above Chile Bar bridge, efforts to work which have been foiled the past two years by high water at inopportune times, will doubtless be thoroughly worked this season. The river bed, comprising their claim, has been pretty well prospected, and the owners are confident of taking out \$100,000, at least, before next November.

INYO.

More Stamps.—*Inyo Independent*, March 3: Mr. Nelson informs us that the Eclipse will start 10 additional stamps next Monday, making 30 in all. Capt. Eudey and Mr. Hubert have gone to San Francisco to procure additional machinery and to perfect other arrangements, to add batteries as fast as possible until at least 100 stamps are in operation in the mill. To keep this, or even half the number supplied with ore, will, no doubt, require the substitution of steam in place of horse-power on the tramway, and it is quite likely the first locomotive to put in Inyo county will be found on that three-mile railroad at the Eclipse.

Defiance.—*Coso Mining News*, March 3: The Defiance mine is looking well in all its different workings and the hoisting machinery is operating well. Ore is being taken out in considerable quantities, being delivered at the furnaces, and the latter will be started as soon as coal can be obtained.

McPhie. who was for a long time foreman of the Hemlock mine, owned by the S. V. M. & W. Co., at Panamint, has received the appointment of foreman of the Modoc company's mines at Lookout.

NEVADA.

Mining Situation.—*Grass Valley Union*, March 1: The mining business has never been better in Grass Valley than it is to-day. In almost every ravine and on almost every hill in the district the prospectors are busy. Picks, pans and shovels are in constant use, and the noise of the prospecting hand mortar can be heard almost anywhere in the low level of the valley. The prospecting is coming to this place, and it has the assurance of fair and honest treatment even if it does not get four-fold returns in a few short hours. We give below something of a summary of work done in this district, remarking that we have omitted to report from many enterprises that are being prosecuted.

In the Eureka they are hunting for a paying ledge in the lower level, under the supposition that more gold is there, because millions have been taken out. Cross-cutting in hard ground continues.

The Empire is the oldest mine of the district and looks better now than it did 20 odd years ago. It pays regular profits.

In the Idaho there have been no changes in it for a long time, and underground indications say there will be none for some years to come. Monday the Trustees will meet and declare the 91st dividend. We have heard of no sales of the stock of the Idaho for more than a year. The mine is managed after its old way of economy and perfect system.

The Omaha is again giving promise of doing well. The shaft is now down 650 feet and is being rapidly put down, and when the depth of 700 feet is reached another ledge will be opened. The lower 100 feet of the shaft has a good ledge, from 15 inches to three feet in thickness, and the ore is estimated as being worth \$30 per ton. The levels are four in number, and the longest is 750 feet. The mill, of 18 stamps, is kept running day and night.

As the Homeward Bound has sent out very fine ore in the past, and as there is not a single indication of barrenness in the underground workings of the mine, it is almost certain that at a depth of 300 or 400 feet at the south point will show a good mining property.

The Centennial is still doing well. The main shaft is down 250 feet, and there are two main drifts—the first 300 feet and the second 85 feet. Fine ore is coming from all parts of the mine. A crushing of 150 loads is now going on at the Orleans mill, and the clean-up will give some \$100,000. One brick of a value of between \$4,000 and \$5,000 has already been taken from the mill during the present crushing. The Centennial will probably keep the Orleans mill constantly at work. The 10th day of this month will be dividend day, and \$1 per share will be declared.

Tus Coc is still idle, and there is no immediate prospect of its starting up.

A consignment from the Alaska of 50 tons of ore gave about \$50 to the ton. The rock crushed at that time was not selected, but was put through just as it came out of the drift, and therefore contained a considerable quantity of waste. A crushing is now going on and it will yield much more than the one noted above.

At the Allison Ranch Phoenix a 10-inch cylinder steam engine is being put up for hoisting and pumping work, and in a few days the systematic development of the mine will be in progress. We yesterday saw some specimens from the ledge, taken from the grass roots, which showed well in free gold and rich sulphurets.

The Kentucky Ridge is at the head of Kentucky flat, a place once famous for its rich placer diggings, and which abounded in large nuggets of rough and unwashed gold. Two tunnels have been dug for the purpose of staking the ledge. The upper tunnel is into the ledge and has drifted upon it for a distance of about 75 feet. The lower tunnel is now in about 200 feet and work on it is progressing day and night, with eight-hour shifts of hands. The work on the lower tunnel is being done by contract. By the time this tunnel is completed a mill will be erected and in operation. At first the mill will be one of 10 or 15 stamps, and the average yield per ton was \$25.

The Rough and Ready hoisting and pumping machinery has been running several days and works to a charm. The mill has had a trial run and everything proved satisfactory. In the early part of next week the 10 stamps will begin their regular work. The ore in the tunnel has improved of late, and an excellent quality is coming out of the shaft.

The French ledge was formerly known as the Buckham, and is situated about 15 miles from Grass Valley, near Bear River. Several shafts have been sunk upon the ledge, making explorations for some 300 feet. The last of the shafts was sunk some three weeks ago to the depth of 40 feet, and it shows a big ledge two feet thick in the bottom. Free gold can be seen all through the rock. About 21 tons of the ore have been brought to Grass Valley and milled, and the average yield per ton was \$25.

On the Inkerman arrangements have recently been made for the erection of steam machinery for hoisting and pumping purposes, and in a short time that will be ready for working, when a thorough test of the ledge will be made.

Grass Valley New company is a prospecting organization, formed at home for the purpose of working a variety of claims in a chance for success. The company is now sinking on a ledge northeast of the town and the prospects are encouraging. Sparrowhawk, in Woodpecker ravine, is being constantly worked. The ore has improved since the first crushing made, and that gave \$24 per ton. Modoc, in the Allison Ranch neighborhood, and is near the East Franklin. The tunnel is in 120 feet and is being pushed with all the force of the hill, and has a depth of 140 feet, with a ledge of from eight to ten inches thick. The average yield of the ore per load is \$200. Pacific is east of the Allison Ranch Franklin, and distant about 1,000 feet. A tunnel is now in about 150 feet, and in a few days the ledge will be cut. The tunnel will give between 100 and 120 feet of back. The Shamrock ore works by a process in average of \$250 to \$300 per ton. The Allison Ranch Franklin shaft is down 250 feet and the ledge looks well. The mill is kept busy at work. On the Bullion Consolidated preparations are being made to erect hoisting works. Ore out of the mine has averaged \$30 per load. Godfrey mine, on Alta hill, is in gravel, and is worked by drifting. The gravel bed is very rich in gold and the explorations so far made show no limit to its extent. The mine is being put through a new battery, and the clean-up will be large. New York Hill is getting into shape for good work. The upper drift is into the pay chute and the work of opening up the mine is progressing favorably. The force of men has been increased within a day or two. Alpha & Omega, in the neighborhood of the Idaho, is quietly worked.

Corral. Near Spencer'sville, in Rough and Ready township, the San Francisco copper mining company is operating with success. About 3,000 tons of ore are now being burned and after that operation the metal will be secured by the leaching process. The company are now taking out about \$4,200 worth of the metal a month at the expense, for the same time, of about \$2,200. The amount of ore is practically inexhaustible, the thickness of the ledge being about 60 or 70 feet.

Gravel Mines.—The gravel mines in the upper part of the county will have a short run this year, on account of a want of water. The mines there, however, are looking favorably on the drifting system of working, and it is probable that many of them will give up the hydraulic for the drift plan. The Watt mine, just starting near Moore's Flat, will work through drifts and calculate thereby to save more gold in the long run than can be done by hydraulic working.

PLACER.

Mining Items.—*Dutch Flat Forum*, March 1: The various claims continue washing as constantly as the circumstances will permit, some, however, have not yet been enabled to clean-up throughout. The Southern Cross made a partial clean-up a few days since, which proved very satisfactory. The Polar Star fired a blast last week which plugged the incline; the gravel is being wheeled out from below, and it is expected that an opening will be made in a few days. The Franklin is being opened from the rim. The Idaho is working the material loosened by the blast of Judson powder referred to last week. The gravel proves to be more thoroughly disintegrated than the most sanguine could have anticipated. The Star and Union has commenced washing pay gravel, the slide having been stripped off the entire front point. The Summersett continues washing nights only. At Gold Run the Cedar, Indiana Hill, Gold Run and Hoskin claims continue washing.

River Mines.—Work progresses in the Centennial, Crissman and Whipple companies without cessation. The mines continue to look well, and the results encouraging. The two former have disbursed another dividend and the latter is expected to follow suit soon.

You Bet Mines.—The following companies have continued to wash since our last without interruption: Necess & West, W. P. Hussey and Nevada, and are making unusual progress.

Little York Mines.—The Empire and Christmas Hill mines continue to wash with all the energy and power that an efficient superintendent can bring to bear on them, through the aid of skillful miners and large heads of water. They will turn off in a few days to clean up.

The Liberty Hill company continues to wash and are making splendid progress.

Quartz Mining.—*Placer Herald*, March 3: Duncan hill lying between Auburn and Ophir, is at present the scene of considerable activity in the matter of developing the numerous quartz veins with which it is known to be riddled. There have been several rich strikes in the mines of this hill, and it is not unreasonable that on thorough development, some of them will prove rich and lasting.

The St. Patrick company as usual are exercising great activity in the work of extracting and crushing ore. The Julian, on Jenny Lind flat, manages to keep its 20-stamp mill running on paying rocks. The Pugh mill at Ophir, is running steadily on custom ore brought in by the prospectors. Indeed, everything in the quartz line in this section of country is active, and the season promises to be one of increased interest and attended with increasing encouragement.

SIERRA.

Iowa.—*Mountain Messenger*, March 3: The Iowa shaft is not yet down to the bedrock. They were in a streak of good luck, and have now reached a level of 100 feet, and are heretofore reached in the mine. There seems to be good prospecting gravel above where they now are. It is demonstrated beyond question that there is a large channel there.

Pennsylvania Claims.—Messrs. Foss & Steilman have been several months busily engaged in running a tunnel to prospect a supposed channel in Thompson ridge, on Nevada creek, north of Howell ranch. They have a tunnel in about 300 feet and had found a body of gravel, but had not prospected it any when we last heard. Should they succeed in finding pay, it will open up a large tract of mining ground.

The Bunker Hill company quit work on their mine during the last snow storm, but will resume operations again in the spring. They have a tunnel in near 900 feet and are running over the second rim. The tunnel is in conglomerate of bedrock, pipe clay and cement.

SISKIYOU.

Good Clean-Up.—*Yreka Union*, March 3: We learn that the Morning Star mine, on Jackson gulch, recently made a clean-up, and took out of which the owners are to be owners. The company have now excellent rock, and the prospects are very flattering.

The owners of the Star of the West, Messrs. Grant, Patton & Sheffield, are going to put up a four-stamp mill at their mine as soon as possible.

Johnson's Mines.—A. M. Johnson, of Oro Fino, cleaned up the mill of the mine, which had been running for some days on rock from the old Shepard mine, which he has been prospecting recently. The rock paid passably well. He will start the mill up again in a few days upon rock from his other mine. The new tunnel he has been running in this mine is about down, and as a consequence the mine will be in a better condition than ever for working. He will not resume work on the Shepard mine for a while.

SONOMA.

Coal.—*Santa Rosa Democrat*, March 3: We learn that Mr. Davis, another mining expert, who has been engaged in the coal mines of this coast for several years, was here last week making thorough tests and examinations of the Taylor Mountain mine, and pronounces the coal to be of superior quality and in great abundance. As soon as the work is finished from the mine to this city the work of delivering it will be begun.

TRINITY.

Union Hill.—*Trinity Journal*, March 3: The heavy rains last winter so saturated the earth in the flat where the Union Hill claim is located, that great quantities of top dirt broke away and moved bodily down upon the agents, forcing one of them down the shaft and crowding upon the others so fast that it necessitated frequent removal to keep it from sharing the same fate. The ditch conveying water across the claim was also broke and carried away, and the only means of conveying water to wash away the constantly advancing bank of top dirt was through the large 22-inch pipe, with its two giants. When one giant was carried down the shaft half of their power to contend with the mud was lost, and the further working of the claim was abandoned for the season. Last summer Mr. J. G. Trotter, one of the proprietors, purchased the other interests and at once began preparations to prosecute work. A force of hands were put to work in the tunnel and incline, the mud removed and the lost giant recovered. With the first flow of water operations were commenced to wash away the remainder of the slide and they have gained slowly but steadily on it from the commencement of the season. The pipe is run night and day, one relay of hands being always in readiness to take the place of those whose "shift" is off. We visited the claim last Sunday and were gratified to perceive the progress made, notwithstanding the scarcity of water which prevailed in the beginning of the season. The worst part of the slide has been washed away, and that which is left grows constantly thinner as the mud settles slowly downward where the stream from the two giants drives its advance into the incline. A large body of rich gravel was uncovered before the slide came, and if we happen to have a good spring, in all probability Trotter will be able to get at this gravel before operations are suspended for the summer. The dry winter has not been without its advantages to this claim. Though it has cut short the water supply, it has also kept the top dirt so dry that there has been very little caving.

Nevada.

WASHOE DISTRICT.

California.—Daily yield, 550 tons of ore. The ore stops continue to put on the same excellent appearance as for months past, and the ore extracted continues of the same uniformly rich character. The yield for February insures the payment of the regular monthly dividend of \$2 per share. The opening up of the ore vein on the 1600-ft level continues to prove its extent greater and its value

more enduring with every step of progress made. On the 1650-ft level the ore prospects are still showing richly on every hand. No one can speak positively of the extent of an ore body until it has been developed, its measurement taken and its value determined. But when the width and character of a vein and ore body are known, and openings like the sinking of the Consolidated and California winzes, penetrating the ore 100 feet perpendicularly, and the connecting drifts on the 1650-ft level are made, there can be no longer doubt as to its continued prosperity to an indefinite future period of time. The California pan mill has been shut down for repairs, as it has been running without renovation steadily for the past year.

CON. VIRGINIA.—Daily yield, 285 tons of ore, keeping the Con. Virginia mill steadily running. The connecting drift with the Best & Belcher and Gould & Curry, on the 1200-ft level, is being steadily enlarged and put in the best of repair as a source of ventilation for the lower levels. On the 1650-ft level the introduction of a current of air has greatly slackened the rock on the sides and top of the drift, making it necessary to entirely retimber 140 feet of the drift during the week. While this was being done a new track has been laid, and switches, along with the usual connected drift, have been put in. These preliminary parts of the work that must be accomplished before the regular hoisting of ore can be begun. A new pump is being put in the O. & C. shaft below the 1650-ft level, preparatory to continuing the sinking. The flow of water is still strong at the bottom of the shaft.

JULIA.—The main south drift on the 1650-ft level is steadily advancing, the face in a fine character of quartz and sand. The grade of the ore is of a fine, white, well-proportioned character, and assays from \$15 to \$25 per ton. Its value is steadily increasing as the drift advances to the southward, and strong faith is entertained that the concentration of the ledge going south will yet afford a big paying body of ore. There is ample room for such a development, and its discovery would be no surprise to those familiar with the very favorable prospects of that portion of the mine.

ORION.—Daily yield, 25 tons of ore. The ore breasts on the 1450-ft level are showing a decided improvement. The character of the ore is much better, and the assay value is steadily on the increase. On the 1305-ft level a cross-cut has been run to the eastward at a point about 150 feet north of the California line. The full size of this drift was not known until the cross-cut was made, when it was found to open out in a large paying body. This discovery is entirely east of all the old workings on the other levels and points to an undoubted tendency of the ore vein, much farther to the eastward on the lower levels, than has ever been predicted by the most astute of our mining experts. The new pumps will be in place ready to run down to the 1600-ft level in a day or two more, when prospecting will be resumed.

OVERMAN.—Sinking the north winze on the ore body is going steadily forward, the bottom still in very favorable ledge matter, carrying some very rich streaks of ore. This winze is inclined with the dip of the ledge, and is being sunk directly on the foot-wall of the ledge, the upper side cutting into the vein and the lower side on the foot-wall. The water heretofore met with in the bottom of the winze has disappeared.

LADY WASHINGTON.—East cross-cut No. 1 from the main northwest drift on the 850-ft level has penetrated a distance of 120 feet, the face still in quartz and ledge matter of a very favorable character. There is now a considerable flow of water from the face of this drift.

SIERRA NEVADA.—The north and south prospecting drifts on the 1700-ft level are both showing favorable prospects. The quartz in the face of the south drift is increasing in both value and quality. Chas. Bonnemort, for a long time foreman of the mine, has been appointed Superintendent in place of W. T. Wright, deceased. Mr. Bonnemort was formerly foreman of the Savage mine, and is one of the best miners on the Comstock lode.

BATTORE AND AMERICAN FLAT.—The northeast drift on the 1400-ft level is making good headway, the face in better character of ledge material, and will soon tap the water in that portion of the vein so as to permit of the resumption of work in the bottom of the north winze below the 1650-ft level.

HALE & NORCROSS.—The repairs to the main incline, made necessary by the cave just below the 1900-ft station, are about completed, and it is confidently expected that the progress, running in continuation with the Savage will lower the water at a much more rapid rate than they ever have done in the past. The pressure of the water is gradually decreasing.

NEW YORK.—Raising the third or pump compartment of the shaft is progressing as usual, rather slow, owing to the hardness of the rock.

SILVER HILL.—Sinking the main incline is making excellent progress. The flow of water is still strong, but is now handled by the pumps. The northwest drift on the 44-ft level has been connected with the Justice, which will greatly improve the ventilation of the mine to that depth.

BULLION.—The face of the north drift on the 1500-ft level is showing more favorable prospects than it has for a week past. The east drift on the 1600-ft level, where the flow of water is recently tapped, is being again steadily advanced. The flow of water is gradually decreasing, and the evidences are that the main ledge will be shortly reached.

TROJAN.—At the 300-ft level the north winze is down 90 feet, all the way in splendid ore. The north winze, 200 feet further north, is 80 feet deep in \$32 ore, and further sinking is suspended in order to concentrate work in sinking the shaft.

IMPERIAL COX.—The north drift on the 2135-ft level has penetrated to within a few feet of the north or Alpha line. The main drift, connecting the north and south winzes on that level is being enlarged, timbered and tracks laid preparatory to a permanent cross-cutting and development of the ledge on that level.

TRUMAN.—Daily yield, 365 tons of ore, keeping the mills all running up to their full capacities. The ore stops on the 600, 700 and 800-ft levels all looking well and yielding fine. The ore vein on the 1,000-ft level is proving much richer in gold than on the levels above.

CHOLLAR-POTOSI.—Sinking the Combination shaft is making the best of progress. There is no water at the bottom to trouble.

NORTH CON. VIRGINIA.—The main shaft is now 40 feet below the 1,200-ft level. The flow of water at the bottom is easily handled.

HOMESTEAD.—Some very fine seams of quartz, giving good assays, are being passed through in sinking the shaft. The quartz bears a strong resemblance to the red ore of the old upper workings of the Chollar mine. Steam hoisting works can be brought into requisition as soon as reaching the surface grading is all ready.

PROSPECT.—Only eight feet has been added to the length of the main west drift at the 400-ft level during the past week, owing to the hardness of the rock.

DAYTON.—The east cross-cut from the north drift on the 220-ft level is being pushed rapidly forward to prospect the ore vein at that point. The ledge is gradually on the bottom of the drift is gradually on the decrease.

CALEDONIA.—The north drift on the 1400-ft level is being driven steadily forward to open up the ore vein in that portion of the mine.

LADY BRYAN.—The new powerful pumping machinery is all in place, ready to start up at any moment. The new hoisting engines have been shipped from San Francisco and will be in the ground in a few days. The appearances are that this valuable mine is soon to have a thorough and complete prospecting to a depth that must surely prove its value.

SUCCOR.—Sinking the shaft is making splendid progress, the bottom still in a mixture of quartz, clay and ledge material. The flow of water gives no trouble. The rapid development of the deep levels of the mine is now an assured fact, at no very distant day.

YELLOW JACKET.—The new shaft is down 560 feet, the bottom in good working ground. There is but little if any change in the flow of water at the bottom.

SOUTH OPHIR.—Work in the shaft, which for some time has been temporarily suspended, has been again resumed,

Notes on Straw-burning.

We gave a few months ago some notes concerning the comparative heating power of straw and other fuels. Our data was taken chiefly from results gained by experiment at the Vienna exposition. We have now an interesting review of the same subject in a pamphlet on portable steam engines, written by John Head, an English engineer. He shows what will be interesting to all our users of straw-burning engines, and that is the comparative cost of straw and coal in several different countries. We quote as follows:

"There is some difficulty in ascertaining the exact amount of straw or other vegetable substances consumed per horse power by a high pressure engine, from the fact that vegetable substances, like straw, vary much in their calorific properties; but a number of experiments have demonstrated that from 3.25 pounds to 3.75 pounds of average dry wheat straw will evaporate the same amount of water in the same time as one pound of good coal in the most modern boiler. The amount of straw grown per acre varies very much, but in England the average may be taken at about 30 cwt. per acre for wheat straw, or say 3,300 pounds per acre, and is worth to the farmer, on an average, about 30s per ton on the estate. Consequently the value of produce per acre would be about 44s. Then, if we take the value of one ton of coal, at the farm in England at about 20s, and admit the proportion of 3.50 pounds of straw to one pound of coal, we shall arrive at the following conclusion: 3,300 pounds of straw, costing about 44s, equals 943 pounds of coal, costing about 8s 6d.

"From this comparison we find that the commercial value of straw in proportion to coal is about as one is to five; that is to say, it will cost in England five times more money to use straw in our steam boilers than coal. It will thus be evident that it is quite impossible to use straw to advantage as fuel for agricultural operations in England, and generally in the western and northern countries of Europe.

"But the above calculation shows an entirely different aspect when applied to the cost of fuel in all the large corn-growing districts of Russia and the East, India, South America and some of the colonies where the minimum cost of coal delivered at the farm is at least from £3 to £4 per ton, and where straw may be said to be worthless, or of merely nominal value. This arises from the fact that the large farmers in these districts cultivate such enormous areas of cereal crops that they have always an immense quantity of straw which remains, after harvesting the crops, over and above what they require for manure and their farm-yard. If we turn to the comparative calculations of the cost of fuel in Russia, Hungary and the Danubian Principalities, and we take coal at the minimum price of 60 shillings per ton and straw at five shillings per ton (which is generally much above its real value), and admit the same proportion as in the previous calculation, viz., that 3.50 pounds of straw are equal in their calorific effect to one pound of coal, and also that the product of an acre in these countries is the same as it is in England (although in reality it is somewhat less), we arrive at the following comparison between the produce of an acre of straw and its equivalent weight in coal: 3,300 pounds of straw, costing about seven shillings, are equal to 943 pounds of coal, costing 25s. 6d.

"These figures therefore show that the commercial value of straw in proportion to coal, when used as fuel in Russia and the East, India, South America, etc., is as one is to 3.6; or that it costs more than three and a half times as much to use coal in steam boilers as straw."

The figures for California, which we wish we had accurately, would doubtless show a result a little less than that given for Russia, Hungary, etc. Although our straw is only of nominal value, and therefore might enter at the same rate as Russian into the calculation, we can put coal into the field a little cheaper than \$15 to \$20 a ton, which is the rate in those countries. But the point remains that our straw is better and our coal poorer than that sold to the Russians. This would do something to place our straw at the same high rate of value as a fuel as that in Russia and Hungary. Have any of our manufacturers or users of straw-burning engines made any experiments which will throw light on these points? If so, we should be glad to have a report of them.

NEW PROCESS.—The Nevada Transcript thus speaks of a new enterprise about to be inaugurated at Nevada City: Messrs. J. G. Mitchell and Prof. A. B. Crosby, of Philadelphia, have arrived in this city, and propose to erect works for reducing sulphureted ore by a new method discovered and patented by Mr. Crosby. Mr. Mitchell was President of a bank in Philadelphia, and is a representative of large capital, which he stands ready to invest in mining enterprises in this country. They will put up their works at their own expense, and propose to demonstrate to miners that they can reduce their ores and secure a very large percentage of the precious metals therefrom. They have no rights to sell, but intend simply to work the ores either on commission or to buy them from owners. If their method operates as they feel confident it will, they propose to erect a number of works in this vicinity. As we are not familiar with their process, we are unable to express any opinion or give any particulars, until the thing is in operation.

California Sunflower.

The accompanying sketch exhibits the true characteristic features of the California sunflower (*Helianthus Californicus*) as found in this vicinity. The outline drawing was made by Dr. A. Kellogg, of San Francisco, directly from a growing specimen brought from the other side of the bay of San Francisco by Mr. Dunn of Oakland.

This sunflower has mostly a simple stem—although in very rich open situations we believe it is sometimes seen with spreading branches. It usually grows to about four to eight feet in height, with a loose open top of golden flowers, radiant as little suns, blooming late in September and October. Dr. Kellogg writes of this plant as follows:

To us, few flowers have such an honest, candid, open-hearted, good old home-like countenance as the sunflower. We never see one without wishing to press it to our bosom—and we always stop to admire it and do homage to its virtues.

We have observed this class of plants for

ready to dismiss the subject without investigating for themselves, would do well to consider, that with regard to this plant, it is one of the most remarkably absorbing and exhaling properties. The perspiration of the sunflower is 17 times greater than the human body, and its exhalations are peculiarly balsamic and healing in mucous irritations.

This plant appears to be an intermediate form between *H. Californicus* (D. C.) and *H. Californicus* (Nutt.) which are distinct species in T. & Gray's Flora. In Nuttall's description, his plant has leaves "narrowly lance-linear," or "four to six inches long" and only "two to five lines wide," *H. Nuttallii* of T. & G.

In De Candolle's description the leaves are "entire"—ours, it will be observed, are slightly serrate—the cup scales of the flower (*involucre*) are spoken of as "rigid" and a "little longer than the disk," and "not ciliate," in which respect it also differs. Notwithstanding these discrepancies, we believe this is the plant alluded to—at least with facilities here offered the scientific reader will be better enabled to form an opinion.

Technical description: Stem smooth, leaves



THE CALIFORNIA SUNFLOWER.

more than 20 years past, with a view to ascertain whether they were justly entitled to their reputation for preventing the effects of malaria, and rendering the atmosphere around them more salubrious. During many years' residence in Georgia and Alabama we had better opportunities for this kind of observation than since our residence in the comparatively healthy climate of California. But we were then, as we are now, persuaded there is much truth in the observation.

Doubtless if we studied the higher and more useful laws that govern the great ocean of atmospheric fluid in which we live, with as much care and skill as the keeper of an aquarium does his reservoirs, we should find it equally as easy to understand and avoid any ill-balanced culture, and thus be able to supply the needed natural compensating vegetable life exactly suited to purify the air by absorbing injurious exhalations and effete accumulations consequent upon stagnation and excess; and also counteracting their baleful influences by balsamic and ethereal exhalations in such abundance as to supply the brain and nervous system with its appropriate pabulum and consequent vital force—sufficient at least to counteract the temporary tendency and preserve a general state of healthy equilibrium.

The time is drawing nigh, we would fain hope, when we shall need the physician less, because we are more willing to search out and submit to the divine laws of Nature. Those who may be skeptical on these points, and too

broadly-lanceolate, entire or crenate-serrate, strongly triplinerved toward the base, feather veined, tapering into a short winged petiole, ciliate, apex elongated, acuminate, slightly scabrous. Branch leaves mostly opposite. Involucral scales ovate, ciliate, three-nerved at the base, apex attenuate, long-linear, squarrose two or three times the length of disk, unequal. Rays 14—pappus of two broadly subulate awns, achenia smooth and shining, anthers of disk florets dark brown or black, florets nerved, five toothed, scabrous externally. Chaff of receptacle acute, entire, short, villous above.

ENGLISH VS. AMERICAN HARDWARE.—An English hardware agent, who has been trying to drum up trade in Canada, sends to the Manchester Guardian a few doleful lines, which may please Americans in the trade: "I have just returned from a trip into the lower provinces. I find that the whole country is overrun by American travelers soliciting orders for their manufactures at almost any price to secure a sale. I feel sure in my own mind that a very large proportion of the hardware trade is altogether lost to England. For instance, of Birmingham and Wolverhampton wares they have secured many of the leading lines—namely, door locks, mortise locks, chest and till locks, cupboard locks, butts and hinges, carriage bolts, gas and boiler tubes, scales, and, to a great extent, hollow wares. From all I can learn, they are in a position to retain the hold they have got."

Movement for a Botanic Garden.

The idea of a public botanic garden is not a new one to our readers. It has been advanced by our correspondents and has lately engaged the attention of our Legislature. The law makers did not favor it, and without arguing whether they were right or wrong, we express an opinion that a matter of this kind is a very graceful subject for private enterprise and investment if our rich men have the disposition to make it thus. This, we learn, they have, and we are informed that there is a reasonable prospect that a botanical garden will be established.

We find the prospectus of the enterprise in the *California Horticulturist*. The following things are proposed: To collect and cultivate specimens of trees, shrubs and plants of every kind, whether useful or ornamental, that can be adapted to our soil and climate, and to arrange them at a botanical garden in such manner as to make it a desirable place of public resort, as well as study; it being the intention to supply to scientific and educational establishments specimens of plants free of charge, for subjects of botanical lessons and lectures. With the garden it is proposed to connect a nursery and seed farm, etc., for the raising and cultivation of various products which are certain to yield a large profit, not only amply sufficient to cover the expenses of the garden, but also to make an excellent return to the stockholders.

For this purpose it is proposed to purchase the establishment now known as the Exotic Gardens, on Mission street, opposite Woodward's Gardens, with all the stock, buildings, improvements, good will and lease of land unexpired, (nine years). The location of the Exotic Gardens is most favorable for the enterprise, and the business itself is so far established that the actual profits from rent, the sale of plants, seeds and other products, place it in a paying condition. The enterprise, however, does not represent sufficient capital to carry out all the requirements. The most suitable locality for the Botanic Garden is in Alameda county, in the immediate vicinity of the railroad, so that the Garden might be easily reached, and the products be shipped without inconvenience to any part of the State. The amount of capital required for the purchase of the Exotic Gardens, with all the stock and improvements belonging thereto; the purchase of the necessary land in Alameda county and for the improvements on the land; for the laying out and planting the Botanic Gardens, and for carrying out all the propositions above mentioned, will not exceed \$130,000. For this purpose it is the intention to form an incorporated company with a capital of \$250,000, divided into 2,500 unassessable shares of \$100.

A large list of our prominent citizens is printed as commendatory of the enterprise. So far as we can see it is a praiseworthy enterprise. We hardly look for much success to the business departments which are proposed, nor should we expect any very large dividends to stockholders. If the other features were successfully developed we rather think the rich patrons of the enterprise would be fully compensated by the thought of having done a good thing for the public. Our money makers have wider resources from which to draw dividends than seed pods and flower pots. They will be content to have the institution self-sustaining and to look elsewhere for dividends.

LIKE OLD TIMES.—The Chinese of Evans's bar, says the Trinity Journal, have built a large double-bearing water wheel to furnish water for their mine at that place. We believe this to be the only wheel now in the county. The sight of it carried us back to the days of 1860-61, when the river was lined with works of this character, there being one or more at almost every bar where there was not a natural water privilege. Some of the wheels of that day were marvels of workmanship, costing thousands of dollars. But the great flood of the last-named year sounded the knell of wheel-building. Not one was left on the whole length of the river, and the angry waters had so changed the face of the different bars that in many cases claims which had in the fall been valued at thousands of dollars were soon abandoned. The river channel was filled up and changed, the bars covered over with sand and gravel; the dams swept out never to be replaced. From that time to the present there has been but three or four wheels built where there was formerly a score or more constantly running. But the sight of an old-fashioned water-wheel puts us forcibly in mind of the palmy days of river mining before the flood.

LIBERALITY OF MINERS.—On many occasions we have witnessed the liberality of our Grass Valley miners. They bestow their help, when called upon in worthy cases, without making a blow or a show of their charity. The other day a case occurred up at the Empire mine, on pay day. A miner had lost both his eyes, some two or three months ago, in the Nevada City mining district. Word reached the Empire boys that the blind miner was in need of help, and as each one was paid off he dropped into the hat of the disabled man a portion of the pay. The sum contributed by the workmen of the Empire, on that occasion, was \$145. The Empire is not only the oldest mine in the district, and steady and good in her yield, but she has the best miners in the world working down under the ground.—Grass Valley Union.

Palmyra District.

The Gold Hill News says: We have been shown some good rock from the Auroramine, in Palmyra district, some eight or ten miles the other side of Carson river from Dayton. The ledge is situated just in the eastern outskirts of the defunct town of Como, and is one of the strongest in its mineral indications of any ledge in the district. It is fully 60 feet wide, and shows free gold and silver in combination with lead and antimony, also copper. Like other ledges in the old district, if it were nearer the Comstock its true merits would have been brought out long ago; but it may have its day yet. People are beginning to look more after these old locations in the outside districts than they used to, and Palmyra district is among the most promising. There was a time in the early history of Washoe, when the well-defined and good assaying quartz ledges of that district created quite a sensation, and Como was a flourishing town. It may be again yet. Within the space of five or six miles square, or in diameter, are included a large number of very promising ledges, as for instance those known as the Montgomery, Montezuma, Altamonte, Goliah, Wagram, Monte Cristo, Buckeye, Rappahannock, Rapidan, Orizaba, etc. All of these show good ore at the surface, and no explorations have been made deeper than 200 feet. Lack of capital and means starved out the miners of that district, and Como is one of the mushroom towns of the early time. Parties in Dayton, Gold Hill and Silver City are organizing at the present time, determined to give those ledges a more thorough test during the coming season, and Palmyra district may come out all right yet.

PREHISTORIC MINING.—In a paper read before the New York Academy of Sciences by A. A. Julien, on prehistoric remains in western North Carolina, a minute delineation was made of an extensive series of ancient excavations extending from Mitchell county southward into Georgia. These cuttings were evidently executed for the purpose of mining for mica and steatite—an industry still actively prosecuted in the region. The coarse granite strata containing the mica are divided into soft and hard bands, which have influenced the character of the mining both in prehistoric and present times. The ancient workings have been discovered in the soil veins, and consist of two classes. In one deep shafts have been found, sometimes containing tools; and these are ascribed to the Spaniards or to still later adventurers. The other class consists of open excavations, occasionally connected with small tunnels; and these are pronounced undoubtedly of prehistoric origin. Ashes have been discovered in some of the mines, showing the use of fire, as in the tunnels of Lake Superior mines. From appearances it is judged that vast quantities of mica have been taken out in prehistoric times; and it is considered that in these mines the source has been discovered of the mica plates extensively used in tombs of the Mound Builders of the Mississippi valley.

EXPLORATION OF VANCOUVER ISLAND.—Says the Victoria Colonist of the 9th on the exploration of Vancouver island: Captain Devereux, of the West Coast exploring party, arrived in town yesterday. The party left here three months ago to explore for gold and other materials. They went first to Barclay sound, and found indications of marble and any amount of limestone. At Euculet they made no discoveries. From Euculet they went to Clayoquot sound; found nothing there in coal or gold that would pay to work. At Hesquoit they saw Father Brabant and his assistant in good health; both are very popular with the Indians. The party next visited Nootka sound, ascending Gold river a distance of 26 miles, but found nothing beyond the "color" of gold. There are favorable looking bars, and the party was there during very low water and had excellent opportunities of prospecting, which they did thoroughly. From Gold river they went to Mowichet to look for coal, which the Indians said abounded there, but it turned out to be black sandstone. About six miles below Mowichet, a vein of very fine white marble was discovered. The party then returned to Barclay sound, and the party, except Captain Devereux, went on to Alberni, where they will remain and give the upper end of the sound and the streams that flow into it a thorough prospecting.

WELL BORING BY STEAM.—The Ventura Free Press says: Messrs. Adams, Thayer and Edwards have got their engine in working order, and are now boring an oil well by steam. The expense is very much less than is incurred in boring by hand, as the fuel costs nothing and fewer men are required to do the work. Steam is made by using the heavy oil as fuel. The intention of the firm is to bore deep enough to ascertain whether a reservoir of oil exists below or whether it can only be obtained in small quantities as now found in the shallow wells.

LOCOMOTIVE ENGINEERS.—The Brotherhood of Engineers was formed 13 years ago. It now embraces 180 subdivisions and 12,000 regular members in all parts of the United States and Canada. It provides for the widows and children of dead brethren, and since its organization has expended more than \$1,000,000 in this work, besides donating \$50,000 to aid needy members. Only locomotive engineers are eligible for membership, and at a death the family receives \$3,009 cash.

USEFUL INFORMATION.

How to Select a Saw.

Messrs. Henry Diston & Sons, of Philadelphia, lately issued a pamphlet which contains the following practical suggestions respecting the selection of a saw: "In selecting a saw get one with a name on it which has some reputation. If a man desires to purchase a first-class watch he selects a maker who has attained a reputation. This remark applies with equal force in the choice of a saw. The first point to be observed in the selection of a hand-saw is to see that it 'hangs' right. Grasp it by the handle and hold it in position for working. Then try if the handle fits the hand properly. These are points of great importance. A handle ought to be symmetrical and as handsome as a beautiful picture. Many handles are made out of green wood; they soon shrink and become loose, the screws standing above the wood. An unseasoned handle is liable to warp and throw the saw out of true. The next thing in order is to try the blade by springing it. Then see that it bends regular and even from point to butt in proportion as the width of the saw varies. If the blade be too heavy in comparison to the teeth, the saw will never give satisfaction, because it will require twice the labor to use it. The thinner you can get a stiff saw the better. It makes less kerf and takes less muscle to drive it. A narrow true saw is better than a wide true saw; there is less danger of dragging or creating friction. You will get a smaller portion of saw-blade, but you will save \$100 worth of muscle and manual labor before the saw is worn out. Always try a saw before you buy it. See that it is well set and sharpened, and has a good crowning breast; place it at a distance from you, and get a proper light to strike on it, and you can see if there be any imperfection in grinding or hammering. We set our saws on a stake or small anvil with one blow of a hammer. This is a severe test, and no tooth ought to break afterward in setting, nor will it, if the mechanic adopts the proper method. The saw that is easily filed and set is easily made dull. We have frequent complaints about hard saws, but they are not as hard as we would make them if we dared; and we shall never be able to introduce a harder saw until the mechanic is educated to a more correct method of setting his saw. The principal point is that he tries to get part of the set out of the body of the plate when the whole of the set must be got out of the tooth. As soon as he goes below the root of the tooth to get his set he distorts and strains the saw-plate. This will cause a full tempered cast steel blade to crack, and the saw will eventually break at this point.

Making Tea.

A writer in the New York World says: A grave mistake among the tea-makers of this country is that they make tea too strong, and thereby lose the full tea flavor. Professional tea-tasters who desire the full flavor of the leaf use but a single pinch to a cup of boiling water, in place of the heaping teaspoonful generally employed. In China and Russia, where tea is prepared to perfection, it is made weak, boiling water being poured upon a few leaves, the decoction covered for a few minutes; and the beverage drunk hot and clear.

While it is positively essential to a good cup of tea that the leaves be steeped in water boiling at the time it is poured over them (not simply at a boiling point), tea should never be boiled, or the true aroma which exists in the volatile essential oil will be thrown off by evaporation, leaving as flavoring only the bitter principle of tannic acid extracted by the excessive heat of ebullition. The old idea, that black tea must be boiled, not steeped, was long ago abandoned by professional tea-makers and tea-tasters, experience having taught that the leaves require the same preparation as those of the green kinds to produce the most desirable drink. A lump of loaf-sugar put into the teapot with the tea will cause it to infuse in one-half the time otherwise required. When fresh tea is desired, always empty out the soaked leaves of a previous drawing, and rinse the teapot thoroughly with boiling water before a second quantity is put in to steep.

CLARIFIED HONEY.—Clarified honey is obtained by E. Dannenberg, of unexceptionable quality, by diluting the crude honey with half its weight of water, boiling for 15 or 30 minutes, according to the quantity operated upon, the scum being carefully removed, and then adding five or six times sufficient cold water to interrupt the boiling for not over half a minute. After boiling for another 15 minutes, the hot honey is strained and evaporated. Thus prepared the author has kept the honey unaltered for over two years.

PROTECTION FOR SAFES CONTAINING VALUABLES.—In order that ordinary fire-proof safes should be in a measure rendered burglar-proof, the Louis Reuttsch Manufacturing Company, of Meissen, has constructed a wire covering which is placed in an electrical circuit with an alarm bell. If any of the wires forming the cover be cut, which must necessarily happen before the safe can be opened by an intruder, the circuit is broken and the alarm bell is sounded. The device is likewise applicable to doors and windows.

USING COAL.—A writer in the Coal Trade Circular says: Too much coal over the grate bars is a positive waste. Waste steam, blown off under the grate bars (with closed doors to the ash pan) produces astonishing results, cleaning and producing a livelier fire. If all engines were arranged to exhaust under the grate box, much economy would be produced thereby. A water pan under the grate bars, at the bottom of the ash pan, is useful also, and if the reader will put in practice these suggestions, their adaptability will become apparent. It is a fact that but few engineers understand how to burn coal so as to get the best results. It is the greatest amount of calorific produced with the least waste of heat up the chimney in the consumption of coal which is the desideratum, for draft made by the application of waste steam under the grate bars is equal to as much coal as will produce the degree of heat in the exhaust steam. It is strange that the philosophic utility of single organic laws are not more generally diffused among engineers and firemen. On locomotive engines, when the engineer desires a quick fire, steam is turned on under the bars, producing the results demonstrated. A word to the wise is sufficient.

DEFECTIVE APOTHECARIES' WEIGHTS.—The Medical Record recently called attention to the fact that in many cases the weights used by apothecaries in dispensing medicines are exceedingly inaccurate. It is reported that out of four establishments visited, in three of them the weights were found to be either above or below the standard. If such a defect really exists, it is one of vital importance to the pharmacist as well as to the physician, and some steps should at once be taken to rectify such an error.

FILTERING PAPERS.—What is claimed as a new method of folding filtering papers has been recently introduced in Paris. The filter is made from a square piece of paper, folded at first so as to make a crease at each angle. This is done in two folds. While still triangular in shape, it is folded in creases parallel with the edges, and is then opened out, and commencing at one corner, is again folded so that the creases converge, repeating the operation from each corner, the result being a circular filter, with rigid or corrugated sides presenting a larger surface than the ordinary circular filter.

PEANUT OIL.—The supply of peanuts is so great that they may be purchased as low as five cents per pound, and at this price peanut oil can be made at a considerable profit, even taking into consideration the small percentage of oil peanuts yield. African peanuts are said to yield about one-half their weight when cold-pressed, and when heated and pressed, the yield is even greatly increased.

GOOD HEALTH.

How the Young Become Nearsighted.

Dr. Agnew, the famous optician of New York City, has been investigating the causes of the prevalence of a tendency to nearsightedness among young people. He says:

The eye is an organ which is soft, as it were, when the child is born, it is plastic—it is in a condition to be changed in its shape, and its tissues are in a condition to be moved—that is, the tissues which go to make up the organ can be molded in various shapes on pressure. Ordinarily the child goes on until it has reached the age of eight or ten years, or perhaps a little older, when it is observed that it is obliged to hold the object at which it is looking a little nearer than before. An examination reveals the fact that the child is nearsighted. This condition usually progresses more rapidly between the ages of 10 and 26. But we know by means of the ophthalmoscope, and by an examination of the body after death, that the nearsighted eye is changed in shape from the spherical to an elliptical or ovoid form, and that progressive nearsightedness is always marked by a change in the shape of the eye. As the eye is made up of healthy tissue, and it is constantly undergoing waste and repair in use, you readily perceive that the quality of its repair is going to be determined very much by the character of the tissue-building quality of the particular child, and by the way in which that child uses its eyes. Parents at home are very often at fault in not teaching their children how to use their eyes—he had suddenly entered the dwellings of many people, and seen little girls curled up on a sofa, or in a chair, with head down in the lap, the vessels of the forehead turgid with blood, remaining in that situation for a greater or less time; and often, before the child can read, some object, like a doll with its wealth of intricate clothing, or some other plaything, the child holding the object near her eyes—using her accommodation and focalizing its eyes; and all the time waste and repair is going on—because there can be no use of the eye without alterations of tissue, and the child will go blind because the proper nourishment of the eye is interfered with, and the tissues cannot be reproduced as fast as the wasting process. If the child uses the eye for a long time or too closely at any particular form of work, the tissue cannot be reproduced or nourished as it should be; and the pressure of the muscles upon the eyeball and the difficult act of the girl in focalizing, means that the

tissue of the soft and pliable eye is undergoing alteration, which will lead to a lamentable form of the disease. Then the child goes into the school and is there put into forms and classes, and oftentimes is made to do work on slates and copy-books which, perhaps, might be better done on the blackboard, and thus the eye is strained until the mischief is perceived in its effects.

Petroleum for Baldness.

We do not know that any of the prescriptions for inducing a growth of the hair are successful. The latest proposed is petroleum, and as the application can do no harm in any event, we reprint the following from the London Pall Mall Gazette, a trustworthy paper: Persons afflicted with baldness will be glad to hear that a luxuriant growth of hair may be produced by a very simple process described by Consul Stevens in his commercial report of Nicolief for the past year, which has just been issued. In the summer of 1875, Consul Stevens' attention was drawn to several cases of baldness amongst bullocks, cows and oxen, and the loss of manes and tails among horses. A former servant of the consul's, prematurely bald, whose duty it was to trim lamps, had a habit of wiping his petroleum-besmeared hands in the scanty locks which remained to him; and after three months of lamp-trimming experience, his dirty habit procured for him a much finer head of glossy black hair than he ever possessed before in his recollection. Struck by this remarkable occurrence, Colonel Stevens tried the remedy on two retriever spaniels that had become suddenly bald, with wonderful success. His experience, therefore, induced him to suggest it to the owner of several black cattle and horses affected as above stated, and, while it stayed the spread of the disease among animals in the same sheds and stables, it effected a quick and radical cure on the animals attacked. The petroleum should be of the most refined American qualities, rubbed in vigorously and quickly with the palm of the hand, and applied at intervals of three days, six or seven times in all, except in the case of horse's tails and manes, when more applications may be requisite.

A Story with a Moral.

Within a year a ship was undergoing an examination in a dry dock, and at a certain point its bottom, for a few inches square, was found to be not thicker than a piece of paper. On examination, it was ascertained that a small pebble was lodged in the space between the plank which faced the water and that which made the inner floor of the vessel; it had been there for two years, and with every motion of the vessel on its billey home that little pebble also moved, and in its motion wore away some of the timber; too small it may be for detection by an ordinary microscope, but in the course of a year it was enough to wear away an inch of solid timber, and in the second year nearly two inches more, for, with the increase of room which it made for itself, there was an increase of momentum, and consequent wear. Because the captain of that vessel was ignorant of that imprisoned pebble, and because he saw no indication of its destructive influences, they were not the less real, and not the less certain of terrible disaster, but for the fortunate discovery. Thus it is with human life and health, the breathing of a vitiated atmosphere, whether in close and small rooms or large and close bedrooms, or in family rooms over cellars without ceilings, whose noisome odors rise incessantly, day and night, to the upper portions of the buildings—the fumes of decaying vegetables, etc. The breathing of such or other vitiated atmospheres does, by an immutable law of nature, bring injury to the system with the same certainty that gravity will affect a projected feather, or cannon ball or mountain.

NEW REMEDY FOR MALARIOUS FEVERS.—We find in the Chemist and Druggist the following mixture recommended as being not only much cheaper but more efficacious than quinine in malarious fevers: "Chloride of sodium, 12 grammes (185 grains); carbonate of iron, one gramme (15½ grains); mix and divide into three powders. These three doses are to be taken in one day, one powder being taken in the morning, another at mid-day, and the third at night. In order to prevent a relapse, one powder should be given every morning for eight days." As chloride of sodium is nothing more nor less than common table salt, and as the iron salts are generally wholesome, we can certainly recommend the above as simple and harmless and worth a trial.

DISGUISED THE TASTE OF CASTOR OIL.—A modification of the old and favorite mode of administering castor oil in orange juice is offered by Potain. He directs that the juice of half an orange be squeezed into a glass, and after carefully pouring the oil upon this, to add the juice of the other half of the orange so as to inclose the oil. If pains be taken to avoid mixing the layers, the combination can be swallowed, it is said, without the least perception of the flavor of the oil.

AGE.—The probabilities of living to be 100 years old are, according to the statistics of Dr. Farr, 223 to the 1,000,000. That is to say, computing the present average number of deaths on the basis of the recent official tables of mortality in England, out of every 1,000,000 now living, 223 live to be 100 years old, and the last one of the million will die in his 108th year.



W. B. EWER, SENIOR EDITOR.

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, March 10, 1877.

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Co., Cincinnati; Ropp's Easy Calculator.

THE BALDWIN HOTEL.—This elegant new hotel
was formally opened on Monday last. The
building is one of the largest in San Francisco,
and is probably the most elegant in all its ap-
pointments. The structure fronts on three
streets, the principal front being on Market
street. The lower story is occupied by stores, the
central portion by the theater and the remain-
der is devoted to the purposes of the hotel.
The theater is, without doubt, the handsomest
and most beautifully ornamented one in the city,
and it is questionable if there is anywhere else
another one to equal it in these respects. The
hotel itself is furnished in the most magnificent
style, no expense having been spared by the en-
terprising and wealthy proprietor. The furni-
ture, carpets, curtains, mirrors, etc., are of the
finest kind; the latter alone costing as much
money as would furnish an ordinary hotel.
Everything is arranged in a tasteful manner,
and in such a way as to be both comfortable
and useful. In fact, the appointments of this
hotel are more like those chosen for the private
residence of a millionaire than for the purposes
to which they are applied. The undertaking
has cost an immense amount of money and
warrants a more thorough description than we
have space to give this week, so we may take
occasion to return to the subject again.

ANTHONY J. OJEDA, the engineer who was so
badly injured last week at the Pacific Gold and
Silver Refinery, has had to have his left arm
amputated, as gangrene set in. He is now do-
ing well.

THE Miner's Protective Association have se-
lected Shell Mound Park, on the Berkeley line
of the Oakland railroad, as the site of their an-
nual picnic, which is to take place on April 1st.

Miners' Wages.

The agitation on the question of the reduction
of miners' wages continues, but is not confined
to the one locality, as it was a few weeks ago.
The miners' strike at Smartsville still continues.
The Grass Valley Union of the 6th says that
last Thursday they had a torch-light procession
with music and banners, and they visited Tim-
buctoo, Smartsville and Sucker Flat, in all of
which places they were received with warm
welcome. There was no disorder on the part of
the miners. They express themselves deter-
mined to hold out in their present course, and
that they will not work for less than \$3 a day.

We see also, by the Mariposa Gazette, that
quite a number of miners quit work at the Hite
mine on account of a decrease in wages. The
wages heretofore paid to miners was \$55 per
month and board, which, we understand, has
been reduced to \$50 per month and board.

The Bingham canyon, Utah, miners are ex-
cited over an impending notice of reduction of
wages. The Salt Lake Tribune says: We are not
informed whether any general reduction of wages
is resolved upon by the mine-owners of Bingham,
but in the event of reduced pay, our cor-
respondent informs us the miners have deter-
mined upon a course. As soon as the spring
opens, rather than submit to what they regard
as unjust, and arbitrary exaction, all the com-
petent workmen will leave their employ. Two
objects will impel them to this course. First,
to retaliate on their employers, by reducing them
to the employment of low-priced and in-
efficient hands, which they believe will result
in loss to the mine-owners; and to better their
own condition by leasing undeveloped mines,
and thus becoming employers of their own
labor. "It will be a poor lease indeed," says
our correspondent, "that will not pay day's
wages;" and in the cheerful picture he draws
every striking miner in Bingham will be profit-
ably employed upon his own enterprise, the
mine-owners dissatisfied with their low-priced
help, and begging their former hands to return
at full wages, while the unspeakable happiness
will be afforded these latter of refusing the so-
licitation of their former employers and show-
ing to the world an example of the triumph of
honest industry over the tyranny and injustice
of soulless capital.

Spider Lines.

At the meeting of the Academy of Sciences
on Monday night, Professor Davidson stated
that when collecting tarantulas last season on
Mount Diablo, he discovered that one of them,
whilst walking, was discharging a web. With
a frame which he uses for collecting fine spider
lines for micrometers, he commenced winding
up the web, merely as a specimen for examina-
tion; in doing so quite rapidly he drew the web
much more rapidly than it would be discharged
by the spider naturally. A light breath of wind
showed by the reflected light from the web that
he was drawing it so fast that it exhibited itself
as composed of many lines, which were united
and exhibited as one when the line was drawn
out more slowly. By a little dextrous handling
he was enabled to spread the lines from the dif-
ferent spinnerets, upon the bars of the frame,
and, upon subsequently counting them, ascer-
tained that there were not less than 23.

Professor Davidson presented also some speci-
mens of small spiders, the webs of which are
familiar to all, in being present on freshly-plowed
ground. The largest are about the size of a
grain of wheat, but the majority of them con-
siderably smaller. When the collector of these
specimens, Mr. Kuehnle, was watching and ex-
perimenting with them, one little black fellow,
which he had upon a stick, threw out his fine
lines in several directions without reaching any
object, but in one of his efforts the line touched
the ground and upon the instant the spider went
over it with lightning rapidity. Upon another
occasion, when sitting upon his plow-handle,
watching one of these spiders throwing its line
to different points unsuccessfully, it finally
threw one to the rim of his hat and then
instantly mounted the web.

Academy of Sciences.

The regular meeting of the California Acad-
emy of Sciences was held on Monday evening.
John C. Mallory and Wm. B. Hyde were elected
resident members. Dr. James Blake donated
a large number of minerals to the museum,
among them forty-eight specimens representing
the strata passed through in the Suto tunnel.
A number of other donations were received.

Professor Davidson, of the U. S. Coast Sur-
vey, read a continuation of his articles on irri-
gation.

A paper by Henry Edwards, a continuation
of his series on "Pacific Coast Lepidoptera,"
was submitted by title.

The President read a letter from a correspon-
dent on the subject of the production of rain
by human agency. He also read a note on the
question of rain-storms following great battles.
This subject is more fully referred to in another
column of this issue.

President Davidson also read notes on "The
Spider Line of the Tarantula," and "Spiders
throwing their Webs," which we give elsewhere.

Production of Rain by Human Agency.

Ever since it became the impression that the
winter of 1876-77 in California, was to be what
is known as a "dry" one, there has been more or
less discussion on the subject of the production
of rain by human agency; many persons believ-
ing that by exploding large quantities of pow-
der the rain could be made to fall, through
some unexplained meteorological conditions.
This theory has many firm advocates, and the
idea was somewhat strengthened by the fact
that a bounteous rainfall occurred immediately
after the heavy cannonading which took place
during the celebration of the Fourth of July in
this city. This confirmed many in the belief,
as rain at that season of the year in California
was considered very unusual. The subject has
been pretty thoroughly discussed in the interior
press, and numbers are desirous of trying the
experiment. Among these believers in the
theory is one who writes a letter from Placer
county to the President of the Academy of
Sciences, asking the Academy to secure the use
of "Uncle Sam's" guns here to test the theory
in the interests of science.

He says, as is generally known, that our last
Fourth of July celebration was unusually pro-
longed for three days, and was followed on the
6th of July by a heavy rain all over the State.
Living at Iowa Hill, Placer county, he had good
facilities for observing the peculiarities of the
storm: "The clouds came rolling up in dark,
dense masses, accompanied by a fearful amount
of electrical discharge. It seemed to indicate
its origin in some unusual, unnatural cause, and
the tall pines to-day plainly show the marks of
the lightning. The rain fell for one day and
night, upwards of two inches falling in that
time."

The writer then goes on to say that if this
was the result of the firing, as is generally be-
lieved, the same effect could, of course, again be
produced by the same cause, and suggests an
accurate scientific test of the matter.

In commenting on the letter, Prof. Davidson,
of the United States Coast Survey, President
of the Academy, said that there was a popular
belief that after great battles, when heavy artil-
lery was used, a rain storm necessarily followed.
This belief rests on no foundation of facts what-
ever, and comes down to us from almost pre-
historic times. It is on a par with the predi-
ction of weather changes at the quarterly changes
of the moon's phases, and of the special suppli-
cation for rain in particular localities. "Old
Probabilities" is gradually sapping and under-
mining the popular faith in the lunar influence,
because the daily predictions of the Signal
Service show no relation between the atmos-
pheric storms upon the world's surface and the
ever-changing phases of the moon. But the
former belief will not be so easily and surely
eradicated, because the great battles hardly oc-
cur with sufficient frequency to afford the nu-
merical cases demanded to satisfy the illogical
mind. Even the actual coincidences can be
shown to be not necessarily physical relations of
cause and effect.

The belief referred to has not arisen since the
invention of gunpowder, but is the tradition
of nearly 1,000 generations. Classical readers
will recollect that when the Teutones and Am-
brones, numbering over 100,000 armed warriors
and as many women and children, left their
Germanic homes about 110 B. C., to seek in
Italy a milder climate and more productive
country, the Roman army under Caius Marius,
crossed the Alps to prevent the invasion. A
great battle ensued and 100,000 invaders were
slain or captured; and Plutarch in mentioning
the report that the earth was enriched by the
dead bodies, says:

"It is an observation, also, that extraordinary
rains pretty generally fall after great battles;
whether it be that some divine power thus
washes and cleanses the polluted earth with
showers from above, or that moist and heavy
evaporations steaming forth from the blood and
corruption thicken the air, which naturally is
the subject of alteration from the smallest
causes."

But from the contest there was no immediate
storm of rain and he especially refers to the sub-
sequent winter's rains. Nor was there rain
after the equally great battle fought in the fol-
lowing August by the Romans, under Caius
Marius and Catullus, against the Cimbri, who
had crossed the Alps and were overwhelmed.
The peculiar difference in the ancient and
modern belief will be at once noticed as residing
in the causes which produce the rain. Then
there was no gunpowder, but suggestions of a
divine power or a moist exhalation; now the di-
vine power is overlooked and villainous salt-
peter conjured up.

As far as the instance of the 4th of July firing
here was concerned it is much more probable
that natural causes produced the subsequent
rain than the burning of powder. The weather,
for some time before, had been very hot, and in
a measure, rather peculiar for this climate.
Professor Davidson was, at that time, on
Mount Diablo with the Coast Survey party
and kept a record of the thermometer, etc. In

the morning of the 1st of July the thermometer
was 86°, at 2 P. M., 101°; on the 2d, at same time,
84° and 103°; on the 3d, 86° and 101°; on the
4th, 88° and 101°; on the 5th, 86° and 101°; and
on the 6th, 64° and 78° and 7th, 57° and 64°.

Dr. Henry Gibbons, Sr., who has kept a more
complete meteorological record for over 25
years in this city than almost any one else,
says that there is generally a tendency to rain
about July 4th. The rains in California seem
to have a very peculiarly marked periodicity.
The most marked is probably that which occurs
on or about the 20th of May each year. The
meteorological conditions on the 4th of July
were favorable to a rain. The tendency to rain
showed itself before the firing took place at all.
It followed very hot weather all over the State.
The atmosphere was not only very hot but very
moist. For the first time in the history of the
State sunstroke cases were recorded, especially
in the San Joaquin valley. The only explana-
tion was the very hygrometrical condition of
the air. A tendency to cloud was the natural
result of this accumulation of moisture, which
resulted in rain. The very hot weather seemed
to gradually advance eastward, where, it will be
recalled, it was unusually hot. The heated
wave crossed the Atlantic to Europe where it
was severely felt. According to all this, there-
fore, it seems our rain in July was due to nat-
ural causes, and not the agency of man.

A Queer Fish.

Mr. Throckmorton, one of the Fish Com-
missioners, gave to the California Academy of
Sciences, the other evening, a specimen of fish
caught in the salt marshes in Marin county.
The fish looks like an ordinary "bull-head" or
sucker, and is probably familiar in appearance
to many. Its peculiarity consists in its mode
of life. Some of Mr. Throckmorton's land
beyond Lime point is ordinary salt marsh land,
and he several times observed Chinamen at
work at low tide, with shovels, apparently dig-
ging into the banks of the little creeks. Last
week he went down to see what they were about,
and was surprised to have a Chinaman answer
his question by saying he was "fishing." Fish-
ing with a shovel was a new experience to Mr.
Throckmorton, although he has been for many
years an enthusiastic sportsman.

On examination he found that the bank show-
ed numerous round holes at about the half-tide
mark, and the Chinaman took the shovel,
sliced off some of the bank and hauled several
fish from one of the holes.

The holes are similar to those made by swal-
lows, and are in such a position that the entrance
is under water about half the time. The tide
rises here about six feet, and the mouths of the
holes are about three feet below high water-
mark. They go straight into the bank a short
distance and then turn down, so that when the
tide falls below them they are still filled with
water, although the entrance may be two or
three feet above the water at low tide. They
seem to have more of the habits of an eel than
an ordinary fish, and the skin is also eel-like.
Mr. Throckmorton says the flavor of the meat
is also similar to an eel. The Chinese laborers
gather great quantities of them at low tide.
A fish living in a hole in the ground like a
squirrel is something new here, we believe, nor
do we recollect of their having been found else-
where.

THE ELECTION.—Events have culminated
during the week in the nation's capital, and the
whole country has been wrapt in contem-
plation of them. For the time the consid-
eration of home interests has been merged
in the contemplation of the wider issues.
The result of the prolonged electoral count was
a majority of one vote for Rutherford B. Hayes,
of Ohio, for President, and William A. Wheeler,
of New York, for Vice President. These offi-
cers have been duly sworn in to their respective
trusts, and the country is glad that the issue is
closed and the opportunity for a steady trade
and the revival of industry has arrived. The
American people has possessed itself in noble
calmness while the momentous questions were
being settled by due process of law, and now,
that the end is reached, the country is blessed
with quiet obedience.

MORE DIGGINGS IN THE BLACK HILLS.—A dis-
patch from Deadwood says: Col. A. L. King,
of Chicago, and party have returned from a
prospecting tour. Considerable excitement is
created by their report of new discoveries,
which are said to be in a new river-bed, filled
with cement and rich quartz. Many citizens
have taken the matter in hand, and will make
a thorough test of the ground.

AN association has been formed in Edinburgh
for the purpose of purchasing and slaughtering
cattle and other stock in the United States and
Canada, and for also purchasing farm and dairy
produce to sell in Edinburgh and other parts of
Great Britain.

IN the Senate of the Nevada Legislature the
bill compelling the use of safety cages in mining
shafts 300 feet deep and over, and also the bill
compelling a better mode of egress from mines
were lost.

COLONEL JNO. A. GODFREY, of New York, of
the Associated Pioneers, formerly a resident of
San Francisco, and Consul General at Guaymas,
Mexico, died in New York on the 3d inst.

Ancient Ruins in Colorado and Utah.

In our last issue we gave a brief account of the ruins which exist in southwestern Colorado, with sketches showing the general features of these ruins. Some of those examined by the Hayden survey party were in a very good state of preservation, but the majority were merely piles of debris with a few scattered stones and broken pieces of pottery to show that they were formerly inhabited. The Mesa Verde, or green table land, as the name implies, extends north and south about 20 and east and west about 40 miles. It is of a grayish-yellow cretaceous sandstone, with a very nearly horizontal bedding, so that the escarpment is about equal on all sides, ranging from 600 to 1,000 feet in height. Side canyons penetrate the mesa and ramify it in every direction, always presenting a perpendicular face, so that it is only at very rare intervals that the top can be reached; but once up there excellent grazing can be found, with thick groves of cedar and pine.

Entering the canyon at its upper end the party struck into the old Indian trail which comes over from the head of the Rio Dolores. Grouped along in clusters and singly were indications of former habitations, very nearly obliterated and consisting mostly, in the first four or five miles, of the same mound-like forms noticed in other localities, and accompanied always by the scattered broken pottery. As they progressed down the canyon the same general characteristics held good; the great majority of the ruins consisting of heaps of debris, a central mass, considerably higher and more massive than the surrounding lines of subdivided squares; small buildings not more than eight feet square were often found standing alone apparently; no trace of any other being detected in their immediate neighborhood. They now commenced to note another peculiar feature. Upon the right the long slopes of protruding strata and debris formed promontories, extending out into the canyon. Upon these, and not more than 50 feet above the stream, were found frequent indications of their having been occupied by some sort of works, the foundations of which were in every case circular, with a deep depression in the center and generally occurring in pairs, two side by side, ranging from 10 to 20 feet in diameter. There was no masonry of any kind visible, but thickly strewn all about was any quantity of broken pottery. Above, were indications of habitations in the face of the cliff, but not marked enough to warrant further search.

At those places where the trail ran high up near the more precipitous portion of the bluff, were found remnants of stone walls, inclosing spaces of from five to twelve feet in length, in the cave-like crevices running along the seams. They were pretty well demolished, the stones undressed and imbedded in mortar. In many places little niches or crevices in the rock had been walled up into cupboard-like inclosures about the size of a bushel basket. There is no doubt that ruins exist throughout the entire canon far above and out of the way of ordinary observation. All those that were found by the party were built of the same material as the cliffs themselves, with but few, and then only the smallest, apertures toward the canon; the surface being dressed very smooth and showing no lines of masonry, it was only upon the very closest inspection that the house could be separated from the cliff. Cedar and pines also grow thickly along the ledges upon which they are built, hiding completely anything behind them.

In another part of the canyon, on the high bluff to the right hand, were found some of the most curious and unique little habitations yet seen. While going along under this bluff, fully 1,000 feet in height, and admiring its bold outlines and beautiful coloring, one of the party, sharper-eyed than the rest, descried away up near the top, perfect little houses sandwiched in among the crevices of the horizontal strata of the rock of which the bluff is composed. While Mr. Jackson was busy photographing, two of the party started up to scale the high and inspect this lofty abode. By penetrating a side canyon some little way, a gradual slope was found, that carried them to the summit of the bluff. Now, the trouble was to get down to the houses, and this was accomplished only by crawling along a ledge of about 20 inches in width and not tall enough for more than a creeping position. In momentary peril of life, for the least mistake would precipitate him down the whole of the dizzy height, the adventurous seeker after knowledge crept along the ledge until the broader platform was reached, upon which the most perfect of houses alluded to stands. The ledge ended with the house, which is built out flush with its outer edge. This structure resembles in general features the cliff houses already spoken of. The masonry is as firm and solid as when first constructed, the inside being finished with exceptional care. In width it is about five feet in front, the side wall running back in a semi-circular sweep; in length fifteen and in height seven feet. The only aperture was both door and window, about 20 by 30 inches in diameter. Fig. 7 of our illustration is a design of this aerial habitation as it appeared from below, its uniqueness consisting in its position on the face of the bluff. To the casual observer it would not be noticed once in fifty

times in passing, so similar to the rocks between which it is plastered does it appear from the trail. A short distance above is another building of somewhat ruder construction, but with the corners square and the walls truncated.

Fig. 8 is an example of the tenacity of the mortar used in the construction of these buildings; the view being one of the line of little houses described in our last number. In this case a portion of the ledge upon which the house stands has become separated from the cliff, carrying a portion of one of the buildings with it; and although torn away from the remaining wall, and thrown over at a considerable angle, yet it remains perfectly firm and unshaken.

The party examined a very extensive group of ruins about "Aztec springs," lying out upon the northeastern flank of "el Late," and close upon the divide between the waters of the Mancos and the McElmo. The town about the springs is nearly a square mile in extent, the larger and more enduring building in the center, while all about are scattered and grouped the remnants of smaller structures comprising the suburbs. About four miles from these ruins is

could give them no more attention than merely noting their existence. A few miles further on the party came upon the tower shown in Fig. 9, standing upon the summit of a great square block of sandstone, some 40 feet in height, detached from the bluff back of it. The building upon its summit is square, with apertures upon its two faces, like window, looking east and north and very much ruined, but still standing in some places about 15 feet above the rock upon which it is built. At the base of the rock is a wall running around it, a small portion only remaining, the rest thrown down and covered with the debris from the house above.

Here they crossed the boundary line into Utah, and then, two or three miles further, they came upon a very interesting group. The valley at this place widens out considerably, and in the center stands a solitary butte of dark-red sandstone, upon a perfectly bare and smooth floor of the same, dipping down to the center of the valley at a slight inclination. The butte, a remnant of a former mesa, worn down by time to its present dimensions, is about 100 feet in height and 300 in length. Running about its base, in irregular lines, are remains of walls,

ground plan of the "city," showing its general arrangement. The McElmo, shown in the sketch, sweeps the foot of a rocky sandstone ledge, some 40 or 50 feet in height, upon which is built the highest and best preserved portion of the settlement. Its semi-circular sweep conforms to the ledge, each little house of the outer circle being built close upon its edge. Below the level of these upper houses some 10 or 12 feet, and within the semi-circular sweep, are seven distinctly marked depressions, each separated from the other by rocky debris, the lower or first series probably of small community houses. Upon either flank, and founded upon rocks, are buildings similar in size and in other respects to the large ones on the line above. The stones of which the entire group are built are dressed to nearly uniform size and laid in mortar. A peculiar feature is in the round corners, one at least appearing upon nearly every house. They are turned with considerable care and skill, being true curves solidly bound together.

General News Items.

THE China Mail Subsidy bill was defeated in Congress.

JOEL T. HART, the American sculptor, living at Florence, is dead.

THE rates of interest have been reduced by the Odd Fellows bank to eight per cent. on securities of the first class.

THE Direct United States Cable Company gives notice of a reduction of rates to 25 cents (gold) per word.

THE Senate receded from its amendment proposing an appropriation of \$250,000 for the erection of a National museum building in Washington.

THE Harding paper mills, at Franklin, Ohio, were burned on Thursday night. Loss, \$200,000; insurance, probably light. The mills were the finest of the kind in the country.

THE House concurred in the Senate amendment appropriating \$25,000 to pay the expense of a commission of five skilled entomologists to be appointed by the Secretary of the Interior to report the best practical methods of guarding against invasion by the Rocky Mountain locusts or grasshoppers.

THE reply of the Powers to the Russian circular will be presented next week. The Powers have agreed to acknowledge the meritorious zeal of Russia on behalf of the Christians in Turkey. The reply will be carefully worded to make Russia's retreat from her threatening position easy. It is understood that the Powers will propose that the Porte be granted time for the execution of reforms.

THE London Money Market Review says: The Bank of France has announced that it will hereafter make advances upon bar silver at one per cent. per annum, with a margin of 10% in greenbacks deposited with the bank. This is a return to the custom prevailing before the panic in silver. The effect will be to steady the market, and may be regarded as an indication of faith in the future of silver.

In the month of February the Harbor Commissioners report a total of receipts from wharves of \$34,041.85, and in addition \$8,426 drawn from the harbor improvement fund. The disbursements include \$2,807.04 for urgent repairs, \$2,479.33 for steam dredger, \$8,615 on construction account and \$22,154.98 remitted to the State Treasurer.

PAPER MAKING.—We recently found the market rates for paper ruling very low in the Eastern States. Many mills making ordinary qualities are at a standstill. Those making superior qualities are willing to increase their supplies and make favorable contracts. At Salmon Falls, five miles west of Westfield, Mass., we visited one of the very best mills in this country—and that implies in the world. It is owned by the Jessup & Laffin Paper Co., and the mill in its general details was constructed most thoroughly under the eye of its (now deceased) founder, Mr. Jessup, after nearly a lifetime spent in successful paper making. The Fourdrinier machinery is used in connection with other perfected moving and stationary apparatus. The water supply is ample for a very large business, and from the uniform character of the superior writing and sized blank printing paper issued under its able and experienced superintendent, we are confident that the future of these works will develop more importance than its friends are really yet aware of. Mr. Henry J. Bush, President of the company, informs us that so far, even in these dull times, the demands for their paper have equalled the supply from this new mill.

THE Union has advices from Maricopa Wells, Arizona, that the people at that station fear an attack from the Pima Indians, who are exasperated over the rumor that two Indians lately arrested have been hung by a mob in Phoenix. General Kautz has ordered a detachment of cavalry from McDowell to Maricopa.

THE claim of Orr & Gard, better known as the Dutch company gravel claims, situated in La Porte, Plumas county, have been sold to San Francisco capitalists for \$250,000. Orr & Gard have been sole possessors of this claim since 1852.

THE Central mine, Nevada county, is to have a mill to be run by water power.



ANCIENT RUINS IN COLORADO AND UTAH.

a stream called the McElmo, which flows westwardly into the San Juan, but is for the greater portion of the year but a deep, dry gulch. A short distance above, and upon the top of the mesa, which in this place is only about twenty-five feet above the valley, was found quite a large tower about fifty feet in diameter. Immediately surrounding this tower is a great mass, of which it is the center, of scattered heaps of stone debris, arranged in rectangular order, each little square with a depressed center, suggesting large subdivided buildings similar to the great community-dwellings of the Pueblos and Moquis. This group covers a space of about one hundred yards square; while adjoining it on the mesa is group after group on the same general plan, great central tower and smaller surrounding buildings. They cover the whole length and breadth of the land; and turn which way they would, the members of the party stumbled over the old mounds and into the cellars, as one might call them, of these truly aborigines. The same painted, glazed and ornamented ware of which we have spoken accompanies each settlement, and they were continually picking up new designs and forms.

Starting down the canyon, which gradually deepened as the table-land rose above them, the party found upon each hand very old and faint vestiges of the homes of a forgotten people, but

but whether for defense or habitation would be hard now to determine. At the back of the rock, a view of which is had in Fig. 10, are the remains of two quite considerable walls, one above the other; the lower portion—one corner only of a square building, all traces of the remaining portions having entirely disappeared—seemed to serve as a sort of approach to the larger building above, the top of which came up nearly to the summit of the rock. The stones of which it is built are very uniform in size, angle and finish. The only access to the top of the rock was through the window of this house. On top are some evidences of mason work, covering it from one end to the other. All the irregular gaps and crevices have been walled up, probably to make an even surface. But few of the stones remain in position; in one or two places, three or four courses; all the rest are thrown down and scattered.

While passing the mouth of a side canyon a tall, black-looking tower caught the eye of one of the party, perched upon the very brink of the mesa, overlooking the valley. On reaching this tower they found that it was evidently an outpost or watch-tower guarding the approach to a large settlement upon or beyond the mesa lying above it. The party then struck out for another group of ruins some eight or ten miles further west. Fig. 11 is a sketch of a

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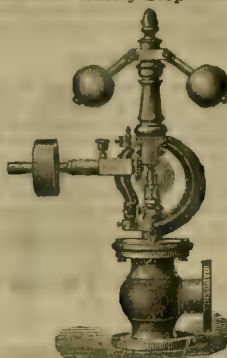
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Cost of Roasting and Chloridizing by this Process:

Two cords of wood at \$6.....	\$12.00
Two firemen at \$4.....	8.00
1,500 lbs of salt at 14c.....	22.50
Wear of shoes and power.....	1.50

Cost for 15 tons.....\$44.00
Cost for one ton.....2.93 1/2

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Consolidated Co.'s mines, in the Peavine District. For further information, apply to

D. J. O'HARRA,
Reno, Nevada.

The Ingersoll Rock Drill



Is Extensively Used in the East and

TAKES THE PLACE OF ALL OTHERS,

Wherever introduced, because it can be run with less power, labor and repairs, and do more work than any other drill in the market. It has but few parts, is easily handled, being light, and has AUTOMATIC FEED, which saves labor. WE ASK FOR TRIAL AGAINST ANY COMPETITOR. For particular information regarding Drills or Air Compressors, send for circular to

J. B. REYNOLDS,
426 California Street

THE

LANE & BODLEY COMPANY,

John and Water Sts., Cincinnati, O.,

Sole Manufacturers of

BRUCKNER'S PATENT

REVOLVING FURNACE,

For Chloridizing, Desulphurizing and Roasting Ores.

-ALSO-

STEAM ENGINES, SAWMILLS, SHAFING, GEARING AND MINING MACHINERY.

Send for our Illustrated catalogue.



The Great Western Scroll Saw Co.'s new and improved \$5.00 Foot and Steam Power Scroll and Bracket Saw is the best one yet invented. With it men and boys are making from \$3 to \$10 per day. We will send you a Machine, six Saws, 15 Patterns and two feet of prepared wood, on receipt of \$5. Address,

GREAT WESTERN SCROLL SAW CO.,

Leavenworth, Kansas.

Metallurgy and Ores.

JOHN TAYLOR & CO.,

Importers of and Dealers in

ASSAYERS' MATERIALS.

Chemical Apparatus and Chemicals, Druggists' Glassware and Sundries, etc.

512 & 518 Washington St., San Francisco.

We would call the special attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our large and well adapted stock of

ASSAYERS' MATERIALS

-AND-

Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application.

JOHN TAYLOR & CO.

THOS. PRICE'S

Assay Office and Chemical Laboratory,

524 Sacramento St., S. F.

Deposits of bullion received, melted into bars, and returns made in from 24 to 48 hours.

Bullion can be forwarded to this Office from any part of the interior by Express, and returns made in the same manner.

Careful Analysis made of Ores, Metals, Soils, Waters, Industrial Products, Etc. Mines examined and reported upon. Consultations on Chemical and Metallurgical questions.

Nevada Metallurgical Works,

21 First Street, 3 doors from Market, S. F.

Ores worked by any process.

Ores sampled.

ASSAYING in all its branches.

Analysis of Ores, Minerals, Waters, etc.

WORKING TESTS MADE.

Plans furnished for the most suitable process for working Ores.

Special attention paid to Examinations of Mines; plans and reports furnished.

E. HUNN,
C. A. LUCKHARDT,
Mining Engineers and Metallurgists

LEOPOLD KUH,

(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical Chemist,

No. 611 COMMERCIAL STREET,

(Between Montgomery and Kearny.)

SAN FRANCISCO, CAL.

INSTRUCTIONS IN ASSAYING,

Chemical Analysis, Determination of Minerals, and use of the Blow-pipe.

HENRY G. HANKS

Will receive a few pupils at his new laboratory, No. 617 Montgomery Street, up-stairs. TERMS MODERATE.

STRONG & CO.,

Assayers and Metallurgists,

10 STEVENSON STREET, S. F.

San Francisco Pioneer Screen Works,

J. W. QUICK, MANUFACTURER,

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Sore, a extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

32 Fremont Street, San Francisco.

MENZO SPRING,

Manufacturer of ARTIFICIAL LIMBS,

Of 166 Tehama street, has removed to No. 9 Geary street; office, room 2, fronting on Market, opposite the head of Third street.

ERICH G. GAERTNER, MINING ENGINEER.

All classes of mining properties reported on, consultations had on reduction of ores of all descriptions, plans for furnaces and reduction works furnished, and the construction of them superintended. Ore tests made at the office.

309 California Street, Rooms 8 and 9.

Continued from page 149.

and will now be pushed ahead with steady vigor.

KNUCKLEBROCK.—The 600-ft level is nearly reached, but owing to the whole body of the ground being so thoroughly saturated with water from the long submergence it all has to be drained, consequently the reduction of the water in the shaft is necessarily somewhat slower than was anticipated.

MINT.—Sinking the shaft for a sump below the 1400-ft station is nearly finished. As soon as this is done, and the 1400-ft station put in shape for rapid work, the cross-cutting and development of the ledge will be in order.

LEVATHAN.—The face of the main drift north at the 600 ft level shows fine streaks of low grade ore. At the next level below—the 650—the drift north from the incline is running in quartz and porphyry, with occasional streaks of low grade ore.

GOULD & CURRY.—The pumps and bobs are being put in place and fitted ready to run, down to the seventh station in the shaft. Below that point they are already completed. The main south drift on the 1700-ft level is being pushed rapidly ahead. Burleigh drills now being used in the face.

SAVAGE.—The pumps are kept steadily at work, and are slowly gaining on the flow of water. The repairs to the 1900-ft level are going steadily forward.

UTAH.—The west drift on the 1150-ft level is being pushed ahead to reach and prospect the ore vein at that point. The pits are being dug for the foundations of a large new air compressor which is to be erected immediately.

MEXICAN.—The north drift on the 1700-ft level is still advancing following the west wall of the ore vein. The face of this drift is in a fine character of ledge matter carrying occasional streaks of ore.

PHIL. SHERIDAN.—The face of the east drift on the 400-ft level, running to cut the ledge, is getting into much softer and more favorable ground. The prospects are that the ledge will soon be reached on that level.

FLORIDA.—A new station has been opened at a depth of 815 feet, and a drift started to cut and prospect the ore vein at that point.

BUCKEYE.—The ore from the slopes on the 350-ft level, north drift, is being assorted before being extracted in order to increase the bullion returns from the crushing of the ore.

ALLEN.—Forty tons of good milling ore per day continue to be the regular yield of this mine. This comes from the 800-ft level. There is plenty of it in sight, and the Western State mill is kept steadily running upon it, giving a good fair profit.

KENTUCK.—Arrangements are now being made to resume work in this good old mine at an early day, either through the Crown Point or Yellow Jacket, or through the old shaft of the mine itself, whichever can be done to the best advantage.

SOUTH COUSROCK.—Very active and efficient work is being done sinking the main shaft deeper. It is now 58 feet below the 300-ft level.

WARD.—Sinking the shaft is being pushed ahead with all the vigor possible, the bottom in very soft, giving ground, which makes the work difficult.

UNION CON.—The quartz in the face of the north drift on the 1300-ft level is looking better as the drift advances.

AMAZON AND GLASSBORO.—The face of the north drift on the 300-ft level is showing about three and a half feet of good ore.

CROWN POINT.—The east drift on the 2000-ft level is steadily advancing toward the ledge, the face in hard blasting rock.

BELCHER.—Sinking the main incline is making excellent progress. The flow of water at the bottom is still quite strong. Sinking the drain shaft is also making good progress.

NORTH CARSON.—The prospects at the 500-ft level continue to be very encouraging and the shaft and machinery are in the best possible condition.

Colorado.

EMPIRE.—Colorado *Miner*, March 3: We understand that prospecting and mining are being vigorously carried on in this locality. Empire has shaken off its lethargy, and the recent strikes have encouraged its inhabitants to manifest some of the energy of the early days. The present year bids fair to do more for this district than have the last four years.

MONTICELLO TUNNEL.—Drifting has been resumed upon a lode cut by this tunnel in Republican mountain, and ore is being produced which mills, first-class, 160 ounces, second-class, 75 ounces silver per ton.

GRIFITH MOUNTAIN.—Messrs. Cree & Tarbell, the fortunate owners of the Pickwick mine, were in town this week, having a run made of the ore they have taken out the past month. The following is the result: \$1,569.30, exclusive of mill charges. This is the result of the work of two men, one month, drifting, no stopping whatever having been done.

SHERMAN MOUNTAIN.—There are four parties of lessees at work on Pay Rock mine, and all are in fair pay, with flattering prospects ahead. The first-class ore runs nearly 400 ounces, and the second-class about 200. In addition to these grades a large amount of concentrating ore is raised. The deeper the mine is worked, the better it looks.

RED ELEPHANT MOUNTAIN.—W. A. Campbell, who is superintending work on Grant mine, informs us that in two weeks two men have taken out twenty tons of ore, which it is believed assures an average run of somewhere in the neighborhood of 800 ounces per ton. This ore was taken out at a depth of 80 feet.

VIRGINIA MOUNTAIN.—The latest strike reported in Clear Creek country is on the Clear Creek lode, located near the head of Virginia canyon. This is near the productive Specie Payment, which has made an excellent record during the past year. The Clarissa is owned by W. H. Bush and P. M. Mixell. Although a depth of only 50 feet has been attained, the level opened at that point shows a splendid vein of ore of the same character as the peerless Hurkell, and maintains a width of from four to five feet. It carries gold, silver and copper, and from 10% to 30% of the latter. The ore is sold at the concentrating works and at the smelting works at Black Hawk. The prices paid vary from \$10 to \$580 per ton, several grades being assorted.

Idaho.

GOLDEN CHARIOT.—Owyhee *Avant*, March 3: The slopes are yielding handsomely and there are several hundred tons of ore at the Chariot and Minnesota awaiting transportation to the mill. The cross-course at the 13th level is being rapidly approached, and all the indications of the existence of a bonanza in the vicinity are quite promising. Work is progressing favorably in the several sections of the mine and everything is looking remarkably well. Preparations for an active campaign continue. A new wire rope has been supplied recently, and the surplus water in the lower levels will be rapidly removed. It is anticipated that the bullion product of the Chariot the coming season will be largely in excess of that of last year. Work is not only being prosecuted vigorously, but all the operations are being conducted with a view to the economy and the fostering of the interests of the company.

Utah.

BRAYNER MINES.—Cor. Salt Lake *Tribune*, March 3: The Wasco mine, in South Camp, can now be considered one of the best producing mines in Star district. The tunnel which was being run to tap the ore body was completed a week ago, and reached the ore 20 feet below the lowest former workings. Here was found a continuous vein, running nearly north and south. There is now uncovered and in sight over \$20,000 worth of ore. The miners, Kemple, Sloan, Edleman and Laners, have commenced shipping their ore to Shuman & Co.'s smelter. Large shipments of ore from the Horn silver mine, the Mammoth, Elephant, Vicksburg, and a number of others, are giving a lively appearance to things around the Shuman smelter. A rich discovery has been made in North Camp, Star district. It is called the Crossus, and is owned by H. W. Donaldson. The assays are 7,000 ounces silver and

30% lead per ton. There is more ore in Star district than the people north have any idea of, and in one year from to-day we will prove it by shipments of bullion. Williams & Latey's smelter at Millford is receiving ores from everywhere as fast as Mormon teams can haul them in. About the first of March all the smelters will start up, then look out for large shipments of bullion from Beaver county. The owners of the Frisco smelter have purchased a new engine and boiler and are now having it put in place ready to run again.

Oregon.

THE MUD SPRINGS.—Dallas *Tribune*, March 1: Everybody knows that there are contradictory reports relative to these springs; some to the effect that they are very rich, and some that they are worthless and a humbug. Within a day or two past we have received information which, to us, incredulous as we have been in regard to them, is almost conclusive proof that they are no humbug, and that they will yet prove to be the richest silver mines ever discovered. It is now quite well ascertained that the silver mud comes from quartz deposits some distance below the surface.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING FEBRUARY 27TH, 1877.
187,830. QUILTING ATTACHMENT FOR SEWING MACHINES.—J. Douglass, La Grange, Cal.
187,846. SPRING BED-BOTTOM.—R. M. Gruwell and C. Newhouse, Stockton, Cal.
187,904. MACHINE FOR RE-SAWING LUMBER.—Samuel Putnam, Emigrant Gap, Cal.
187,912. CURRY COMB.—J. W. Rundle, S. F.
187,931. VALVE GEAR FOR STEAM ENGINES.—J. C. H. Stut, S. F.
187,947. VALVE GEAR FOR STEAM ENGINES.—S. H. Wheeler, S. F.

N. B.—By a new arrangement with the Patent Office we shall be able to give the numbers of the patents hereafter.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.
GOVERNOR CONS. M. Co.—March 2d. Location: Nevada. Capital stock, \$10,000,000. Directors—Martin White, William H. Gwiley, R. C. Clement, Lytleton Price and W. B. Clement.

PACIFIC TELEGRAPH Co.—March 2d. Capital stock, \$200,000. Object: The construction of 786 miles of telegraph line in Nevada, Idaho and Oregon. Directors—M. L. McDonald, M. J. McDonald, J. M. McDonald, E. J. Baldwin and R. H. Minister. The route of the line is to be as follows: From Winnemucca, Humboldt county, Nevada, to Camp McDermott; thence to Summit, Baker county, Oregon; thence to Silver City, Owyhee county, Idaho, with a branch line from Silver City to Fairview, and from Silver City to South Mountain; the main line continuing from Silver City to Boise City, Ada county; thence to Baker City; thence to Walla Walla, Washington Territory; and thence westerly to Portland, Oregon, together with a short line to Portland.

HIMLOCK CONS. S. M. Co.—March 7th. Capital stock, \$10,000,000. Directors—B. F. Fish, Wm. Whalen, J. J. Dolan, T. G. McLeran and S. E. Holcombe.

METALS.

[WHOLESALE.]

THURSDAY, M., March 8, 1877.

IRON.	
American Pig, ton.....	29 00 @ 32 00
Scottish Pig, ton.....	31 00 @ 32 50
White Pig, ton.....	30 00 @ 31 00
Refined Bar, ton.....	4 00 @ 4 40
Boiler, 1.....	4 00 @ 4 40
Plate, 13 to 20.....	7 10 @ 8 00
Sheet, 10 to 14.....	5 00 @ 5 50
Sheet, 15 to 24.....	6 00 @ 6 50
Sheet, 22 to 24.....	6 00 @ 6 50
Sheet, 26 to 28.....	6 00 @ 6 50
Horse Shoes, keg.....	6 00 @ 9 00
Nail Rod.....	8 00 @ 8 50
Norway.....	8 00 @ 8 50
Rolled.....	7 10 @ 9 00
COPPER.	
Copper Tinned.....	37 00 @ 40 00
Sheathing, lb.....	37 00 @ 40 00
Sheathing, Yellow.....	21 00 @ 22 10
Sheathing, Old Yellow.....	10 00 @ 11 00
Composition Nails.....	21 00 @ 22 00
Composition Bolts.....	24 00 @ 25 00
STEEL.	
English Cast, lb.....	14 00 @ 25 00
Anderson & Woods, ordinary sizes.....	16 00 @ 25 00
Drill.....	16 00 @ 25 00
Flat Bar.....	15 00 @ 20 00
Flow Sheet.....	9 10 @ 12 00
TIN PLATES.	
10x14 I C Charcoal.....	9 00 @ 9 25
Banca Tin.....	24 00 @ 25 00
Australian.....	18 00 @ 18 10
ZINC.	
By the Cask.....	11 00 @ 12 00
Zinc Sheet 7x3 ft, 7 to 10, lb.....	11 00 @ 12 00
7x3 ft, 11 to 14.....	11 00 @ 12 00
8x4 ft, 8 to 10.....	12 00 @ 13 00
8x4 ft, 11 to 10.....	12 00 @ 13 00
NAILS.	
Assorted sizes.....	3 37 1/2 @ 4 00
By the lb.....	42 1/2 @ 45 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]

SAN FRANCISCO, March 7, 3 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 95 1/2 @ 95 1/2, SILVER, 5 1/2 @ 5 1/2.

GOLD IN New York 105 1/2. SILVER BARS, 7 @ 10 1/2 cent. discount.

EXCHANGE ON New York 50 @ 55-100 1/2 cent. premium for gold; on London bankers, 4 1/2; Commercial, 4 1/2; Paris, five francs, 10 1/2; Mexico, 10 1/2; India, 10 1/2.

LONDON Consols, 96 1/2; Bonds, 102 1/2.

QUICKSILVER IN S. F., by the flask, 43 @ 44.

Newspaper Fileholders.

Dewey's new elastic fileholders (black walnut), size of the PRESS, Harper's Weekly and Scientific American, for 25 CENTS. Larger sizes to suit any newspaper, 75 cents. By mail, postpaid, 10 cents extra. Cash with all orders. Patent allowed. Address, DEWEY & CO., Publishers, San Francisco.

Excelsior Silver Mining Company, Nye County, Nevada.

A meeting of the stockholders of the above company will be held on the 28th day of March, 1877, at the office of the company, 306 Post street, San Francisco, California, to elect Trustees.

W. A. KOLLMYER, Secretary.

Mining and Other Companies.

Aetna Tunnel Company.—Location of

principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of January, A. D. 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
O G Sawyer.....	17	10	8 30
O G Sawyer.....	18	10	30
O G Sawyer.....	59	5	15
J A Van Pelt.....	19	10	30
J A Van Pelt.....	47	5	15
P Casson.....	67	750	22 50
P Casson.....	68	750	22 50
P Casson.....	69	100	3 00
P Casson.....	70	150	4 50
P Casson.....	71	175	5 25
J B Cooper.....	74	50	1 50
B O Cutter.....	77	25	75
B O Cutter.....	78	25	75
B O Cutter.....	79	25	75
B O Cutter.....	80	25	75
B O Cutter.....	81	25	75
B O Cutter.....	82	25	75
B O Cutter.....	83	25	75
B O Cutter.....	84	25	75
B O Cutter.....	85	25	75
B O Cutter.....	86	25	75
B O Cutter.....	87	25	75
B O Cutter.....	88	25	75
B O Cutter.....	89	50	1 50
B O Cutter.....	90	50	1 50
B O Cutter.....	91	50	1 50
B O Cutter.....	92	50	1 50
B O Cutter.....	93	50	1 50
B O Cutter.....	94	50	1 50
B O Cutter.....	95	50	1 50
B O Cutter.....	96	50	1 50
B O Cutter.....	97	100	3 00
B O Cutter.....	98	100	3 00
B O Cutter.....	99	100	3 00
B O Cutter.....	100	100	3 00
B O Cutter.....	101	100	3 00
Miss Mattie Guion.....	48	5	15

And in accordance with law and an order of the Board of Directors, made on the second day of January, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room No. 6, No. 420 California street, San Francisco, California, on Monday, the nineteenth day of March, A. D. 1877, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.
Office, Room No. 6, No. 420 California street, San Francisco, California.

Dolores Consolidated Mining Company.

Location of principal place of business, San Francisco, Cal. Location of works, Dolores Mining District, Esmeralda County, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 17th day of February, A. D. 1877, an assessment, No. 1, of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 418 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 26th day of March, A. D. 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 16th day of April, A. D. 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. CLARK, Secretary.
Office, Room No. 2, 418 California street, San Francisco, California.

Howland Tunnel Company.—Location of

principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of January, A. D. 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
O G Sawyer.....	17	10	8 30
O G Sawyer.....	18	10	30
O G Sawyer.....	59	5	15
J A Van Pelt.....	19	10	30
J A Van Pelt.....	38	5	15
P Casson.....	67	750	22 50
P Casson.....	68	750	22 50
P Casson.....	69	100	3 00
P Casson.....	70	150	4 50
P Casson.....	71	175	5 25
J B Cooper.....	74	50	1 50
B O Cutter.....	77	25	75
B O Cutter.....	78	25	75
B O Cutter.....	79	25	75
B O Cutter.....	80	25	75
B O Cutter.....	81	25	75
B O Cutter.....	82	25	75
B O Cutter.....	83	25	75
B O Cutter.....	84	25	75
B O Cutter.....	85	25	75
B O Cutter.....	86	25	75
B O Cutter.....	87	50	1 50
B O Cutter.....	88	50	1 50
B O Cutter.....	89	50	1 50
B O Cutter.....	90	50	1 50
B O Cutter.....	91	50	1 50
B O Cutter.....	92	50	1 50
B O Cutter.....	93	50	1 50
B O Cutter.....	94	50	1 50
B O Cutter.....	95	50	1 50
B O Cutter.....	96	50	1 50
B O Cutter.....	97	100	3 00
B O Cutter.....	98	100	3 00
B O Cutter.....	99	100	3 00
B O Cutter.....	100	100	3 00
B O Cutter.....	101	100	3 00
Miss Mattie Guion.....	39	5	15
George Guion.....	20	10	30
Mrs Sarah Guion.....	21	10	30

And in accordance with law and an order of the Board of Directors, made on the second day of January, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room No. 6, No. 420 California street, San Francisco, California, on Monday, the nineteenth day of March, 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.
Office, Room No. 6, No. 420 California street, San Francisco, California.

Mariposa Land and Mining Company

of California. Location of principal place of business, San Francisco, California. Location of works, Mariposa county, California.

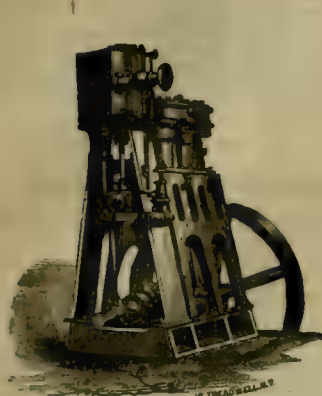
NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 9), levied on the 16th day of January, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Brumagim, J. H.....	unissued	550	\$550 00
Brumagim, J. H.....	1342	100	100 00

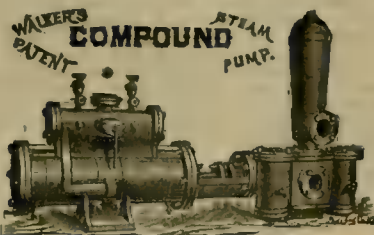
Names.	No. Certificate.	No. Shares.	Amount.
Brumagim, J. H.....	1341	100	100 00
Birmingham, D. Walton.....	1478	100	100 00
Collins, J. A.....	1200	100	100 00
Collins, C. A.....	1208	100	100 00
Collins, C. A.....	1206	100	100 00
Curles, W. B.....	272	100	100 00
Colborn, W. T.....	473	100	100 00
Colborn, W. T.....	474	100	100 00
Durbrow, Lamont.....	unissued	100	100 00
Hallgarten & Co.....	unissued	50	50 00
Hoyt, E. P.....	1223	100	100 00
Hoyt, E. P.....	1224	100	100 00
Hoyt, E. P.....	1225	100	100 00

MINING MACHINERY DEPOT,

PARKE & LACY, 417 Market Street, S. F.



ECONOMY IN COST.
ECONOMY IN FUEL.



POSITIVELY UNEQUALLED FOR
SIMPLICITY AND DURABILITY.



Air Compressors,
ROCK DRILLS
—AND—
Tunneling Machinery.

Burleigh's.

Machinists' Tools,
Planers & Matchers.

Putnam's.

COMPOUND STEAM PUMPS—WALKER'S.

Plunger Steam Pumps—Cope & Maxwell's.

BUCKET PLUNGER PUMPS—WRIGHT'S.

Centrifugal Pumps—Heald & Sisco's.

Vertical Steam Engines, All Sizes—Haskin's.

Emery Wheels—Cosmopolitan.

TWIST DRILLS—MORSE'S.

BATTERY FOR BLASTING—FARMER'S.

EXPLODERS—HILL'S.

Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

VILLAGE HOOK AND LADDER TRUCKS,

Chemical Engines Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.

PATENT AGENTS.

Office—224 Sansome St., San Francisco.

PATENTS obtained promptly; Caveats filed expeditiously; Patent re-issues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting Business promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons, and our success and business are constantly increasing.

The shrewdest and most experienced inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the most illustrious and widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

DEWEY & CO., Patent Solicitors.
San Francisco, 1877.

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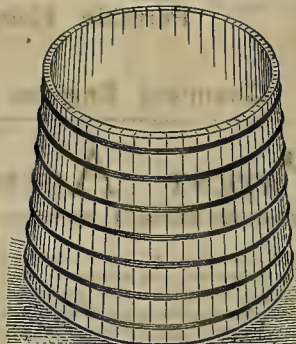
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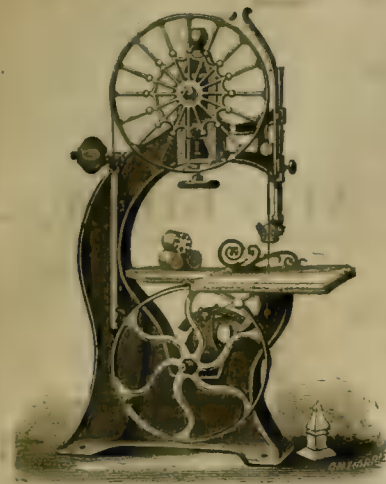
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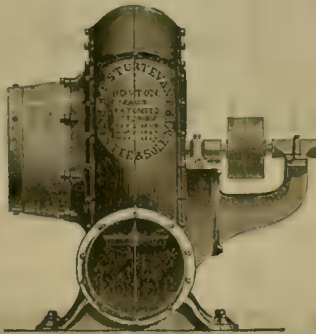
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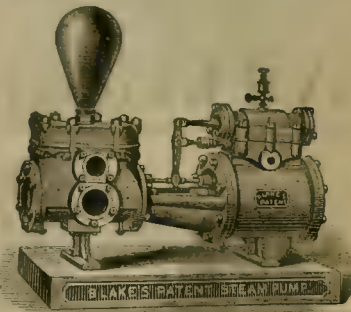
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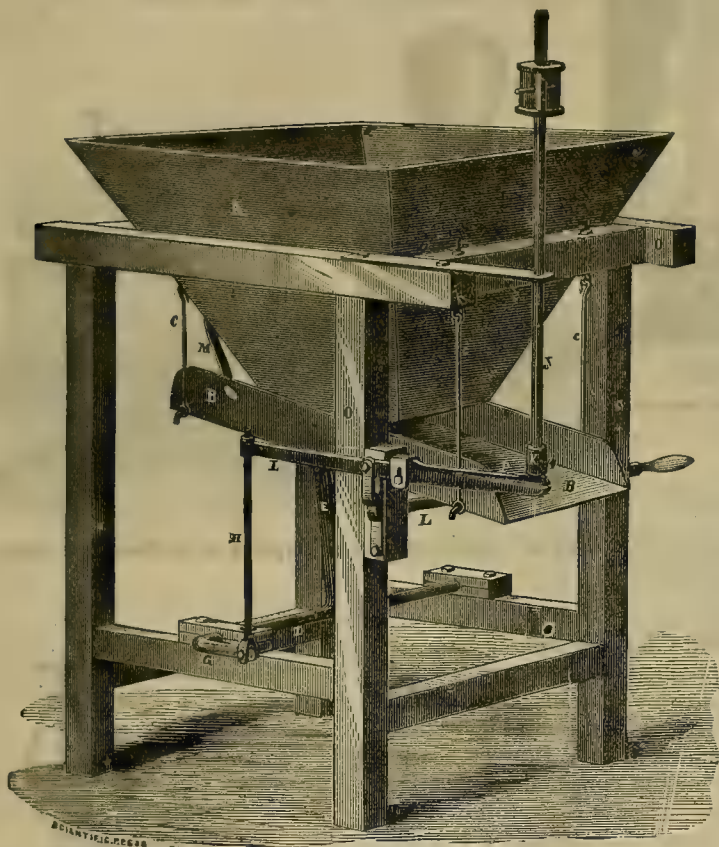
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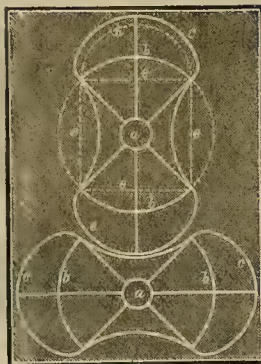
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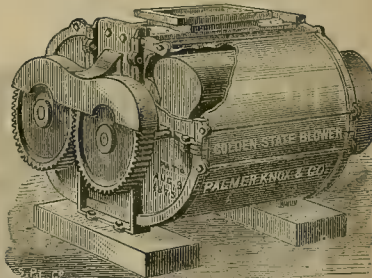
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At the Hydraulic Elevator Works.

GOLDEN STATE IRON WORKS, CO-OPERATIVE, FOUNDRY and MACHINE WORKS.



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GOLDEN STATE SUCTION AND PRESSURE BLOWER FOR VENTILATION OF MINES. BLAST OR EXHAUST FOR FURNACES OR REDUCTION WORKS.

They have no superior. The casing is made in sections, so as to be easily accessible. They run easily, not rapidly, and the perfect contact of wings gives a uniform and powerful blast.

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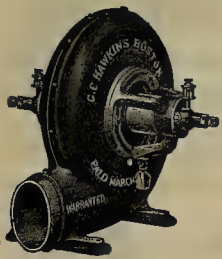
Nos. 19 to 25 FIRST STREET, San Francisco, Cal.

A. L. FISH & CO.,

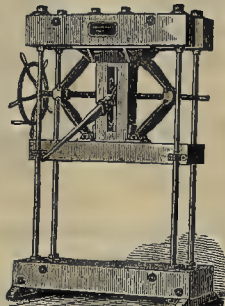
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All kinds of New and Second-Hand Machinery.



Hawkins' Blowers and Exhaust Fans.



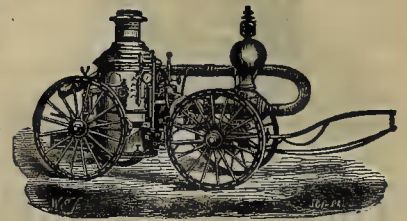
Boomer Press,
For Wine, Cider, Lard, etc.



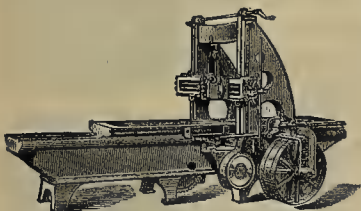
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1,000 Feet Single Lift Guaranteed.



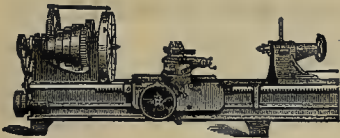
Waters' Patent Governor.



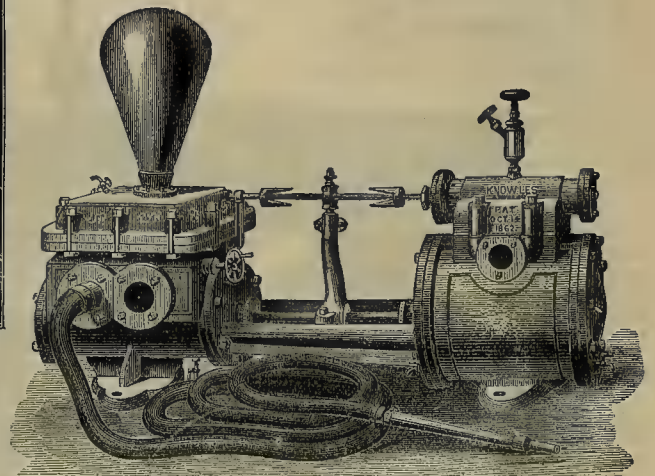
Clapp & Jones' Steam Fire Engine.



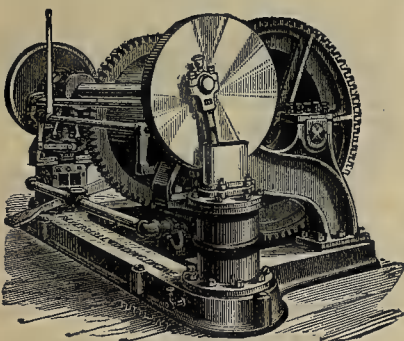
Ferris & Miles' Lathes, Planes and Machinists' Tools.



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Steam Hammers.



Knowles' Steam Pump; for all purposes where Pumping is required.



Bacon's Hoisting Engine.

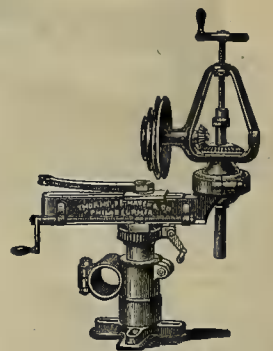
Especially adapted to use in Mines, Hotels, Factories, Quarries, and Steamships, with Bacon's Safety Stop.

Office of Amazon and Glasgow Mining Co.,

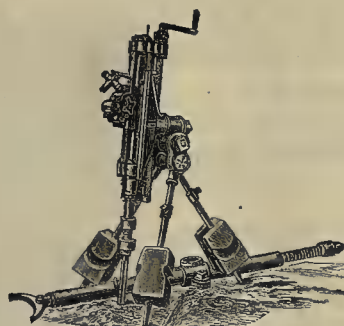
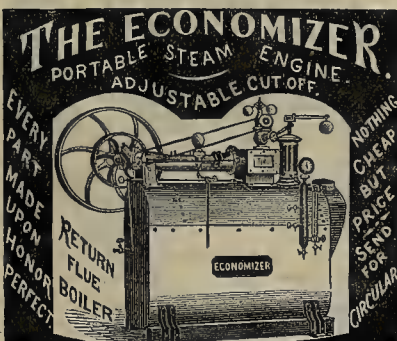
San Francisco, Nov. 25, 1876.

A. L. Fish & Co., Agents for Knowles' Patent Steam Pump,
Gents: After using many devices for pumping mines I must say the DOUBLE ACTING PLUNGER MINING PUMP (Knowles' Patent), bought some time since for the Amazon and Glasgow mines, is seemingly as near perfection as it is possible to be. We carry steam 500 feet to the pump, raising water 400 feet, which it does easily with 40 pounds of steam, without the slightest jar on the pipes, and is perfectly noiseless. Gravel cannot wear the cylinder, and it is by far the simplest, cheapest and most economical way I know of for draining mines. I would cheerfully recommend them. Yours truly,

A. Caldwell, Superintendent.



Thorne & DeHaven Drill.



Union Rock Drill.

We offer this as the least complicated and most practicable Rock Drill yet introduced.



Agents for the NEW YORK BELTING AND PACKING CO.'S RUBBER TEST HOSE, expressly for Fire Engine use; manufactured by the oldest and most responsible manufactory in this country. This is the Original Carbolized Hose in which the fiber is carbolized, assertions by any defunct agent to the contrary notwithstanding.

Engines, Boilers, Quartz Mills, Saw Mills, Etc., Etc.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MARCH 17, 1877.

VOLUME XXXIV.
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Mechanical Ore Concentration and Separation—No 26

[Written for the Press by FRANCIS M. F. CAZIN, M. E.,
Santa Fe, New Mexico.]

Apparatus for Slime Separation.

In a thin, evenly distributed stream of water, an evenly distributed coat of pulp on an inclined plane will be so affected that the coarser particles, protruding higher into the stream of water, will be moved quicker than the finer particles, and the difference in the speed will be materially augmented if the finer particles by heavier weight adhere closer to the plane. The local separation between particles so described can be still further promoted by imparting to the inclined plane a concussion in a direction rectangular or reverse to the direction of the stream of water, because the heavier particles will thereby be made to become stationary or to recede, but the lighter parts will by such concussion be influenced less or not at all in their progress down the incline with the stream of water.

The above explains the principles on which all apparatus for slime separation are based which treat ores classified by the second mode described. I am well aware that although in accordance as far as principles are concerned with the highest authority on these matters (Ritter von Rittinger), I have preferred to depart entirely from his method of representing them, and I believe thereby to lose nothing in theory, but to be more intelligible to American minds. I also differ herein from Mr. G. Kuestel's mode of representation.

Before describing such apparatus as are in successful use for the purpose specified, I may state that none deserves a general preference. The proper selection depends upon the nature of the ore and its pulp more than on the general preference to be accorded to any of the apparatus. Pulp from ore of crystalline nature or pulp from crushers and rollers will show a different action than pulp from amorphous ore or stamps and pulverizers. The former will consist of particles with sharp edges and corners, and the other of globular particles. Although all apparatus to be described are arranged to accommodate the nature of the ore, one may operate with greater success than another under certain circumstances. I arrange the different apparatus so as to represent the different actions on which they are based:

1. The greater adhesion of smaller and heavier parts than coarser and lighter ones to an inclined plane, under the influence of a light and evenly distributed stream of water.

2. The retarding action of a concussion in its direction on heavier ore particles in motion on an inclined plane under an evenly distributed light stream of water.

3. The combination of the two actions before specified.

These apparatus are, the convex revolving table and the plashen-hearth, the Rittinger double concussion table, and Frue's slime table.

The Convex Revolving Table.

With this apparatus as with all others for the same purpose, it is important,

First, that the pulp be evenly distributed in a thin coat and of a proper consistency.

Second, that the stream of water be a very light one.

Third, that the inclination of the table be the correct one and no other.

The convex revolving table, unlike the Cornish buddle, has no sweepers, but their place is taken by a fine rain, distributed and distributable on the hearth, and forming the medium to wash down the different materials. At *a* is the water supply for the distributor, *c*; *b* is the pulp supply, and *d*, *d* are the rain sweepers; *e*, *e* is the circular gutter having partitions and different outlets, receiving waste and concentrated material. The woodcut is after a photograph of the apparatus.

SEVENTY miners were discharged from the Eureka Consolidated mine last week. This is the result of litigation.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city.

The Superintendent of the Cosmopolitan has quit prospecting and is chiefly engaged with a few men in taking out ore.

The last six days' clean-up of the Eureka (G. V.) mine was 395 ounces of amalgam. In the last end of the stopes the ledge has come in larger and with a fair quality of rock.

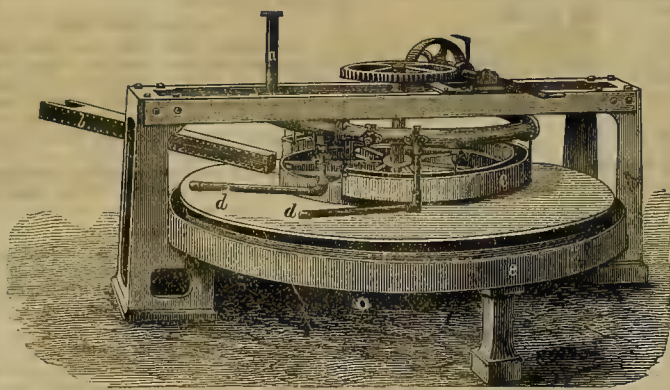
At the Ward work is being rapidly advanced. The road-bed for the side track is nearly completed. The diamond drill was in 100 feet on the east drift of the Gould & Curry, when they were obliged to abandon it on account of having struck a heavy body of water. The pressure was so great and the water so hot that it was impossible for a man to live in the face of the drift. The drill has been removed and the hole

The Martin White mining company shipped 70 tons of bullion on the 5th, valued at \$42,000. This bullion was from the Paymaster and De-fiance mines, in the Ward district, and is the first under the new process of reduction. The company claim that with present facilities they can turn out from \$275,000 to \$300,000 per month.

Testing Roasted Ore.

C. H. A. sends us the following description of an apparatus for testing roasted ore:

The sample of ore to be tested is placed on the filter in the funnel, *A* (see engraving), and the inverted flask, *B*, containing the leaching solution, usually sodium hyposulphite, is suspended over it in such a manner that the longer glass tube, *C*, nearly touches the surface of the ore, represented by the dotted line, *e*. Air enters the inverted flask through the shorter glass tube, *D*, and allows the solution to flow



CONVEX REVOLVING TABLE.

plugged, as they are not prepared to handle any water on the 1700-ft level at present.

The air in the 500-ft level of the Hussey is getting bad. They expect to begin milling ore from the mine in about six weeks.

The following encouraging letter is from the Superintendent of the Alps mine, Ely district: The prospect at the mine is quite encouraging—the Corbus stope in the lower part of the old works is opening up very favorably, and considerable \$100 ore can be taken therefrom; the winze southeast to cut the same vein is looking remarkably well; we have cut through several feeders and ore of excellent quality is coming in on the bottom. The west end of the new development in the Hale lode is looking better than it was at last advice. The streak in the east end, however, has left us. I have great faith in the Alps mine and believe that the 300-ft level could be made to show up a mine could work be prosecuted upon it. Both mills are now running, the Pioche mill running 12 hours each day on custom ore, and the Condor 24 hours on tailings; the tailings have not worked up quite to our expectations until yesterday, when we had results which will make a success of it.

They took little ore out of the California last week on account of being busy with repairs.

The ore producing sections of the Justice, commencing 45 feet above main track floor of the 400-ft level, are looking exceedingly well; from that point to the topmost floor the average width of the vein is fully 12 feet; the ore is also extending in height, showing a strong and well defined vein.

through *C* on to the ore in the filter, till its surface, rising to the dotted line, *f*, closes the air tube, when the flow ceases.

As soon as the surface of the fluid in the filter falls so much below *f* that the weight of the column in *C* preponderates sufficiently over that in *D*, the flow is re-established, and so the leaching proceeds without trouble to the operator, who only has to test the filtrate occasionally to know when the operation is finished.

This apparatus works very nicely, and the fluid flows through the tube with just enough force to stir up the ore on the filter so as to insure the extraction of all soluble silver or other metal. A slight regurgitation of the liquid from the funnel back to the flask, which sometimes happens, is not material.

CERRO BONITO MINES.—Applications were received at the Interior Department two or three years ago from Benjamin Flint and several other Californians, for patents for the Cerro Bonito quicksilver mines, in Fresno county. Pending Departmental action on the applications, Mr. Garraghan filed a protest against them, alleging that the mines are within the exterior boundaries of the Rancho Panoche Grande. The matter thus remained hanging until last week, when Secretary Chandler, as almost the last act of his administration, signed a decision overruling Mr. Garraghan's protest and directing patents to issue forthwith.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Modoc, March 6th, \$5,384.28—total to date, \$10,528.28; Northern Belle, 6th, \$6,500.67; Tybo Con., 6th, \$9,175.35; Northern Belle, March 8th, \$8,608.88; Tybo Con., 5th, \$9,175.35; Grand Prize, 6th, \$8,333; Grand Prize, 12th, \$8,000.

THREE new saw-mills are now building by the North Pacific Coast Railroad Company, between Tyrone and Moscow. This will make five in all, with a capacity of 140,000 feet per day. Mr. Duncan's mills cut 35,000 feet, making a grand total of 175,000 feet per day. These are all to be finished and running by June 1st.

Running Lumber in Flumes.

William H. Thurman, of Borden, Fresno county, has just patented a method of running lumber in flumes, which will be of interest to many of our readers in the mountains. The usual method of running lumber is to place the separate pieces in the flume and allow them to run down by the force of the current, but it is found in practice that the lighter pieces and boards will soon overtake the heavier sticks and partly over-ride them, and in this way several lengths will become jammed in time so as to form a more or less rigid mass, which will become jammed at turns or corners, and this necessitates the employment of a numerous force at long flumes to keep them clear, besides greatly decreasing the capacity of the flume.

In the new method, Mr. Thurman takes any lumber which he may have ready to send down, and piles it up together in lengths, until he has accumulated a bulk suitable to the carrying capacity of the flume. This pile is then secured together in any suitable manner; but the inventor has found a very satisfactory method to be in the employment of a peculiar clamp. This clamp is made of iron of suitable strength, having a body a little longer than the thickness of the pile of lumber to be bound together. The ends are bent so as to extend at right angles with the body and enclose the pile, and these ends have sharpened points bent down. The pile of lumber being made up, the clamps are slipped over the ends, and then the workman takes a piece of wood of a suitable thickness to form a key, and drives it between any of the pieces of the pile. This key forces the pile apart so that the points of the clamps will be firmly secured in the outer boards of the pile and the whole mass will be bound securely together. In order to unite these piles into a gang, pieces of rope are taken and knots made in each end. These knots are placed between the boards of any pile, and when the pile is keyed up the ropes form a loop projecting from the ends of the piles. These loops from the consecutive piles being connected will unite the whole into a gang of any desired length, and these gangs will so fill the flume that they will run down in regular order and never become jammed. It is not necessary in making up the piles to select lumber of any particular size and lengths. Lengths may vary somewhat, it being only necessary to have the outside pieces of the pile the longest.

Another advantage derived from this method is that green heavy lumber that will not float may be moved by putting it into piles with a certain proportion of dry lumber, so that the whole will have sufficient buoyancy to float. Other methods of binding the piles together may be employed, but this inventor has found the clamps and keys best, as by driving the keys out the whole pile is loosened.

These flumes for carrying lumber are some of them of great length, and have varying grades, so that the lumber may run five miles in 12 or 15 minutes, and the next five miles in an hour or more. The flumes are also made of different widths, as at a low incline they must be wider to take all the water from the steeper grades. The great advantages of uniting the lumber into gangs will be readily appreciated. At Mr. Thurman's flume of 51 miles, the lumber runs through in a little over 12 hours, and so regularly that they can always time its arrival within 15 minutes; and where they formerly needed a man to each mile to keep the flume clear, they now have but seven for the whole distance. If they desire to send green lumber that will not float, they simply put it into the gang between enough dry lumber to tow it down.

The practical advantage of this method is very great. In the old way, whenever the lumber is choked in the flume it throws out water, and feeders are necessary at short intervals to keep up the supply. Side flumes must be made so that in a jam the lumber can be switched into these side flumes, from which, after the flume is cleared, it must be thrown bodily into the main flume again. All this is obviated by this method.

A NEW 20-stamp mill is contemplated by the Harrisburg Co. at Silver Reef, Utah.

CORRESPONDENCE.

Mining at Stockton, Jacob City, Etc., Tooele County, Utah.

Stockton is 40 miles west of Salt Lake City, 25 miles of the distance being made by the Utah Western railway, the remainder by Gilmer & Salisbury's stages each daily. As a friend and former pupil, of Paris, Ill., unexpectedly, almost joyfully, met with here, has kindly come to our aid, in the way of notes, and personates us so well, his manuscript is submitted entire with the exception of a few verbal alterations.

My sojourn in Stockton was so limited that I cannot write much concerning it, or its mining interests, which have laid almost dormant for a number of years. The majority of the city belongs to General P. E. Connor, who has a patent for 175 acres of land upon which the city has been built. This gentleman has expended almost a fortune in the development of

The Mines Surrounding Stockton.

And in building furnaces for the reduction of ores—the furnaces proving almost valueless, but the ores are now proving that the General's head was level as to their value.

Among the mines that are now being worked, and with

A Profit to the Owners,

Are the following: The Muscatine, King of Stockton, Continual, Our Fritz, Quandary and Atkins, owned by Atkins & Ostram; the Great Basin, owned by General P. E. Connor; the Iroquois, by P. J. Shoff; the West Extension of Silver King, No. 2, by W. S. Godbe & Co. and the Chicago smelting and mining company. The Legal Tender, Lievnau, Lawrence & Crocker, has paid well, running from 50% to 65% lead and 15 oz. to 20 oz. silver; the Globe, by Lawson & Torneuten; the Madison, by Merwin, Ellis, & Spaulding; the Reno Tunnel, by Thompson & Merwin; the Everlasting, by J. W. Wallace; the Bolivia, by General Connor & James G. Brown; the Katharina, by Alston, Steele & Co.; the Hannah, by Nack & Hoge; the Putnam, by P. L. Shoff; the First National, by Dr. Thompson.

In addition to the above I might enumerate

Over Forty More Claims,

Or prospects, that are down from 50 to 150 feet, which will produce ores, with sampling assays, from 30 oz. to 60 oz. in silver, and from 40% to 75% lead per ton. Upon the whole, from our short visit to Stockton, I must say that I was favorably impressed with the apparent prosperity of its mining interests, and was surprised to find one of my old pupils to be the sole owner of

The Iroquois and Putnam,

Two of the best claims in the district. From what I could learn from reliable sources, the Iroquois has been a paying mine from the jump and the Putnam yields \$60 per ton, but as it is so high up in the mountain, friend Shoff seldom visits it, as he is getting as corpulent as an alderman from the good living he gets at the Eureka hotel, Wm. Willoughby, proprietor. But I must now bid farewell to Stockton and leave for Dry Canyon, where the lucky lessees, Messrs. Callahan & Co., are taking out ore from the Kearsarge mine, from which choice pieces have assayed \$24,000 per ton, and 80 sacks, sampled, \$5,000 per ton; and 60 sacks, \$8,700 per ton. Before setting out for Jacob City, some further facts were furnished by Mr. P. S. Shoff, more particularly in regard to

The Greatest Depth Attained

On some of the principal mines at Stockton, as follows: West extension, Silver King, 480 feet; Muscatine, incline, 420 feet; Iroquois, incline, 190 feet from face of incline; Legal Tender, 120 feet; Great Basin, 265 feet; and the others from 60 to 150 feet. The deeper the mines are sunk the richer the ore. Climate such that the mines can be worked the whole year round. Snow does not lay long on the ground. Mines all accessible for wagons to go almost to the dumps.

The Hidden Treasure Company's Smelting Works

Are located here for the working of the ores from their mine at Jacob City, distant from 10 to 12 miles. In connection with the furnace a fume saver has been erected, 24 feet high, 17 feet long and nine feet wide, the invention of the manager, Mr. Geo. E. Ayres, the principal object aside from saving the dust being the prevention of lead poisoning or any sickness arising from breathing the impurities of the atmosphere surrounding the works. The principal machinery employed is a revolving screw cylinder, and water, the agent for condensing the fumes. If effectual, as represented, it should, for sanitary reasons alone, be introduced generally by the reduction works.

At Rush Lake, two and one-half miles west of Stockton,

The Chicago Smelting Works

Are running two stacks very successfully (and intend to put up a third), reducing from 60 to 70 tons per day, the ore coming from the King of Stockton and the Queen of the Hills (Dry canyon), both valuable and profitable mines be-

longing to the company. In addition, much custom ore is worked, that averages 35% lead and 30 ounces per ton of silver. The gangue of the King, quartz, from 18% to 20% iron and lead 49%. The gangue of the Queen of the Hills is principally lime, with some carbonate of zinc, fluor spar and steatite or soapstone. It is understood that both mines and works have paid very handsome dividends from the outset, which may be put down almost as one of the exceptional cases among the English companies in Utah. Much may be attributed to the ability and energy of Godbe & Co. and to Mr. Ballard, Superintendent of the works, for the unwonted success of their operations.

The Mines About Jacob City,

Perhaps better known as Dry canyon, in consequence of some recent rich discoveries in the Kearsarge mine in particular, and already alluded to, are at present attracting a good deal of attention. Your correspondent had some curiosity to ascertain by personal examination whether or not the actual facts would be found to correspond with the rumors afloat, or with the published accounts in the *Tribune*, some of which have probably made their appearance in the columns of the *MINING AND SCIENTIFIC PRESS*. To this end a visit was made to

The Ira or Kearsarge,

The property of Messrs. Lilly, Lisenring & Co., of Mauch Chunk, Penn., but at present leased and worked by Messrs. Callahan and Vanskiver. During the year 1874 the sum of \$300,000 was mined from a single chamber, since which more or less good ore has been found from time to time, as the developments proceeded, up to about 18 months ago, when a break occurred and the ore deposit lost. The lessees on sinking perpendicularly from the old incline, which had reached the depth of 480 feet, struck the original pipe of ore, giving assays as above represented, and lowest grade bringing in the market as much as \$730 per ton. Average sample assays for first class run as high as \$10,120 per ton, carrying gold to the amount of \$325. Within less than a month about \$27,000 worth of ore has been mined, and present developments show sufficient ore of similar character to insure each of the lessees a rich harvest for his labor before the expiration of the lease. The character of the ore is principally chloride and sulphide of silver.

The Tessora,

Owned by S. E. Bright, located about 300 feet east of the Kearsarge, and claimed to be on the same vein. An incline of 30 feet lays open some rich ore, carrying horn silver, assaying upwards of \$600 to the ton and represented to be in every respect similar to the bonanza last mentioned.

The Alabama, Balsam and Dry Pine,

The property of an Omaha company, are situated on the same hill. A shaft has been sunk 100 feet and a tunnel run 200 feet, with drifts in each direction along the vein, which varies in width from 12 inches to three feet. Character of ore, carbonate and galena, said to contain from 35% to 60% lead and from \$30 to \$90 silver.

The Deseret Mine,

Owned by Mr. S. Chamberlain, of Cleveland, Ohio, is one of the leading mines of the district, and at present making shipments of from 40 to 60 tons per month of excellent silver ore (chloride and sulphide), represented to run from \$200 to \$500 per ton.

The Mono Mine,

One of the most prominent as well as one of the most promising in the camp, is under the superintendence of Mr. M. T. Gisborn, of Salt Lake, who also holds a half interest, the other half being owned by a gentleman in New York. Incline 650 feet, 12 levels; ore vein from one to four feet, all of which is mined and gives working average of \$400 per ton—two small lots, first class, running as high as \$8,000. Character, horn silver, together with sulphide and bromide and other varieties of silver ore, also some carbonate of lead and galena.

The mine was reopened about a year ago, after being idle for some time, since which it has been thoroughly retimbered as far as the works have advanced and put in good shape for future working. In accordance with statements from the Superintendent the prospect is flattering, the ore improving, that at present depth estimated to be worth probably somewhere from 500 to 800 ounces silver per ton.

The Jenny Lind,

On Forest hill, free milling and high grade ore, different from most of the ores of the district, worth (working test) from \$100 to \$500 per ton; vein near surface from 10 inches to three feet. The Modoc and Faro on the same hill are of the same character. The hill has not been much prospected and is thought by some to be an inviting field for the employment of a little idle capital.

The I X L. On Shoo Fly Hill,

The property of Messrs. Tiernan, Marshall and Royle, is situated immediately below the Ira, and one of the oldest locations on the hill. Work is progressing, and it is said to give every indication of developing into one of the most promising on the hill. The Pocahontas, owned by Mr. J. Tiernan, has a fine large body of ore, between the lime and slate, and is also thought to be promising, being on the same reef as

The Hidden Treasure.

This large and important mine of the district lies on the opposite side of the canyon from the Mono. Incline on vein, 1,000 feet, 8,000 feet

in levels and inclines. Average width of vein, four and a half feet, opening in places to 24 feet of galena and carbonate ores, that need no flux and work about 30 ounces in silver and 45% lead. If selected, first-class would run 50 ounces silver and as high as 70% lead. The yield last year amounted to 12,000 tons, and it is said to be the only mine that has been able to run a furnace solely on its own ores. It is understood to be paying property, and is giving employment to a large body of men. The Fourth of July, in the same neighborhood, has a face of similar ore, averaging \$60 per ton and 50% lead, paying the lessees well. Before entering upon the details of

Mining Operations at Ophir,

Something of the somewhat peculiar geological aspects of the vicinity may not be out of place. The general formation is limestone. The dip of the strata on one hand to the east and on the other to the west, points to some great ancient upheaval, causing at this point a complete and regular curvature in the sedimentary beds, with longitudinal axis north and south.

A large ravine enters the deep canon at Ophir from the north, following the center line of the upheaval, cutting the strata and exposing for a considerable distance the quartzite, and above it the slaty shale of the Lower Silurian, (Salt Lake *Tribune*, January 1st) from the trilobites, spirifers and other fossils found in the shale beds.

A porphyry dyke 150 feet wide and cropping out in places from 11 to 15 feet above the surface in grotesque forms, spires and pillars, extends northeasterly from the vicinity of Ophir for many miles, crossing Dry canyon, and at other points disappearing from sight, its continuance, nevertheless being determined by the different underground explorations on the line of its course, and the cause no doubt of the breaks, faults and other local disturbances of some of the veins in the neighborhood.

Owing to the temporary suspension of some of the best mines at Ophir at the time they were visited, many interesting facts in regard to their operations were not noted. In fact, the same or a similar remark may be made in regard to most of the districts, and generally only a sketch can be given. In no case let it be imagined that an exhaustive report is intended.

On the south side of Ophir hill, from the Hidden Treasure is

The Gray Rock Lode,

A true fissure vein, with four feet between walls, that has been worked to the depth of 300 feet, and a large amount of ore extracted, running high in lead when properly assorted, and probably 30 ounces in silver. The whole of the matter can be used as flux, which adds greatly to its value.

The McCullen has two feet of carbonate ore—medium grade—and the Great Eastern four feet of similar ore.

The Buckhorn

Has large deposits of sulphide of lead and carbonate ore, in some places as much as 30 feet in width, giving 30% lead, and from 20 oz. to 30 oz. in silver, containing some good streaks of ore of a much higher grade.

The Mineral King

(Bliss & Co.), has been worked uninterrupted since last August, during which time 120 tons of ore have been shipped, running from 33% to 37% lead and 35 oz. in silver; average width of ore vein 18 inches, with foot wall of porphyry, and the other of limestone. Greatest depth from surface, 100 feet.

The Giraffe,

Also the property of Bliss & Co., and 200 feet lower on the same hill, has two feet of argentiferous galena, carrying 40% lead, and 60 oz. silver, one shipment to Reno going as high as 69 oz. in silver. A shaft has been sunk 56 feet, and tunnel extended on the vein 128 feet, with the view of making connection with shaft at the depth of 300 feet from surface, requiring a further run of 196 feet: The ore is carried from both mines to ore-house on the road below in a chute, whence it is hauled, without sacking, to the smelting furnaces at Rush Lake.

The Lily Rose

(I. Roland). A fissure vein from six to eight feet between walls, and cropping out on the surface the distance of 600 feet, with 18 inches of good smelting ore, containing 30% iron, 100 tons shipped brought 35 oz. in silver and 32% lead. The Brethel, on Chloride hill, also the property of Mr. I. Roland, has a vein from six to eight inches of chloride ore, running upwards of \$100 in silver. The Roland, owned by same, is situated a little below Ophir in the quartzite, and is opened by a tunnel 110 feet, showing three feet of galena, with from 25 to 30 oz. silver, with, perhaps, 40% lead.

The Bonanza,

Lying between the slate and the limestone, has an immense body of low grade ore. Sulphurets of iron are found in considerable bodies, which will probably pay well with proper facilities for reducing this character of ore. The mine is said to have paid fairly and continuously.

The Miners' Delight shipped last year 3,800 tons of ore to the furnaces at Rush Lake, and thousands of tons of low grade ore are at present laid open by the different tunnels and drifts.

The Resuscitator, shaft 100 feet and a level run shows four feet of vein matter between walls—character of ore mostly galena and carbonates, with about \$600 worth on the dump.

The San Joaquin

(H. W. Lawrence), has an incline of 325 feet on

the vein, which varies from 15 inches to three feet. At present there are two feet of very high grade ore, sampling about \$800 per ton in silver (free milling). The mine is paying, but how well was not ascertained, not wishing to pry too far into private business, but probably quite handsomely, judging from the amount and value of the ore.

The Monarch,

On Lyon hill, owned by Messrs. Lawrence & Cliff, and opened by tunnels, shows chambers of chloride and milling ore from 3 to 30 feet in width; first-class sampling from 125 oz. to 250 oz., and second-class from 50 oz. to 60 oz. It is classed among the best paying mines in the district.

In consequence of works suspended on some of the principal mines, and other causes not likely to occur, this camp was unusually dull. It was thought, however, that new life would be infused on the resumption of work, and a prosperous season was anticipated. The surface indications for mineral bearing veins could not be better.

A. C. K.

The "Lieu Lands."

The bill confirming title to California school indemnity selections was signed by the President on March 1st, and became a law. It will have the immediate effect of quieting title to several hundred thousand acres of the most valuable lands in the State, preventing an otherwise incalculable amount of litigation and disturbance of property interests. A dispatch from Washington gives the following account of the passage of the bill. "Notwithstanding their failure to defeat the passage of the bill, the jumpers and their Washington attorneys made desperate efforts to prevent its approval by the President. Eighty of the Los Angeles jumpers telegraphed to the President, earnestly requesting him to veto the bill on the ground that it would deprive them and other honest settlers of homes and other valuable improvements. He therefore referred it to the Interior Department for examination and advice as to whether he should approve it or not, and Judge Widney, who, as the representative of the State titles, has spent nearly a year in procuring the passage of the bill, found himself last week obliged to encounter seven or eight attorneys in a two-days' argument before the Commissioner of the General Land Office on the whole merits of the question.

We append the text of the bill:

SECTION 1. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the title to the lands certified to the State of California, known as indemnity school selections, which lands were selected in lieu of 16th and 36th sections, lying within Mexican grants, of which grants the final survey had not been made at the date of such selection by said State, is hereby confirmed to said State and its vendees, in lieu of the 16th and 36th sections, for which the selections were made.

SEC. 2. That where indemnity school selections have been made and certified to said State, selection shall fail by reason of the land in lieu of which they were taken not being included within such final survey of a Mexican grant, or are otherwise defective or invalid, the same are hereby confirmed, and the 16th or 36th section in lieu of which the selection was made, shall, upon being excluded from such final survey, be disposed of as other public lands of the United States: Provided, that if there be no such 16th or 36th section, and the land certified therefor shall be held by an innocent purchaser for a valuable consideration, such purchaser shall be allowed to prove such facts before the proper land office, and shall be allowed to purchase the same at \$1.25 per acre, not to exceed 320 acres for any one person: Provided, that if such person shall neglect or refuse, after knowledge of such facts, to furnish such proof and make payment for such land, it shall be subject to the general land laws of the United States.

SEC. 3. That the foregoing confirmation shall not extend to the lands settled upon by any actual settler, claiming the right to enter not exceeding the prescribed legal quantity under the homestead or pre-emption laws: Provided, that such settlement was made in good faith upon lands not occupied by the settlement or improvement of any other person, and prior to the date of certification of said lands to the State of California by the Department of the Interior; and provided further, that the claim of such settler shall be presented to the Register and Receiver of the District Land Office, together with the proper proof of his settlement and residence, within 12 months after the passage of this act, under such rules and regulations as may be established by the Commissioner of the General Land Office.

SEC. 4. This act shall not apply to any mineral lands, nor to any lands in the city and county of San Francisco, nor to any incorporated city or town, nor to any tide, swamp or overflowed lands.

The Engineer says: The first Bessemer rail ever run over by cars was laid down in Derby Station, Eng., early in 1857. It was a double-headed rail, and kept its place for 16 years, though 500 trains daily passed over it during that space of time.

MECHANICAL PROGRESS.

English Patent Law Reforms.

We have alluded before to the agitation which now prevails in England over proposed changes in the patent law. Of one mooted measure, *Iron*, after finding many faults, notes the good points thus: "Some of the wiser and better provisions of the bill are as follows: The reduction in the fees is a most important point, and this concession to the poorer class of inventors should be received with gratitude. Until the new scheme gets to work—if it ever does—it cannot be said whether the benefit will not be illusory, from the additional cost of procedure, in cases where the examiners report adversely and the applicant has to appeal to the Chancellor; but at any rate the reduction is a step in the right direction, and the way in which it is proposed to levy the fees, lightly at first and more heavily afterwards, is a sensible one. Other parts of the bill are also good—the surrender of crown rights over patents, the abolition of the cumbersome procedure of *scire facias* for the revocation of a patent, and the substitution of a simple petition to the Lord Chancellor, the extension of the period of provisional protection to 12 months instead of six, the facilities given for extension of time in case of the accidental omission to apply for a renewal. These and some other minor points are all steps in the right direction; but, after all, they are but small steps, and the question arises whether it is worth while to take so much trouble for so little."

In the same connection we read that a memorial, identical with one some time since presented by the Society of Arts, but now signed by 1,150 persons, more or less interested in Patent Law Reform, has been presented to the Lord Chancellor. It states that under the provisions of the "Patent Law Amendment Act, 1852," the Lord Chancellor, the Master of the Rolls and certain law officers of the crown therein named, together with such other persons as her majesty the Queen should appoint are made Commissioners of Patents, with full powers, as therein specified, to conduct the business of granting letters patent for inventions and to make regulations for the administration of the Patent Office. That up to the present time the provisions of the foregoing act, authorizing the appointment of one or more persons as Commissioners of Patents, in addition to the *ex officio* Commissioners, have not been acted upon, no additional Commissioners, as contemplated by the act, have been appointed, and thus the whole business of the Patent Office falls upon the *ex officio* Commissioners, who are already overburdened with other important and heavy duties. The memorial recommends the appointment of one or more additional Commissioners of Patents, to whom might be entrusted the full carrying out of the duties of the office and who shall be responsible for the same, and that no further legislation be attempted until after such Commissioners have been appointed and the system contemplated by the act administered in its integrity.

An English Straw-Burner.

As the subject of straw-burning engines is of wide interest on this coast we quote from an English paper a description of a contrivance which is used by engine builders in that country. The contrivance described is manufactured by Messrs. Ransomes, Sims & Head, of Ipswich, Eng. The apparatus for feeding the straw, reeds, and other fuel into the fire box consists of two toothed rollers placed at a minimum distance of about one-fourth inch apart, and capable of rising so that the distance between them can be increased to one and one-fourth inches. The under roller is set in motion by means of a strap from the crank shaft of the engine, and makes about 45 revolutions per minute. The upper roller moves at the same speed, and is connected with the under one by means of long toothed wheels. The rollers are carried on a cast-iron frame, to the front of which is attached a trough for holding the supply of vegetable fuel to be fed into the furnace. The rectangular space between the rollers, which serves as a passage for the fuel into the boiler, is placed from four to five inches above the fire bars, this distance having been found by experience to give the best results, as by injecting the fuel at this point the fresh substance forces its way into the center of the burning mass inside the fire box, and ignites more quickly than when it falls on the top of the fire. The theory of the invention is, that by means of a continuous mechanical feed, the fuel can be forced into the furnace in a thin stream in the form of a fan, and the fresh fuel is practically held in suspension for a short time, allowing the separate stalks to become immersed in the flames, and the long pieces of straw, reeds, or brush-wood to have the effect of stirring up the half-burnt material in the furnace, thus keeping the whole in motion, besides permitting a proper ingress of atmospheric air, which is necessary for the rapid combustion of vegetable matter.

THE EXHIBITION OF 1878.—The number of Parisian exhibitors at the international exhibition, to be held at Paris in 1878, exceeds by 2,000 the corresponding number of Parisian exhibitors at the great French show of 1867. The works of construction are proceeding rapidly in the Champ de Mars and the Trocadero.

Mechanical Progress in Germany.

Thirty-six years ago, says Mr. Geo. Thomas, mechanical engineer, there was not a single locomotive or wagon works in the kingdom; but all locomotives were imported from England, save some few from America. At the present time there exists in Berlin, Hanover, Chemnitz, Cassel, Carlsruhe, Esslingen and other towns, extensive locomotive works, which produce together nearly 1,500 locomotives yearly, representing a value of about three million sterling. Borsig, of Berlin, turned out 1,031 locomotives within the six years from April 1st, 1867, to April 1st, 1873, of which 300 were sent to Russia and 30 to Austria, Holland and Java. Without stopping to inquire why those 300 locomotives were sent by one German firm to Russia, etc., and why they commenced successfully to compete with our English makers in Java, we certainly cannot, as a nation of free traders, deny them the right to do so; but at the same time it is not selfish on our part to examine the causes of successful competition. Those engineers and merchants make the best progress who have an ever-watchful eye to such opposition, and we must, in all branches of our industry, always endeavor to keep ahead of our rivals. Borsig has, up to 1875, exceeded the number of 1,700 locomotives. Unfortunately Borsig has cut some of our own locomotive constructors out during the past two years in Sweden, and in a most formidable manner, too, having sold more than fifty locomotives there.

Germany manufactures yearly upwards of 30,000 railway wagons, representing a value of \$4,500,000, many being for export, principally for Russia. In this branch iron has replaced wood to a great extent, and they possess many specialties; for instance, the almost universal use of cast steel instead of iron; of cast steel axles of splendid quality (first made in Carlsruhe); Krupp invented an ingenious process of fixing on cast steel wheel tires, and Meier, of Bochum, casts splendid cast steel disc wheels in one piece.

MECHANICAL NOMENCLATURE.—A mechanic writes to the *Polytechnic* in the following pertinent way: "There is no reason why the name of a tool or a part of an engine or machine should not indicate or to some degree denote the nature or the use of the thing designated. And yet such is far from being the case. Let us take for example the tools by which hexagons or square heads are screwed home. Such a tool for use on a nut is called in England a spanner, because it spans the nut and is open at the end. If it is closed at the end it is called a box spanner. If it is constructed so that one jaw will shift or move, it is called a shifting spanner. If, on the other hand, it has a square hole in it (such as is used for taps), it is called a wrench. In the United States, as applied to a nut, it is called a wrench; as applied to a tap, it is a tap-wrench; and if adjustable, it is termed a monkey-wrench; while a tap-wrench is called a one-ended or a two-ended wrench, according to whether the hole is in the middle of the length or near one end—the English term under those circumstances being a single or double wrench. Why should the device used in small lathes to drive the work be called a dog, when the English term driver, or carrier, is so much more appropriate? Why, on the other hand, should the lower half of an axle box be called a keep instead of a cellar? Why, indeed, should a crank-pin be called a wrist-pin, or a coupling rod a parallel rod? Echo answers "why?"

THE AMERICAN WORKINGMAN.—The American workingman must live in a house, not a hut; he must wear good clothes and eat wholesome and nourishing food. He is an integral of the municipality, the state and the nation, subject to no fetters of class or caste; neither pauper, nor peasant, nor serf, but a free American citizen. He has the ballot, and if it were possible it would be dangerous to degrade him. The country stands pledged to give him education, political power, and a higher form of life than foreign nations accord their laborers, and he must be sustained by higher rates of wages than those of Europe. Our industries, operated by American citizens, must be freed from foreign interference, and organized into a distinct American system, which will exact some temporary sacrifices, but result in general prosperity and true national independence. In maintaining diversified industries we utilize every talent, provide a field for every capacity, and bind together the whole people in mutual dependence and support, assuring strength and security to our Republic.—*Hon. D. J. Morrell.*

ATTENTION TO MACHINERY.—In looking through different manufacturing establishments one cannot fail to notice the difference in the care and attention paid to the use of machinery. In some you will find a mass of patched up belts, looking as though the next revolution of the shaft would tear them asunder; the line shaft rocking to and fro and wabbling around in several of the hangers, reminding you that at any moment some part of it was very likely to give way; some loose pulley on a counter-shaft making such a rattling noise you could scarcely make persons hear you though standing close to them. Thus from one part of the establishment to another you would find everything in a dilapidated condition, causing you to come to the conclusion that there was but little system or business about the proprietors and no prospect of their succeeding in the business, and in fact only injuring the trade of first-class factories by poor work at low rates.—*Mech. Jour.*

SCIENTIFIC PROGRESS.

The Barometer and Mine Explosions.

The European engineers are tracing a connection of much scientific interest, between the falling of the barometer and fire-damp explosions in coal mines. Mr. Zimmerman, a Belgian engineer, holds that "Explosions of fire-damp generally occur simultaneously with a rapid fall of the barometer." Calculations prove also that this coincidence is not merely fortuitous, but that a diminution of atmospheric pressure is, as a rule, the prime cause of calamities of this nature. Taking the daily readings of the barometer for 16 years ending Jan. 4th, 1877, the lowest readings invariably occur in the four winter months—that is, November, December, January and February; and it is worthy of notice that we have had very low readings during the past three months, and several explosions of gas have occurred during the same period, and it may reasonably be concluded that the views of the Belgian engineer are really correct, although we may not have a sufficient collection of statistics to enable us to affirm this positively. The expression, however, that sudden falls of the barometer and reduction of atmospheric pressure are the cause of these explosions is not strictly correct. The cause really is that accumulations of gas have been made in some part of the workings and a sudden change of atmospheric pressure induces or allows those pent up gases to escape out of the working places or roads of the mine. If this occurs, then the exposure of a naked light brings on the catastrophe.

OLD SEA MARGINS.—At the late meeting of the Edinburgh Geological Society, Mr. David Milne Home, read a paper on "Old Sea Margins." He stated that he had been in the custom of taking a note of old sea margins wherever he came across one, and now he had put together the result of his notes during the past 20 years. He considered that it would be taken for granted that the sea had covered this country at different levels. This might be inferred from the fact that sea shells had been found up to the height of 500 feet, and that immense beds of sand and water-worn gravel had been also discovered at great heights, particularly in the Highlands. The horizontal lines formed on the mountain sides also showed old sea levels. On the west coast of Scotland he had seen at about a dozen places a sea margin at the height of 11 feet. On the Firth of Clyde he had noted half a dozen at the same height, and about a dozen on the east coast. A beach 26 feet high and another 40 feet high were seen at about a dozen places on both sides of the country. Old beaches were also observed at the height of 50 feet, 70, and 90, to 100 feet. There were beaches at even vastly greater heights, he himself having seen two lines 1,500 feet high at Glenelg and Lochaber, and one 1,800 feet high at Glenroy. Mr. Ferguson, F. G. S., of Kinmundy, gave his American observation, which similarly proved that high old beach-lines obtained there also.

ASTRONOMICAL NOTES.—Dr. Henry Draper, of this city, says the *New York Independent*, and Mr. Huggins, in England, have been simultaneously at work upon the photography of stellar and planetary spectra. They have both obtained good and very interesting impressions of the spectrum of Vega (a Lyrae), which shows peculiar broad dark bands, quite unlike anything in the solar spectrum. Dr. Draper finds that the spectrum of Venus exhibits at the purple extremity the same sort of weakening in photographic power which is observable in the spectrum of the sun near sunset. On December 28th the observatory at Wilna, in Russia, was burned. The large refractor and photo-heliograph were destroyed and only books and instruments of minor value were saved. The observatory has been of late years doing very valuable work in astronomical physics, especially in the line of solar photography, and its destruction is a serious loss to science.

LIFE ON TITICACA.—Late numbers of the *Bulletin* of the Museum of Comparative Zoology of Cambridge give the results of Prof. A. Agassiz and Mr. S. W. Garman's exploration of Lake Titicaca, undertaken during the earlier months of last year. The mammals and birds are elaborated by Mr. J. A. Allen, with Mr. Garman's field notes. None of the ten species of mammals are new; four of them are llamas. Among the birds, of which 69 species were collected, there are several novelties, and would have been more had not various collectors been in the same field a little before and had not their discoveries been promptly published in the English *Ibis* and Cabani's *Journal fuer Ornithologie*. Mr. Walter Faxon elaborates the crustacea, describing and figuring several new species, all, with one exception, belonging to a single amphipodous genus.

WILLOWS AND STREAMS.—Lester Ward, in a very interesting article on local distribution of plants, in the *Popular Science Monthly*, suggests that the willow, the alder, the elm and the sycamore hug the banks of streams because baffled and beaten back at every attempt to invade drier ground. There is no doubt a struggle for supremacy going on in nature, as well as a struggle for life; and yet the one point is in a great measure involved in the other.

FRENCH INVESTIGATIONS OF DUST.—We learn from foreign journals, says the *Journal of Chemistry*, that at the suggestion of the Municipal Administration of Paris, M. Marie Davy is carrying on, at the Meteorological Observatory of Montsouris, a regular study of the dust found in the air, on the ground, or in water, collected in the principal quarters of Paris. These powders will be sent to the observatory and regularly examined by M. Miquel. Some preliminary observations were lately made on the infirmaries connected with the Prince Eugene Barracks, which were recently evacuated with a view to disinfection. On scraping the floor of some of the wards that had been occupied a few days, a dark powder was got, which, put into pure water and under the microscope, showed a multitude of filiform vibrones, with slow undulatory motion, and at the center some vibrating points which changed places rapidly. The frames of some of the windows gave a specially large number. Various algae, bacteria, monads, etc., were met with. While the troops were there, and especially in dry weather, there can be little doubt that these powders would be raised by the tramping of their feet, or by their clothes, and would mix with the respired air, as also with the food and drink. M. Davy indicates some precautions that ought to be taken in barracks in view of these facts.

NEEDS OF A UNIVERSITY.—President Gilman, of Johns Hopkins University, has been speaking of the office and work of a true university. He says that "three by-laws should be passed—that no waste of time should be allowed within its walls, that there should be no disparagement of any branch of learning, and that character is before knowledge. Not what one knows, but what he is, should be the criterion. The first requisite of such a university is brains—a large number of learned teachers, who must also be ready to teach and skilled in teaching. The day is passed when the same teacher can teach everything. Other requisites are choice collections of books, apparatus, etc.; good plans; method and harmony; good working places, as laboratories, etc.; and, last, a good body of enthusiastic students."

NEW FISH.—An ichthyological discovery of the utmost importance has lately been communicated by Prof. W. Peters to the Royal Academy of Science of Berlin. This is a second genus and species of the wonderful order of *Lepidocardi*, or brainless fishes, the so-called invertebrate vertebrates. This order, which some naturalists rank as one of the primary divisions of vertebrata, has hitherto been known to be represented by the single genus *Amphioxus*, which comprehends the various supposed species of lancelets. The new animal is closely related the *Amphioxus*, but wants both caudal and anal fins, and has, instead, a high dorsal fin. The *Epiomethys cutellus*, as the creature is called, was dredged in eight fathoms, near Peale island, Moreton bay, Australia.

INSECT NERVES.—The nervous system of the *Hymenoptera* (bees, wasps, ants, sawflies, etc.) has been studied by E. Brandt. He describes certain pedunculate bodies whose development, as originally discovered by Dujardin, corresponds with the degree of development of the instincts and intelligence in the different species. Brandt's researches now enable him to prove that this is the case also for the different sexes of the same species. Thus in the worker of the honey bee they are of immense size, while they are slightly developed in the queen and in the males.

WEIGHT OF AN ATOM.—On the absolute weight of atoms, a lecture experiment by J. Annanheim, is as follows: Dilute solutions of fuchsin were examined, and it was found that 0.00000002 gram. of the substance can be detected by the naked eye. If we assume that in a drop of the solution there is one molecule of fuchsin, and at least this amount must be present, the weight of an atom of hydrogen would be 0.0000000059 gram. A similar experiment with cyanine gave similar results.

A GASQUAKE.—A Pennsylvania paper says: It is rather a strange freak for the bed of a creek in this part of the country to be heaved up 20 feet, but the story may be true, nevertheless. Twenty feet of the bed of Dunkard creek, Greene county, Pa., near the Wiley oil well, was upheaved a few days ago by an internal convulsion of some kind, supposed to have been caused by gas. At the same time several old and deserted oil wells commenced to flow slightly again.

RAINFALL IN ENGLAND.—E. J. Smith, President of the English Institution of Surveyors, says that measurements are now being made daily at 1,500 stations in the United Kingdom, and at longer intervals at about 300 others. Taking the country generally, July and October might be regarded as the wettest months—July owing to the very large amounts often falling during thunder storms, and October from frequent steady rains; while the least falls in April and May.

UTILIZATION OF FISH BONES AS FERTILIZERS.—German manufacturers are continually engaged in purchasing fish bones, gathered along the Norwegian shores near extensive fish-curing establishments. These are pulverized and converted into fertilizers. It is suggested that arrangements be made for utilizing the bones from the establishments in Newfoundland.—*Manufacturer and Builder.*

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Feb. 22.	Week Ending Mar. 1.	Week Ending Mar. 8.	Week Ending Mar. 15.
Alpha	21 19	20 19	19 19	17 17
Andes	13 13	13 13	13 13	13 13
Baltimore Con.	13 13	13 13	13 13	13 13
Belcher	13 13	13 13	13 13	13 13
Best & Belcher	13 13	13 13	13 13	13 13
Bullion	13 13	13 13	13 13	13 13
Caledonia	13 13	13 13	13 13	13 13
California	13 13	13 13	13 13	13 13
Chollar	13 13	13 13	13 13	13 13
Confidence	13 13	13 13	13 13	13 13
Con Imperial	13 13	13 13	13 13	13 13
Con Virginia	13 13	13 13	13 13	13 13
Crown Point	13 13	13 13	13 13	13 13
Coso Con.	13 13	13 13	13 13	13 13
Dayton	13 13	13 13	13 13	13 13
Eureka Con.	13 13	13 13	13 13	13 13
Exchequer	13 13	13 13	13 13	13 13
Gen Thomas	13 13	13 13	13 13	13 13
Grand Prize	13 13	13 13	13 13	13 13
Gila	13 13	13 13	13 13	13 13
Golden Chariot	13 13	13 13	13 13	13 13
Gould & Curry	13 13	13 13	13 13	13 13
Hale & Norcross	13 13	13 13	13 13	13 13
Hussey	13 13	13 13	13 13	13 13
Justice	13 13	13 13	13 13	13 13
Kentuck	13 13	13 13	13 13	13 13
K K Con	13 13	13 13	13 13	13 13
Knickerbocker	13 13	13 13	13 13	13 13
Kossuth	13 13	13 13	13 13	13 13
Lady Wash	13 13	13 13	13 13	13 13
Leadville	13 13	13 13	13 13	13 13
Leviathan	13 13	13 13	13 13	13 13
Leeds	13 13	13 13	13 13	13 13
Modoc	13 13	13 13	13 13	13 13
Mountain	13 13	13 13	13 13	13 13
Meadow Valley	13 13	13 13	13 13	13 13
Mexican	13 13	13 13	13 13	13 13
North Con Virginia	13 13	13 13	13 13	13 13
New York	13 13	13 13	13 13	13 13
Northern Belle	13 13	13 13	13 13	13 13
New Coso	13 13	13 13	13 13	13 13
Occidental	13 13	13 13	13 13	13 13
Ophir	13 13	13 13	13 13	13 13
Overman	13 13	13 13	13 13	13 13
Pacific	13 13	13 13	13 13	13 13
Phil Sheridan	13 13	13 13	13 13	13 13
Prospect	13 13	13 13	13 13	13 13
Raymond & Ely	13 13	13 13	13 13	13 13
Rock Island	13 13	13 13	13 13	13 13
Sage	13 13	13 13	13 13	13 13
Seg Belcher	13 13	13 13	13 13	13 13
Sierra Nevada	13 13	13 13	13 13	13 13
Silver Hill	13 13	13 13	13 13	13 13
Silver Chariot	13 13	13 13	13 13	13 13
Succor	13 13	13 13	13 13	13 13
Trojan	13 13	13 13	13 13	13 13
Union Con.	13 13	13 13	13 13	13 13
Utah	13 13	13 13	13 13	13 13
Wells Fargo	13 13	13 13	13 13	13 13
Woodville	13 13	13 13	13 13	13 13
Yellow Jacket	13 13	13 13	13 13	13 13

Sales at S. F. Stock Exchange.

FRIDAY, A. M. MAR. 9.	00 Challenge	2
30 Alta	1.30	50
115 Alpha	1.10	45
175 Andes	1.30	15
380 Best & Belcher	1.30	34
300 Belcher	1.30	34
410 Bullion	1.18	13
540 Baltimore Con.	1.18	13
1115 Con Imperial	1.18	13
455 Crown Point	1.18	13
1115 California	1.18	13
2420 Con Virginia	1.18	13
50 Chollar	1.18	13
1020 Caledonia	1.18	13
850 Exchequer	1.18	13
550 Gould & Curry	1.18	13
390 Hale & Norcross	1.18	13
785 Justice	1.18	13
100 Kossuth	1.18	13
1010 Lady Bryan	1.18	13
590 Lady Washington	1.18	13
540 Leviathan	1.18	13
325 Mexican	1.18	13
330 Mint	1.18	13
115 New York	1.18	13
700 North Con Vir.	1.18	13
235 Ophir	1.18	13
130 Overman	1.18	13
300 Prospect	1.18	13
100 Phil Sheridan	1.18	13
50 Succor	1.18	13
700 Savage	1.18	13
100 Sierra Nevada	1.18	13
55 Silver Hill	1.18	13
380 Trojan	1.18	13
40 Utah	1.18	13
135 Union	1.18	13
100 Ward	1.18	13
700 Woodville	1.18	13
600 Yellow Jacket	1.18	13
AFTERNOON SESSION.		
25 Alps	1.18	13
495 Belmont	1.18	13
30 Best & Belcher	1.18	13
75 Bullion	1.18	13
300 Caledonia	1.18	13
900 Con Imperial	1.18	13
950 Con Virginia	1.18	13
170 California	1.18	13
45 Crown Point	1.18	13
200 Coso Con.	1.18	13
300 Empire Id.	1.18	13
445 Eureka Con.	1.18	13
490 Exchequer	1.18	13
545 Grand Prize	1.18	13
400 Gold Chariot	1.18	13
500 General Thomas	1.18	13
50 Gila	1.18	13
230 Gould & Curry	1.18	13
100 Harrisburg	1.18	13
1050 Hussey	1.18	13
545 Leopold	1.18	13
780 Leeds	1.18	13
605 Modoc	1.18	13
170 Manhattan	1.18	13
110 Meadow Valley	1.18	13
20 Mexican	1.18	13
485 Northern Belle	1.18	13
350 New Coso	1.18	13
410 Ophir	1.18	13
300 Overman	1.18	13
500 Poorman	1.18	13
500 Prussian	1.18	13
150 Raymond & Ely	1.18	13
275 Rye Patch	1.18	13
25 Sierra Nevada	1.18	13
200 Utah	1.18	13
100 Alpha	1.18	13
175 Andes	1.18	13
300 Best & Belcher	1.18	13
75 Belcher	1.18	13
600 Bullion	1.18	13
180 Baltimore Con.	1.18	13
10 Belmont	1.18	13
1485 California	1.18	13
1420 Crown Point	1.18	13
40 Chollar	1.18	13
490 Con Virginia	1.18	13
1875 Con Imperial	1.18	13
15 Caledonia	1.18	13

150 Gould & Curry	1.18	13
200 Grand Prize	1.18	13
80 Hale & Norcross	1.18	13
150 Harrisburg	1.18	13
300 Jackson	1.18	13
225 Justice	1.18	13
550 Leeds	1.18	13
60 Leopold	1.18	13
140 Manhattan	1.18	13
480 Modoc	1.18	13
80 Mexican	1.18	13
250 New Coso	1.18	13
445 Northern Belle	1.18	13
130 Ophir	1.18	13
100 Overman	1.18	13
600 Panther	1.18	13
100 Rye Patch	1.18	13
30 Savage	1.18	13
130 Sierra Nevada	1.18	13
135 Union Con.	1.18	13
150 Utah	1.18	13
TUESDAY, A. M. MAR. 13.		
1145 Con Virginia	1.18	13
80 Alpha	1.18	13
320 Andes	1.18	13
180 Belcher	1.18	13
140 Best & Belcher	1.18	13
250 Bullion	1.18	13
85 Baltimore Con.	1.18	13
195 Caledonia	1.18	13
585 Crown Point	1.18	13
1145 Con Virginia	1.18	13
570 Con Imperial	1.18	13
455 California	1.18	13
10 Chollar	1.18	13
850 Dayton	1.18	13
320 Exchequer	1.18	13
410 Gould & Curry	1.18	13
200 Hale & Norcross	1.18	13
270 Julia	1.18	13
100 Justice	1.18	13
80 Kentuck	1.18	13
410 Kossuth	1.18	13
25 Lady Bryan	1.18	13
795 Leviathan	1.18	13
250 Lady Wash	1.18	13
340 Mexican	1.18	13
350 North Con Vir.	1.18	13
150 Ophir	1.18	13
810 Overman	1.18	13
50 Phil Sheridan	1.18	13
205 Savage	1.18	13
410 Sierra Nevada	1.18	13
55 Silver Hill	1.18	13
850 Trojan	1.18	13
330 Utah	1.18	13
115 Union Con.	1.18	13
200 Wells Fargo	1.18	13
140 Woodville	1.18	13
130 Yellow Jacket	1.18	13
AFTERNOON SESSION.		
50 Alps	1.18	13
10 Belcher	1.18	13
170 Chollar	1.18	13
120 Best & Belcher	1.18	13
160 Bullion	1.18	13
110 Caledonia	1.18	13
55 Chollar	1.18	13
335 California	1.18	13
350 Con Imperial	1.18	13
430 Con Virginia	1.18	13
330 Crown Point	1.18	13
190 Empire Id.	1.18	13
285 Exchequer	1.18	13
190 General Thomas	1.18	13
260 Grand Prize	1.18	13
55 Gila	1.18	13
370 Golden Chariot	1.18	13
120 Gould & Curry	1.18	13
2800 Harrisburg	1.18	13
300 Hussey	1.18	13
200 Jackson	1.18	13
70 Julia	1.18	13
170 Justice	1.18	13
200 Leopold	1.18	13
285 Leeds	1.18	13
225 Manhattan	1.18	13
420 Mexican	1.18	13
835 Modoc	1.18	13

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M. MAR. 8.		THURSDAY, A. M. MAR. 15.
25 Alps	1.18	1.18
115 Alpha	1.10	1.10
300 Baltimore Con.	1.18	1.18
300 Belcher	1.18	1.18
410 Bullion	1.18	1.18
540 Baltimore Con.	1.18	1.18
1115 Con Imperial	1.18	1.18
455 Crown Point	1.18	1.18
1115 California	1.18	1.18
2420 Con Virginia	1.18	1.18
50 Chollar	1.18	1.18
1020 Caledonia	1.18	1.18
850 Exchequer	1.18	1.18
550 Gould & Curry	1.18	1.18
390 Hale & Norcross	1.18	1.18
785 Justice	1.18	1.18
100 Kossuth	1.18	1.18
1010 Lady Bryan	1.18	1.18
590 Lady Washington	1.18	1.18
540 Leviathan	1.18	1.18
325 Mexican	1.18	1.18
330 Mint	1.18	1.18
115 New York	1.18	1.18
700 North Con Vir.	1.18	1.18
235 Ophir	1.18	1.18
130 Overman	1.18	1.18
300 Prospect	1.18	1.18
100 Phil Sheridan	1.18	1.18
50 Succor	1.18	1.18
700 Savage	1.18	1.18
100 Sierra Nevada	1.18	1.18
55 Silver Hill	1.18	1.18
380 Trojan	1.18	1.18
40 Utah	1.18	1.18
135 Union	1.18	1.18
100 Ward	1.18	1.18
700 Woodville	1.18	1.18
600 Yellow Jacket	1.18	1.18
AFTERNOON SESSION.		
25 Alps	1.18	1.18
495 Belmont	1.18	1.18
30 Best & Belcher	1.18	1.18
75 Bullion	1.18	1.18
300 Caledonia	1.18	1.18
900 Con Imperial	1.18	1.18
950 Con Virginia	1.18	1.18
170 California	1.18	1.18
45 Crown Point	1.18	1.18
200 Coso Con.	1.18	1.18
300 Empire Id.	1.18	1.18
445 Eureka Con.	1.18	1.18
490 Exchequer	1.18	1.18
545 Grand Prize	1.18	1.18
400 Gold Chariot	1.18	1.18
500 General Thomas	1.18	1.18
50 Gila	1.18	1.18
230 Gould & Curry	1.18	1.18
100 Harrisburg	1.18	1.18
1050 Hussey	1.18	1.18
545 Leopold	1.18	1.18
780 Leeds	1.18	1.18
605 Modoc	1.18	1.18
170 Manhattan	1.18	1.18
110 Meadow Valley	1.18	1.18
20 Mexican	1.18	1.18
485 Northern Belle	1.18	1.18
350 New Coso	1.18	1.18
410 Ophir	1.18	1.18
300 Overman	1.18	1.18
500 Poorman	1.18	1.18
500 Prussian	1.18	1.18
150 Raymond & Ely	1.18	1.18
275 Rye Patch	1.18	1.18
25 Sierra Nevada	1.18	1.18
200 Utah	1.18	1.18
100 Alpha	1.18	1.18
175 Andes	1.18	1.18
300 Best & Belcher	1.18	1.18
75 Belcher	1.18	1.18
600 Bullion	1.18	1.18
180 Baltimore Con.	1.18	1.18
10 Belmont	1.18	1.18
1485 California	1.18	1.18
1420 Crown Point	1.18	1.18
40 Chollar	1.18	1.18
490 Con Virginia	1.18	1.18
1875 Con Imperial	1.18	1.18
15 Caledonia	1.18	1.18

Pacific Board—Latest Sales.

WENSDAY, A. M. MAR. 14	220	Caledonia	61¢63
60 Alpha	178	1650 Con Imperial	1.17¢1.60
165 Andes	178	810 Con Virginia	.41¢.41
200 Bullion	151¢151	20 Chollar	.62¢.63
115 Best & Belcher	283¢30	440 California	.43¢.47
40 Belcher	63	500 City of Boston	.40¢
50 Crown Point	81	270 Eschenauer	.61¢.61

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

BUTTE BASIN.—Amador Ledger, March 10: The boring operations at Butte Basin continue to be prosecuted. One hole has been sunk 200 feet, at which depth the augur was in very hard rock. It was concluded not to sink any further in that spot. Another hole has been commenced nearer the basin. No gravel has been struck as yet.

YORK'S GRAVEL CLAIM.—The gravel claim lately owned and operated by York, at Butte City, has recently passed into the hands of Ginochio Bros. and C. D. Horne, who are working it on a far more extensive scale than heretofore. A stream of 500 inches kept playing upon the gravel, washing away the embankment at an astonishing rate.

BECK.—The drift to ascertain the width of the vein is over 40 feet, and the end is not yet. Samples of the rock show specks of fine gold in several places. On Wednesday a splendid streak of quartz was struck in the vein, one or two feet wide, with gold visible through the whole of it.

Mona Mine.—The mineral region near the Mokelumne river, as the result of the development of the Beck claim, continues to attract attention. Parties visit the neighborhood almost daily on the lookout for mines. Captain Beck has secured a large extent of ground on each side of the company. The total amount of ground now under the management of Captain Beck is over 5,000 feet. Other parties are negotiating for the purchase of the Beck claim. The Beck claim of Dryden, is running on ore from the Olive. The owners are anxious to know the result of the crushing, as upon that will depend in a great measure the future operations of the company.

CROWN POINT.—A clean-up was had at this mill last week, which, we are told, yielded a trifling over 80 per ton. This is considered low-grade ore, but nevertheless it leaves a fair margin of profit.

MOXTENA CLAIM.—Tribb & Bellard are still engaged upon their gravel claim at French Hill, realizing a considerable quantity of gold at each clean-up. Occasionally a nugget of coarse gold is washed out. One was obtained last week worth between \$20 and \$30. The drift is now in the main channel of pay dirt, and even better yields may be anticipated in the future.

BUTTE.

BORING.—Orville Mercury, March 9: The artesian well being bored for J. R. Bennett, near Chico, is down some 640 feet. The first 500 feet was bored by contract, and they made from 10 to 40 feet per day; but since that time they have not made more than 10 feet per day, and it is feared that has greatly lessened speed. At the depth of 520 feet they struck lava rock and boulders, which made their progress very slow. The lava rock differs in no respect from that found on the top of Table Mountain; the boulders are the same as are met with in our mining claims. The next met with was sand and soapstone rock, cement and wash gravel. Afterwards came a large body of quicksand.

CALAVERAS.

RICH ROCK.—Calaveras Chronicle, March 10: We have seen some specimens of rock from the Blue Jay mine at Mosquito. The specimens were taken from the mine at the depth of 45 feet, at which point the vein is fully three feet wide and is fairly streaked with gold. Our informant states that from a bucket of unsorted rock they obtained over \$300. The Blue Jay is a fair sample of a majority of the mines in the upper country mining district.

IN LUCK.—J. F. Voith, proprietor of the Excelsior hydraulic on Tunnel ridge, has been particularly fortunate. The Excelsior claim is full of enormous quartz boulders, necessitating a vast amount of labor for their removal. In the work of breaking them to pieces to facilitate operations, Mr. Voith discovered the quartz to be of unexampled richness. One of the finest specimens we have ever seen was the other day shown us by Mr. Voith, bearing large pieces of free gold. The discovery will naturally lead to a careful examination of what have been considered huge incumbrances, but which may prove a prolific source of wealth to the owner of the claim, besides the richness of the gravel. The Excelsior is one of the best claims in the State.

CONTRA COSTA.

CLAYTON QUICKSILVER ORE.—Cor. Contra Costa Gazette, March 10: Some of my rock runs over 11%, some samples 13% and others 20%. The poorest samples 1%. The richest rock is that from the bottom of the tunnel, and it improves in going down, but, on account of water, the vein can only be advantageously worked below the present level, by running another tunnel on a lower one. If such quicksilver mine as this was in some far away situation there would undoubtedly be a great future about it; but, here within three hours' reach of the great Pacific coast metropolis, it scarcely attracts any attention, and there are numerous prospects in the vicinity equally as good. The management has not been judicious, and a good deal of money has been uselessly expended in experimental assays that have not answered expectations, leaving the company embarrassed with an empty treasury and debts; but Mr. Jacob Bendixen has now undertaken to pay off these debts from the products of the mine and the prospect is good that he will be able to do it within a short time.

FRESNO.

NEW IDRIA MINES.—Cor. Hollister Enterprise, March 10: A tunnel runs 1,000 feet into the side of the mountain, which distance steam is conducted to work the engines used in elevating the ore. From this tunnel shafts are sunk to the depth of 350 feet. Two donkey engines hoist the water accumulating in the mine. The men employed here are principally Cornishmen. One mile below this camp is the hacienda, or headquarters. Here are the furnaces, three in number, for smelting the ore, at which none but Chinamen are employed. The average production of quicksilver is about 900 flasks a month, each flask weighing 74 lbs. About 250 men are employed in and about the mines. The total population is between 600 and 700.

INYO.

MINNETTA BELLE MILL.—Coso Mining News, March 10: R. C. Jacobs, Superintendent of the Minnetta Belle mill, is in from the lookout last Monday and informs us that his mill is very near completion. He thinks he will steam up by the 15th and be ready to crush ore by the 20th inst. When this mill starts renewed life will be given to operations of the Minnetta. At present nothing is being done in the mines, as the dumps are all full to overflowing with ore, and to proceed with work it would involve the expense of building additional dumps.

LETT US.—Mr. J. F. Cox, the able Superintendent of the Minnetta Belle mining company went below last Tuesday to tender his resignation. He is compelled to this course on account of his health, which has become greatly impaired by his hard and severe labor, much of it having been self-imposed because of his great anxiety to make the venture a success for his friends.

MARIPOSA.

MARY HARRISON MINE.—Cor. Mariposa Gazette, March 10: This valuable gold-bearing quartz mine is about two miles below the town of Coulterville, and about half a mile from the 36-stake quartz mine, which is run by steam power, all of which belongs to the Maxwell Creek gold mining company. The Mary Harrison mine is producing rock from a vein five or six feet thick, taken from the bottom of a shaft 50 feet deep, averaging from \$15 to \$20 per ton. There are 64 white men and 18 Chinamen employed in and about the mine and mill, besides 10 men engaged in chopping wood and cutting teams. About five cords are consumed and 25 tons of ore crushed every 24 hours. A

clean-up occurs every ten days, resulting in the production of large brick of gold, valued at some thousands of dollars. The mill contains 50 stamps in good working order, 35 in use and 15 standing idle at present. It is contemplated by Mr. Douglas to commence work again on the Potosi mine some time during the coming spring or summer, when all of the stamps will be put in motion. An engine of 80-horse power is sufficient to run the large, heavy spauls, 50 stamps, six pans and all other machinery that attack.

ORE FROM MT. ST. HELENA.—St. Helena Star, March 9: J. C. Bullenger, of Oakville, passed through town Saturday, with samples of gold and silver-bearing ore from a claim, the Comet, owned by himself and son, on the southwest side of Mt. St. Helena, eight miles from Calistoga. Mr. S. and son discovered the claim three years ago, and have since sunk several shafts, run one tunnel and built a house on the claim. They have taken out, from time to time, about 20 tons of ore. They expect to commence work as soon as the weather settles, taking out considerable quantities.

NEVADA.

THE TUNNEL.—Grass Valley Union, March 9: We gave an account of the tunnel which is being driven through the hill. The idea of such an enterprise meets with general approval from the old miners of the district. No doubt but the tunnel will pay well, under proper understanding with owners of quartz ledges, and of course it is known that it would open up a large section of valuable mining ground, which would not have to be pumped. Osborne hill has millions of gold in it, and a tunnel would enable the miners to get at it. The tunnel would be driven straight along, for instance, ought to be continued right straight along, toward the east, cutting Osborne hill ledges at nearly right angles, until a large section of country is drained. A proper survey of the country would show at once the feasibility and the practicability of the tunnel. Mr. John Smith, of the Orleans mine and mill, who knows the section to be drained as well almost as if he had made it, thinks the cost of the tunnel would be very small in comparison to the benefits which would be by it secured.

PROPOSED CHANER IN MINING.—There are a great many of the big hydraulic miners who think that working their mines by drifting will pay them more money than they do by the present way of working. Instead of sending whole mountains of rich soil down to the valleys, the drifting would scarcely muddy the streams. The farmers who would have to be compensated would be very small, as they would be deprived of ground on which they can profitably raise potatoes. The miners, however, have no hostility to the farmers in thinking of adopting the change of method of working their mines. The change would immediately be followed by a cry for more "slickens," instead of the growl at that enrichment which is now heard every day.

DEADWOOD MINE.—We hear some most excellent news from the Deadwood mine, located in Willow valley, above Nevada City. A crushing of about 30 tons of ore has lately been milled, which gave about \$75 to the ton. That kind of a result makes it pretty certain that the mine will come out as it did in the days gone by, when it acquired its name.

PROSPECTING.—Nevada Transcript, March 7: Richards & Currow are prospecting a ledge which was struck while the railroad tunnel was being run a year or more ago. They went 200 feet from the point where the ledge was discovered and commenced to sink a shaft. After getting down 50 feet they struck a ledge one foot in thickness, which shows free gold and sulphurets in liberal quantities, and all the indications are favorable for opening up a good mine, so we are informed.

We are told by Mr. Duncan, Superintendent of the Shultz gravel mine, that the company are getting along well with the prospect incline, and the gravel prospects from three to nine cents per pan. He thinks he has a good thing ahead, and is pushing the work as fast as circumstances will permit.

DUNCAN & BEESINGER are sinking an incline on the hill of Little Deer creek, near Graceland, for the purpose of opening up a bed of gravel supposed to exist there, with a view, if it proves profitable, to erect machinery and drift it out. Mr. Duncan informs us that he has reached the gravel and that it prospects satisfactorily so far, and he is in hopes it will warrant more extensive work.

PLACER.

THE GRAVEL MINES.—Dutch Flat Forum, March 8: The Elmore Hill claim is cleaning up. The Polar Star, Southern Cross and Franklin claims are all off cleaning out the debris from their tunnels, all having the misfortune of being plugged up. It is expected that they will be washing again in a few days. The ditches are all carrying their full capacity of water and everything is now looking prosperous.

THE RHODE ISLAND HILL.—The Rhode Island company still continue to ground sluice, and will resume hydraulic in a short time. Mr. McCann, the principal owner of the Wide West company, called at our office this week, and reports the running of the second tunnel completed to within ten feet of where it will be connected with tunnel No. 1, by means of a side drift 70 feet in length. When this is accomplished, work in both tunnels will be resumed, and prosecuted without interruption, with the exception of making occasional connections for air, until they have advanced the entire length of their mine along the channel a distance of 2,100 feet, when a large force of men will be employed in breasting out the ground toward the mouth of the tunnel the full width of the channel. The bedrock in tunnel No. 2 has decreased to two feet, and the pay incline will have averaged \$12 per day for the men during the last nine days.

LOWELL HILL.—The work of breasting out and washing in the Swamp Angel continues to be prosecuted. They are also extending their main tunnel for prospecting the course of the channel, and also opening up new drifts.

LITTLE YORK.—The Empire company turned off and cleaned up last week, with unusual good results. The blocks have been run, and washing resumed again. Washing at Christmas hill is progressing favorably without interruption.

SHADY ROCK.—The North American company continue to work a large force of men in their drift diggings with good results. The Wild Yankee mine have removed their pipe and giant to another point and are now hydraulic and opening up their mine, commencing where the ground is shallow.

The Liberty Hill company continue running all the water that can be utilized to advantage.

YOU BET.—The mines are all running, but if we do not have rain soon some of them will be compelled to close down. There is a little excitement at Hunt's hill, caused by the changing of owners. A company from Smartsville has taken over the mine, and the new owners have commenced operations and are now running tunnels, laying pipe and building reservoirs, and intend working the claim on a large scale. These mines at one time paid well, but have been idle of late, owing to a lack of sufficient capital to work them.

SAN BENITO.

STAYTON MINES.—Hollister Enterprise, March 10: The mines never looked better. They are working now a force of about 20 men. The new furnaces do not seem to perform their work very well, and have been shut down in order to make some changes by which the metal can be saved. Some improvements or changes were made a short time ago, but they were not up to the requirements, and the company is determined to spare no pains or expenses until the furnaces are made to work in the best possible manner. It is unfortunate that any obstacles have been thrown in the way, however temporarily, of the progress of this enterprise. The mines are yielding endless quantities of ore of a high grade, and if the furnaces had not proven defective, large shipments of metal would be made each week, besides giving employment to a greater number of hands.

SAN DIEGO.

BARNER AND JULIAN.—San Diego Union, March 8: Mr. Geo. V. King, of the mines, came in from Julian last evening. He informs us that several of the mines manifest

some activity just now. The Ready Relief has just had a crushing of 25 tons of ore, yielding \$1,100. Mr. D. Shoup brought in the bullion last week. Mr. King, David Shoup, S. A. McDowell and Joseph Condy are the lessees of the mine from Mr. Noyhart. The Hubbard mine is looking very well now. It is reported that they have opened an eight feet wide ledge, the lowest rock milling \$20 per ton. The San Diego mine has just developed a fine two feet ledge at the bottom of the winze they have been sinking, which will yield 90 per ton ore. Mr. King says the ledge had abundant rains and will make good crops in the vicinity of the mines.

Nevada.

WASHOE DISTRICT.

COX, VIRGINIA.—Gold Hill News, March 14: Daily yield, 250 tons of ore. The south ore slopes on the 1500-ft level are being worked 85 feet in length and about 25 feet in width, and will furnish a plentiful supply of ore to keep the Consolidated mill steadily crushing for at least three months. In the meantime the drift on the 1650-ft level is being enlarged, turn-tables put in, all timbers laid, and every other improvement being made. The drift on the 1650-ft level. At the Cox & Co. about two splendid five-inch wire cables have just been put in place, and four cables attached to each cable. This will give double the hoisting capacity in a given length of time, the ore dumps at the 1650-ft station being so arranged that each car is loaded simultaneously and no stoppage or delay whatever incurred. In the ore vein on the 1650-ft level the work has been continued for enlarging the drift and making preparations for future operations. The first set of timbers has just been placed in the face of the south drift, intended to connect with the deep winze. A drift northward from this winze is soon to be started on the 1650-ft level to connect with the south drift. Another drift south from the 1650-ft station in this winze is about to be started to make an air connection with winze No. 13 below the 1650-ft level. The mine is fast cooling in every portion, and is now in a good, comfortable working condition throughout. The opening up of the 1650-ft level no longer leaves the least doubt as to the resumption of dividends at no distant day.

CALIFORNIA.—Daily yield, 550 tons of ore. The ore slopes on the 1500 and 1550-ft levels are looking splendidly, every point and are yielding rich ore. The lateral drift on the 1600-ft level. At the Cox & Co. about two splendid five-inch wire cables have just been put in place, and four cables attached to each cable. This will give double the hoisting capacity in a given length of time, the ore dumps at the 1650-ft station being so arranged that each car is loaded simultaneously and no stoppage or delay whatever incurred. In the ore vein on the 1650-ft level the work has been continued for enlarging the drift and making preparations for future operations. The first set of timbers has just been placed in the face of the south drift, intended to connect with the deep winze. A drift northward from this winze is soon to be started on the 1650-ft level to connect with the south drift. Another drift south from the 1650-ft station in this winze is about to be started to make an air connection with winze No. 13 below the 1650-ft level. The mine is fast cooling in every portion, and is now in a good, comfortable working condition throughout. The opening up of the 1650-ft level no longer leaves the least doubt as to the resumption of dividends at no distant day.

CROWN POINT.—The east drift on the 2000-ft level is in over 100 feet, the face still in very solid, hard blasting rock. This rock, however, blasts out splendidly and admits of excellent progress. Provided the ledge retains its uniform dip, surveys recently made show that this drift will have from 250 to 300 feet to run to the ledge, it is now having extended to the 2000-ft level. Every preparation has been made to take care of a flow of water should one be struck. Strong Cameron pumps, run by compressed air, have been put in at the 1800, 1900 and 2000-ft levels. These pumps will each have a lift of 100 feet, or 300 feet in all, to carry the water up to the 1700-ft level, through which it will pass southward to the combination Crown Point and Belcher drain shaft.

BELCHER.—Daily yield, 90 to 100 tons of ore. The old ore breasts on the 1300 and 1400-ft levels are being gradually worked out, and the supply of ore is steadily lessening. The water is again drained from the bottom of the main incline sufficiently to admit of a resumption of the sinking. Putting in another lift pump at the 1850-ft level is about finished.

ORION.—Daily yield, 125 tons of ore. The ore slopes are looking well, and the ore taken out is gradually increasing in value. The average assay of car samples is about \$70 per ton. The east ore streak recently struck on the 1365-ft level is developing into quite a valuable body of ore.

TRONAN.—The shaft is down to the 300-ft level, and drifting both north and south is commenced at that point to open up a new ledge. Both drifts are in excellent ore, which, together with what is extracted in sinking the north winze below the 300-ft level, which is to-day down about 100 feet, gives a daily ore yield of 27 tons.

HALE & NORCROSS.—The water is reduced in the main incline to a point 50 feet below the 1900-ft level. The repairs to the cave in the main incline below the 1900-ft station are being forwarded as rapidly as possible.

NEW YORK.—Hard blasting rock continues to impede the work in the third pump compartment of the shaft. It will not take much longer to finish this much needed enlargement of the shaft, when the pumps will be put in at once.

LADY WASHINGTON.—A station has been opened and a drift started at the 950-ft level in the winze. This drift will run to the eastward and will prospect the ore vein 100 feet deeper than it has ever yet been worked.

NORRIS CO., VIRGINIA.—The character of the vein matter through which the shaft is passing is of the finest kind and gives great encouragement.

DAYTON.—The prospecting drifts on the upper levels have all been suspended for a few days in order to afford an opportunity for leveling and lining up the pumps and pumping machinery. This is being done in order to have everything in the most perfect order in case the drifts when they cut the ore vein should encounter an increased supply of water.

PHIL SHERIDAN.—The east drift on the 400-ft level is steadily advancing toward the ledge, the face in hard blasting ground. It will probably have 50 feet or more to run in order to strike the ledge. The water has very nearly all disappeared.

GOULD & CURRY.—During the first part of the week the diamond drill in the face of the main east drift, on the 1700-ft level, tapped a very strong flow of extremely hot water. The work stopped until the pumps are ready to start up. This will be about the 1st of April.

JESTICE.—Daily yield, 400 tons of ore. A large reserve of ore is being deposited at the Petaluma mill, which will be started up in a few days. The large quantities of water still somewhat retards the advancement of the prospecting operations on the 1000-ft level.

OVERMAN.—Sinking the winze below the 1200-ft level is making steady headway, the ore prospects in the bottom still being of the most favorable description.

SOUTH COMSTOCK.—The new shaft is now down 77 feet below the 300-ft level. The rock breaks and blasts well, and there is no need to contend with, consequently good progress is being made.

IMPERIAL CON.—The drifts on the 2125-ft level are being enlarged and the level is being put in the best possible working condition previous to commencing cross-cutting.

CHOLLAR-POTOSI.—The east drift on the 1785-ft level is steadily advancing, the face in ground of a softer and more favorable nature. The daily yield of ore from the old upper slopes is 100 to 120 tons.

YELLOW JACKET.—Sinking the main shaft is making the usual splendid progress. A new hoisting winch is soon to be added to the machinery.

SILVER HILL.—The north and south lateral drifts on the 650-ft level are each advancing steadily along the west line of the ledge, and each making about four feet per day.

BEST & BELCHER.—The south and middle cross-cuts on the 1700-ft level are being steadily advanced. The middle cross-cut penetrated a small vein of quartz and low grade ore during the first part of the week, but has passed again into soft porphyry.

SUCCESS.—Sinking the main shaft is making the usual good progress. The bottom still in the most favorable character of ground.

LEVATHAN.—At the 650-ft level the drift north has run into good vein matter, carrying considerable ore of a low grade.

URAN.—The erection of the new and powerful air-compressor is being urged forward at a very rapid rate. Arizona. The water is running but little trouble, and the pumps continue to handle it with ease.

BALTIC COX.—Better and larger streaks of low grade ore appear in the face of the main west drift this week.

SAYRE.—The water is being steadily drained from the main incline below the 1900-ft station. The pumps work finely.

UNION CON.—The face of the north drift on the 1300-ft level is still showing some very fine quartz.

JELIA.—The main south drift on the 1800-ft level is steadily advancing, the face still in favorable quartz and low-grade ore. The face of the main south drift on the 1800-ft level is showing a much more favorable character of ore.

KNICKERBOCKER.—The water in the shaft is reduced to the 600-ft level, which is now being drained; but owing to the ground being so heavily saturated with water the progress of drainage is slow.

MINT.—The prospecting station at the 1400-ft level is nearly finished, ready to commence the development of the ledge.

MEXICAN.—The north drift on the 1700-ft level is steadily advancing, the face in a very favorable vein formation.

LADY BRYAN.—The preparation for the erection of the new and powerful hoisting engine is going rapidly forward. The new pumping machinery is all up, in the first class working order.

HOMESIDE.—Favorable looking stringers of quartz are continually being passed through.

FLORIDA.—The main west drift on the 815-ft level is being pushed rapidly forward to cut and prospect the ore vein.

ALLEN.—The 800-ft level continues to give forth its usual yield of 40 tons of good milling ore, keeping the Empress mill steadily pounding away.

AMAZON & GLASSBORO.—The face of the north drift on the 800-ft level is still in ore. The bottom of the winze below the 300-ft level is also showing well.

BUCKEYE.—The quality of ore extracted from the north slopes on the 350-ft level is growing better. The Hope mill is kept steadily running.

WENSTRUCK.—Arrangements are about being completed to resume extraction in this mine very shortly.

BATTLE MOUNTAIN DISTRICT.

ENCOURAGING.—Silver State, March 9: Reports from the mining camps of Galena and Old Battle Mountain are of a very encouraging character. There are now in Galena about 150 men, nearly if not all of whom are at work in the mines. Old locations abandoned for years are being worked, and there is perhaps more excitement in the camp than at any previous time since its discovery. In Old Battle Mountain, in the same district with Galena, C. T. Meader has taken hold of one or two mines and is setting a force of men at work on them, and a new life seems to be instilled in the camp.

ELY DISTRICT.

THE ALPS.—Pioche Record, March 3: The Alps company's mills are both running steadily—mill No. 1, at Pioche, is running on custom and Alps ore; mill No. 2 (which the company intend to reduce to redoubt any one) is running principally on concentration and tailing ore. Co. and Johnson, Vivian and Cutts are, however, having worked at the latter mill some custom ore, the former 30 and the latter 50 tons. The usual force is employed at the mine. The company intend to resume prospecting on the lowest level at an early day.

RAYMOND & ELY have been progressing well with the work of development during the past week. Harkness added some to the working force of the mine. The 10th and 11th levels are being pushed ahead, also a prospecting drift from the 11th level. On the 8th and 9th levels there are very encouraging prospects for ore in some of the undeveloped ground.

CHERRY CREEK DISTRICT.

SOLD.—White Pine News, March 10: The Pacific mine, at Cherry creek, with all the rights and privileges thereunto belonging, was sold by Sheriff Raum last Saturday, to satisfy an execution of \$1,000 and costs. The property was knocked off at \$1,200. We presume, of course, that the bulk of the property was sold to the company, and that within the time allowed by law as the latest litigation over the property would indicate it to be worth many times the amount it sold for.

PENNSYLVANIA DISTRICT.

SALE OF A MINE.—Pioche Record, March 3: We learn that McDougall, owner of several mining interests in Pennsylvania district, has sold one of his claims, on which there is a shaft 180 feet deep, to Charles Hoffman, for the sum of \$14,000. The intention is to put a mill in the district very shortly, as the ore will not pay to transport a long distance.

TUSCARORA DISTRICT.

NEW MILL.—Silver State, March 9: The new mill of the Grand Prize company at Tuscarora, which was shut down immediately after it started in consequence of a fault in the foundation, is again running. The first shipment of bullion was made last Saturday, and consisted of several bars valued at \$11,000. Seventy odd tons of ore from the Grand Prize worked at the Humboldt reduction works before the company's mill was built, yielded about \$25,000, and the bullion averaged 905 fine. Whether the new mill is as successful in treating the ore we have not learned.

EUREKA DISTRICT.

NEW HOISTING WORKS.—Eureka Sentinel, March 10: The Hamburg mining company will, in a few days, award the contract for erecting the hoisting works and putting up machinery on its mining property, situated on Peel Stick hill. The machinery for the works was ordered some time ago, and will commence to arrive here in about two weeks.

IDE MEN.—A stranger coming into town now and seeing the number of men congregated on Main street, would think we had a lively town at present. Yesterday, and the preceding night, a large number of miners from Ruby hill, who have been thrown out of employment by the mining litigation, were in town canvassing the general state of affairs and the probabilities of the work being resumed. The recent arrivals from Virginia City, who came in the hope of securing employment, find themselves badly mistaken, and if anything, worse off than when there. Another draft has been made at the Richmond mine, and but few men will be lucky enough to retain their places during the suspension of work at the two mines.

Arizona.

THE MCCrackEN CONSOLIDATED MINING COMPANY.—Arizona Enterprise, Feb. 24: This company's mill has recently been changed from a dry to a wet crusher, and its capacity greatly increased by the putting in of new amalgamating pans. It now works from 23 to 25 tons per day, yielding from \$1,000 to \$1,200, the monthly average of the mill being about \$35,000. Teams are running regularly from the mine to the mill, 14 miles, and make the round trip in ten days. Large quantities of ore are being broken down in the mine, but on account of the decomposed nature of the ore it takes but few men to get out enough to supply the mill. The company employs at the mine and mill about 50 hands, and preparations are being made for an increased yield of bullion. Abe Bateman, who is now the Superintendent, is a very competent and experienced man, and is very popular with everybody, as is also D. P. Pierce, who runs the mill.

The San Francisco mine, on the McCracken ledge, is being developed and shows every indication of being the equal, in every way, of the Senator, which is the location upon which the company are doing most of their work. The McCracken company own three locations, the Senator, the Alta and the Paimetto, the last named of which is being developed. The Senator, being claimed by John Baker, Grant Blake and the estate of Jesse S. Pitzer, deceased. The San Francisco is owned by Alonzo E. Davis and others and is now under bond to W. M. Leet, of San Francisco, who has a force of men employed and is tunneling. He keeps 15 men at work and the ledge shows the same character of ore as the Senator mine, and is of equal width, the ore body ranging from 35 to 60 feet wide. A mill is to be

THE ENGINEER.

Sectional Caisson Tunnel.

D. Farrand Henry describes in the *Polytechnic* a new style of sectional caisson tunnel in which the sections are to be made of convenient length and form of timber strengthened by angle irons passing round the outside, and sufficient brick-work inside to sink them. They are built inside a coffer-dam with a movable bottom, which has sufficient buoyancy to float them; the coffer-dam to be provided with air pumps, windlasses, chains, etc. The dam containing a section is floated to place, and the weight of the section taken off the bottom by being suspended by the chains. The bottom is then unfastened and towed away, and the section lowered to the bed of the river, being guided to place by piles or other apparatus. The section has water-tight bulk-heads at the ends, and air tubes passing up above the water level.

Air being forced into the section, the men enter and remove the earth from under it and permit it to sink to the required grade. If proper foundation is not found at the grade, the section is lowered till good bottom is reached, and then raised to grade, the excavated space being filled with concrete. To make joints between two sections the timber shell projects beyond the bulk-heads, and the ends of the timbers of the completed tunnel and the section being placed, are brought as near as possible together when the section is sunk. If a good joint is not made it is covered with tarpaulin, or otherwise made secure by divers. Then there will be a water space between the bulk-head in the completed portion and the bulk-head of the last section sunk. A small hole is made in the bulk-head of the completed tunnel, letting so much of this water as will, run out, and if the joint is tight, a partial vacuum is formed, forcing the section against the completed tunnel, to which it is then bolted by properly arranged bolts; the bulk-heads at the tunnel are then removed, the brick-work connected, and the bottom filled in with concrete. Underneath and between the tracks is a drainage tube formed in the concrete bottom; and above is a ventilating tube. The approaches are built up to the first section inside a coffer-dam.

STANDARDS IN PUBLIC PLACES.—The English seem determined that there shall be opportunity for the people to know exactly what the legal standards of length are. We read in the late reports of H. W. Chisholm, Warden of the Standards, that a somewhat notable event of the year has been the laying down at Trafalgar square of several standards of length embedded in a solid platform of granite. All the details of this operation are given in the appendix to the present report. The platform is situated at the foot of the north wall of the square, and the entire cost has been about £450. These mural standards are now available for public use, like those erected outside the wall of the Royal Observatory at Greenwich, only the Trafalgar square standards are on a much larger scale, the platform being nearly 200 feet long. The Standards Commission, in one of their reports, recommended that mural standards of length should be securely fixed for public use in all populous towns, the expenses connected with them to be defrayed out of the local funds. The Warden of the Standards has accordingly sent a circular letter to the local authorities, urging the expediency of their carrying this recommendation into effect, at the same time offering such information as, in his judgment, would facilitate their course of action.

INDIAN ENGINEERING.—Referring to engineering works in India, the *Builder* says: The smallest rill that is allowed to trickle over the edge of an earthen bank wears itself a passage and becomes a destructive torrent with extreme rapidity. On one occasion the water in the Veranum tank is said to have overflowed the whole 12 miles of the bund, and to have breached it in 13 places. On another occasion the engineer in charge of a bund, finding the water rising with more rapidity than he was able to meet by the supply of earth, made a wall of the bodies of his laborers, causing them to lie down close to one another on the top of the threatened part of the dam, and thus keeping back the two inches or three inches of water, which, if unchecked, would soon have wrecked the whole bund and ruined a whole district, until their places could be supplied with baskets full of dirt. It was an original expedient, but it saved the district. What the laborers said about it we have not heard.

A DIRECT RAILWAY FROM ENGLAND TO INDIA.—One of the possible railway projects which is now being agitated in Great Britain, but may not be realized for a score of years, says the *Railway World*, is the establishment of direct railway communications between England and India. There are so many political and commercial reasons for the creation of such a stupendous through route, that it is clearly one of the probabilities of the future, and many of the details relating to the missing links have already received earnest attention. If we assume that the necessity of sailing over the English channel from Dover to Calais; and the crossing of the Bosphorus at Constantinople will never be abolished, the difficulties to be surmounted are mainly those presented by the construction of railways through Asia Minor, Persia, and Beloochistan.

Discussions on Dynamite.

The English engineers are still figuring on the comparative value of dynamite as an explosive. Mr. J. C. Mackay, who is now engaged on the works of the tunnel which is in course of construction at Dowlais, Glamorganshire, directed attention to the need of a highly disruptive explosive, and, at the same time, of one available to carry on the arduous operations of the miner with safety and economy. He pointed out that such an explosive should not be affected by damp, should not require large borings, involving expensive works, should not generate an accumulation of smoke, nor be too easily ignited, and should possess facility of transport and storage. He showed that dynamite, in careful hands, fulfilled to a great extent all these conditions, and was especially adapted for tunneling through hard strata of rock. It was not injured by moisture, a quality which no other explosive possessed, it would only explode by detonation, and was not explosive by ignition. It presented an economy in labor which, as compared with other explosives, was in the ratio of four to three. The result of the comparative cost of experiments in Clifton tunnel, for driving 15 lineal yards, he gave as follows: For powder, £29 10s; for gun-cotton, £18 2s; for dynamite, £16 10s. Mr. Mackay also referred to the results obtained by experiments under his own observation at Dowlais, and pointed out that the use of dynamite must be regulated by the character of the rock, and though most economical when applied to harder rocks, it was found to be less useful in the case of coal and the softer friable rocks.

TELEGRAPH EXTENSION.—At a late meeting of the Atlantic and Pacific Telegraph Company, Mr. Thomas T. Eckert, President, submitted a report in which he recommended the construction of 10,000 miles of new lines, completing the system of wires operated by the company and connecting every important city and town in the Union. Work on the main lines, in his judgment, should be commenced immediately, and the branch network extending to the small towns should be constructed afterwards as rapidly as possible. The report was adopted enthusiastically, and the work on the new lines will, it is stated, be begun at once in accordance with the vote. To provide the sinews of war \$600,000 was subscribed, to be paid into the treasury of the company by installments of 25% a month. This subscription takes up the remaining \$3,000,000 of authorized stock previously undisposed of at the market rate of 20% of its face value.

THE ENGINEER A COSMOPOLITAN.—In a recent lecture Mr. Thomas Carghill, C. E., pointed out the extensive scope of the engineering profession, which, without any invidious comparison, he maintained was greater than any other. The engineer was by profession and nature a cosmopolitan. His operations were not confined to any particular district or locality, but had the whole world for their field of action. He did not attempt to mark out any special line of preparatory training, as there were plenty of colleges and schools where a good technical education could be acquired; but he would enforce upon his audience the absolute necessity of all intending engineers entering by the door, and not by the window. The days of rule of thumb were gone by, never to return. The profession had become an essentially scientific one, and its avenues were more stringently guarded than heretofore.

CRYSTAL PALACE RESTORED.—Iron says the Lord Mayor of London has issued a circular having reference to a meeting shortly to be held for a purpose which will be found in the following paragraph, which concludes the printed invitation—"To meet the possibility of your being unable to attend, I should inform you that the plan of restoring the Palace and grounds to their original state of beauty and usefulness is by the formation of a new association, called the 'Crystal Palace of Arts of All Nations (limited)', the shares in which are to be £1 each, and the net profits of each year are to be distributed, not as in a commercial undertaking, by dividends, but in the form of prizes, in accordance with the Art Union Act of Parliament, and on the same principle as the Art Union of London, of which Lord Houghton is President."

THE TYNE BRIDGE.—One of the finest engineering structures of its kind in the world is the swinging bridge over the Tyne, at Newcastle, the construction of which has just been completed after eight years' labor. The bridge is described as of extraordinary strength, both in the masonry and in the immense iron super-structure, and is the largest and most imposing work of the kind in England. The center pier, which supports the massive swing-girder, weighs 1,500 tons, and is said to be unequalled in Europe. The gigantic fabric has a total length, between the abutments, of 530 feet, and a total width of 48 feet, the width of the roadway being 22 feet, while that of the foot-paths is eight or nine feet.

CONCRETE BRIDGE.—At Seaton, Eng., a three-arch bridge is being built of concrete, on a new principle invented by Mr. Brannon, of London. The idea of the inventor is that concrete would, for such work, prove far more enduring than stone. The toll house at the end of the bridge is being built on arches. Mr. Brannon suggests that by building cottages on arches, instead of on the solid ground, all fear of fever caused by exhalations from the soil would be avoided.

Rights of Land to Water.

At the last meeting of the California Academy of Sciences, Prof. Davidson, of the United States Coast Survey, read the following in continuation of his series of papers "On Irrigation in India, Egypt and Italy."

A vital issue that naturally arises in the subject of irrigation, is the relation of land not bordering water to the use of that water. It is the old question of riparian rights with the new complication of States rights, and of the irrigation of broad districts. Honest differences of opinion upon this, as upon all other important questions, must exist; arguments and illustrations are plentiful on each side, but when we look at the problem in its broadest, most liberal and really grand phases, all minor considerations must be held in abeyance. Where irrigation is a necessity, all irrigable lands should have equal rights to the water available for that purpose, and the water should be so wedded to the land that the fee simple to the latter should include the former. Their bond should be indissoluble under any process of law. In all sales and transfers the water must go with the land, and the land must carry the water.

The full development of our extensive valleys depends wholly and solely upon this broad proposition. In consecutive seasons of drouth the main supply of water will be reduced, and in such cases the percentage of water to each acre would necessarily be reduced, thereby involving the watering of a less number of acres. If the farmer with 1,000 acres can, in such seasons, receive only a half supply of water, he may use the water allotted to him for such proportion of acres, or for such crop as he may decide upon.

How Shall Water be Sold?

Upon this point there exists a multiplicity of opinion, and a great diversity of practice in the various countries where irrigation is a necessity and where it has been practiced for ages. There are differences of opinion among the best informed engineers of India; arising partly from the character of the section of country studied, but principally from the condition and peculiarities and traditions of the inhabitants. There the prevailing feeling is strong against any system of selling water by volume; but the unique relation of the native cultivator to the Government molds and influences the judgment. The reasoning that favors it in India finds no similar conditions in the United States. There the government is virtually the landlord, who delegates to the engineer authority to decide at once what land and what crops shall have water, and how much. There is no appeal. Fortunately he is in a position to judge fairly and honestly, and the cultivators almost invariably acknowledge the justice of the decisions.

But the methods depending upon the flooding of arable lands at a fixed price per acre, according to the crop, are not equally just to the cultivators of different soils differently situated, and lead to abuse in the application of the water, to bad drainage, the formation of swampy lands and consequent malarial fevers. It is a wasteful use of the life-blood of a parched country, and, in seasons of drouth, would, from our standpoint, lead to dissension and trouble. In India, as well as at home, on a small scale, the evil effects of the system are too frequently seen. It is a safe estimate that the amount of water thrown upon the land by flooding, per acre, is twice that which is necessary. Some authorities have shown cases where it has been as high as ten times that required to mature a crop.

In Italy and in Spain the water is sold by measurement, and in some localities daily sales are made of the water to the highest bidder!

In the Gold Mining Regions

Of California, the sale of water is an established custom, and it certainly seems a reasonable proposition to apply a similar method to the water of irrigation.

The main canal of each district is constructed to supply a given volume of water for the irrigation of a specified number of acres of arable land, based upon the general proposition that each acre requires 12 inches of water (more or less) during the season to mature ordinary grain crops. And the scheme of the distributing channels and irrigating ditches is necessarily designed to carry this volume of water to the different sub-areas at reasonable intervals.

When the water is thus ready for the fields the question for solution is the manner of selling it. The flooding per acre is in reality a means of measurement of the crudest character, and not suited to the temper of our citizens. The method of selling in Italy is by measurement, but does not appear satisfactory; the majority of engineers in India condemn it.

I have no hesitation in recommending the sale of water by measurement; and that the method adopted by the miners of California, or such modification of it as experience has shown to be advisable, or which the change of conditions may suggest, is the simplest, most direct, and most satisfactory.

The Quantity of Water Necessary to Raise a Crop.

Practico and the authorities differ very much on this all important question, doubtless because of local and ever-varying circumstances of rainfall, evaporation, percolation, absorption, crops, soil, wastefulness, etc., which enter largely as disturbing elements.

There are plenty of statistics to show the actual duty of water, but all exhibit results far short of the theoretical duty; the two should and would agree if proper factors be assigned to the different elements governing the problem.

The best authorities assume a depth of from 10 to 12 inches of water to the production of a crop of wheat, barley, and maize, when applied in waterings of four times two and a half inches (Login), or of three times four inches (Beresford). The smaller of these results is almost identical with the amount deduced from observation in the great valley of California, where a rainfall of 10½ inches, fairly distributed, has insured a large crop of wheat, etc. (Report U. S. Commissioners of Irrigation).

But different crops require different amounts of water. Taking the average of a number of Indian authorities, the quantity of water necessary to raise the various crops may be stated as follows: Wheat, barley, maize, etc., 1,300 cubic yards per acre, or a total depth of 9.7 inches over the soil. Wheat is the crop of upper India and is raised at the season when water is scarce and precious. Rice, 3,500 cubic yards per acre, or a total depth of 26 inches over the soil. Rice cultivation is carried on in the autumn, when there is, ordinarily, plenty of water from rainfall available. Sugar cane, 8,000 cubic yards per acre, or a total depth of 59½ inches over the soil.

If we assume that ten inches of water is necessary for one crop, each acre will require a total amount of 36,300 cubic feet; hence one cubic foot of water per second for 24 hours would furnish a supply sufficient to irrigate 2.38 acres, and further, that one cubic foot of water per second for 100 days would give water sufficient for a crop on 238 acres. This, let it be distinctly understood, is exclusive of rainfall. At those seasons in India when there are partial rains, some sections receive two waterings from canals or wells, others only one, and all are lighter than the average of the dry season waterings. Under these conditions their engineers report that during the rainy season the duty of water is almost doubled. If this be taken as a point of departure, we should expect that a total amount of irrigating waters added to the small rainfall would suffice for an acre, or one cubic foot of water per second would, in 24 hours, afford a supply sufficient for 4.76 acres; and running for 100 days would be sufficient to irrigate 476 acres; but their figures vary from 320 to 384 under these conditions.

Their conclusions in relation to the theoretical duty of water (running one cubic foot per second) is a total of 500 to 600 acres in two crops per year. But even this theoretical duty is too low, for there are examples in Spain where the duty has amounted to 1,000 acres.

Per contra, the actual duty in the best divisions in India is not over 160 to 180 acres in two crops per season, or one-third of their calculated theoretical value! The average duty of the whole Ganges canal (except the Cawnpore division,) in 1873-4 was only 155 acres, and of the distributing canals 189 acres, each the sum of two crops.

We can, therefore, readily understand the warning of one of their latest investigators, when he says: "If the question of increasing the duty of water is not solved in some form, a great many of our new canals must be financial failures. Their future profits have been calculated on duties that are not obtainable on our oldest canals. Waste is inseparable from works like our great canals, but there are no such physical or practical difficulties in the way as will oblige us to be content with the present state of things."

These warnings have double weight in California, because we are commencing without profiting by the dearly bought experience of others. Beresford has endeavored to formulate the efficiency of the water of irrigation by introducing functions determined by experiment; and in so doing he has taken the subject away from the rule of thumb.

He says: Each cubic foot of water entering the headworks of a canal is expended as follows: 1st. In waste by absorption and evaporation in passing from the canal-head to the distributing-head. 2d. In waste from the same causes in passing from the distributing-channels to the secondaries or ditches. 3d. In waste from the same causes in passing from the secondaries or ditches to the fields. 4th. In waste by cultivators through carelessness. 5th. In useful irrigation. But among the sources of waste from evaporation should have been included the very considerable one of the water when spread as a thin film over the ground in flooding. Yet another function has not been considered, namely, that depending upon the special demands of each class of soil and crop. In his investigations he has shown that the chief part of the loss is due to absorption and percolation; that old canals exhibit less loss than new ones; and that more waste occurs in excavated than in embanked canals.

The loss by evaporation up to the point where the irrigating water reaches the field is only 5% of the probable discharge of the canal; but when the water is spread over the fields the loss may amount to 20% or more. This would entail a total loss of 25% by evaporation!

Again, he says that loss by absorption along the canal and distributing channels and ditches is greater than the loss by evaporation; he even places it as high as 33% of the whole volume of the great Ganges canal!

These sources of loss amount to no less than 53%, and we can readily understand how the wastefulness of the cultivators may increase that loss to fully 67%! This at once reduces the actual duty of the water, measured at the source of supply, to one-third of the so-called theoretical duty.

The lesson to be learned therefrom is, that loss by absorption should be prevented, and loss

by wastefulness of the cultivator reduced by stringent oversight and by rigid measurement.

But it may be asked how all these apparently conflicting results may be applied to the driest parts of California? I should state them broadly, thus: One cubic foot of water per second for 150 days would furnish 12,960,000 cubic feet, or a quantity affording a total depth of ten inches over 357 acres of land; 1,000 cubic feet of water per second for the same period would supply 357,000 acres. And if the canals, channels and ditches are constructed no better than they are in India, and if the farmer was just as wasteful of the water, this area of land would be reduced fully one-half, or say to 180 acres for each cubic foot of water per second for 150 days. On the other hand, the rainfall would, even in a season of only six or eight inches supply, doubtless supplement the loss by evaporation, absorption and waste, and bring the duty up to 357 acres.

But with low grades to the canals and channels, unpuddled bottoms and sides, and inferior plans and work, it would be next to impossible to make a close approximation to the actual duty of water; anything less than the above duty suggests necessity for improvement in all the sources of waste.

In estimating the total acres that can be irrigated from a given supply, allowance must be made for the amount lying fallow, wood-land, marsh, roads, streams, towns, etc. In India the average under cultivation each season is only one-third of any given area; in this country we might safely estimate it at two-thirds of any irrigation district.

Desert Lands.

Senator Booth's bill to encourage the irrigation, sale and settlement of desert lands, has become a law, and such portions of our western territory are now open to enterprise and may be made applicable to settlers so soon as formal regulations and instructions shall be issued by the Interior Department. Senator Booth, in the course of an able report recommending the bill for passage, made the following interesting points:

There are extensive regions of country in the States and Territories named in the bill where there is not sufficient rainfall to render the cultivation of the soil possible without irrigation. In other words, large portions of the country from the Rocky mountains west are deserts, but it has been ascertained that by irrigation these lands can be made exceedingly productive. The subject of irrigating these lands has attracted the attention of the Interior Department and Congress for many years, and various schemes have been proposed to Congress, and to the States interested, to secure aid for that purpose; but Congress has hitherto wisely, as we believe, refused to aid any of these projects further than to provide for examinations and reports upon the subject.

The whole subject should be left, as far as practicable, to private enterprise, and the Government should interfere as little as possible with the subject. It is certainly best to give the people an opportunity in the first instance, and when they have failed to utilize both the water and the land it is time enough to call for Government aid or legislative control, but it is necessary that the people have an opportunity to acquire title to the lands before private enterprise will undertake a reclamation of these deserts.

Experience has shown that the homestead and pre-emption laws afford no means of acquiring title to desert lands. Those laws require settlement and occupation as a prerequisite. Neither settlement nor occupation is possible without water. Irrigation must precede the settlement. But this is expensive, and settlers upon the public lands are unwilling to construct the necessary ditches and canals to irrigate lands to which they have no title and no certainty of obtaining title.

It has been suggested that these lands be sold in large quantities in order to induce private capital to undertake the work of their reclamation. Your committee fear that any system of sale whereby the title would pass before irrigation, would encourage speculation without inducing settlement. The bill provides for the sale of a section of land to any person who will first irrigate the same, at the usual price of \$1.25 an acre. A more liberal policy has been suggested of granting lands, after irrigation, without any money consideration. But the committee believe that when these lands are irrigated they will be of sufficient value to enable the purchaser to pay the Government price charged for other public lands. Besides, the quantity allowed will be an additional inducement to settlers to undertake the work of irrigation. At all events, it will be time enough to make donations of these lands when it is ascertained that settlers are unwilling to purchase them. It is believed that by far the larger portion of the lands bordering on the streams, where sufficient moisture exists for cultivation, and where irrigation is cheap and easy, have been appropriated, but the provisions of this bill enable settlers by combined effort to construct more extensive works and reclaim a class of lands that are now absolutely worthless.

The bill, in its full text, is as follows: A bill to provide for the sale of desert lands in certain States and Territories: Be it enacted, etc., That it shall be lawful for any citizen of the United States, or any person of requisite

age "who may be entitled to become a citizen, and who has filed his declaration to become such," to file a declaration with the register and the receiver of the land district in which any desert land is situated, that he intends to reclaim a tract of desert land not exceeding one section, by conducting water upon the same, within the period of three years thereafter. Said declaration shall describe particularly said section of land if surveyed, and, if unsurveyed, shall describe the same as nearly as possible without survey. At any time within the period of three years after filing said declaration, upon making satisfactory proof of the reclamation of said tract of land in the manner aforesaid, and upon the payment to the receiver of the sum of one dollar and twenty-five cents per acre for a tract of land not exceeding 640 acres to any one person, a patent for the same shall be issued to him.

Sec. 2. That all lands, exclusive of timber lands or mineral lands, which will not, without irrigation, produce some agricultural crop, shall be deemed desert lands within the meaning of this Act.

Sec. 3. That this Act shall only apply to and take effect in the States of California, Oregon and Nevada, and the Territories of Washington, Idaho, Montana, Utah, Wyoming, Arizona, New Mexico and Dakota.

USEFUL INFORMATION.

Requisites of Good Brick Clay.

During the summer there has been considerable inquiry into the character of the clays of this State and their adaptation for the manufacture of stone-ware, fire brick, etc. Another branch of the subject is the adaptation of clays for brick-making. In the course of an elaborate article in the *Polytechnic Review* on the general subject of clay for brick, we find the following:

We find that the clay employed in brick-making is composed of alumina, with greater or less proportions of silica, lime, water, iron and other components, as indicated by subjoined analyses. We find these grades of clay used in brick-making:

1. Pure, rich, strong clay; composed almost entirely of alumina and silica, with some iron, lime and magnesia. 2. Loams. 3. Marls.

We may say in general that the best brick clays are composed of silica three-fifths, alumina one-fifth, and the remaining one-fifth of iron, lime, magnesia, soda, potash and water. Where there is an excess of alumina over the silica, the bricks are apt to crack in burning; the presence of silica remedies this by rendering the bricks more porous. Where sand is added to the clay, it should be clean, sharp, fusible and not too fine; proper selection and proportion insure a hard, strong, ringing brick of good color. For the finer grades of bricks, a finer sand may be used. Foundry sand ("fine sand"), is not at all suitable; good building sand should be a proper material.

Loamy clays need the addition of lime as a flux; and are most commonly improved by the use of lime and ashes or "breeze," which, although affecting the color, benefit the burning. Sandy clays may be improved either by the addition of richer or purer clay, or by the tedious and expensive process of suspending them with water and using those portions which remain longest in suspension.

Brick clays often contain mica, feldspar, phosphate of iron, etc. Where mica and feldspar are present in connection with oxide of iron, they act as fluxes; and in known quantities either of them is helpful rather than undesirable. Flints and large lumps of carbonate of lime or of gypsum are injurious. Clays containing lime and little iron burn easily, as do those containing carbonate of lime; but the presence of carbonate of lime is injurious, as in the kilns this material is converted into quick-lime, which, afterwards slaking under the influence of air and moisture, bursts the bricks.

Pyrites is a very objectionable component of brick-clays; as the process of burning expels the sulphur, leaving behind ferric oxide or a basic sulphate, occupying less volume than the pyrites, and causing shrinking. For a similar reason, roots, sticks and other organic matter should not be present in the clay. Stones injure the bricks by expanding during the firing, and afterwards contracting more than the clay—thus leaving pits or holes surrounding them.

To Find the Contents of Boilers, Etc.

To find the contents of cylinder boilers multiply the area of the head in inches by the length in inches and divide the product by .1728; the quotient will be the number of cubic feet of water the boiler will contain. Example: Diameter of head, 36 inches; area of head, 1017.87 inches; length of boiler, 20 feet or 240 inches. Now multiply 1017.87 by 240 and the product will be 244,288.80; divide this by .1728 and the result will be 141.37 cubic feet, which will be the contents of the shell.

In fire boilers, multiply area of the head in inches by the length of the shell in inches; multiply the combined area of the flues in inches by their length in inches, subtract this product from the first and divide the remainder by .1728; the quotient will be the number of cubic feet of water the boiler will contain.

To find the requisite quantity of water for a

steam boiler: Add 15 to the pressure of steam per square inch; divide the sum by 18; multiply the quotient by .24; the product will be the quantity in U. S. gallons per minute for each horse power.

To find the required height of a column of water to supply a steam boiler against any given pressure of steam: Multiply the boiler pressure in pounds per square inch by 2.5; the product will be the required height in feet above the surface of the water in the boiler.

Another rule to find the requisite quantity of water in a steam boiler when the number of pounds of coal consumed per hour can be ascertained: Divide the number of pounds of coal consumed per hour by 7.5, and the quotient will be the required quantity of water in cubic feet per hour.

The Insecurity of Iron.

The Ashtabula disaster, says the *Mechanical Journal*, will increase the suspicion with which iron bridges have always been regarded by a good many persons. They will recall the terrible accident at Dixon, Illinois, on May 4th, 1873, when a new iron Truesdell bridge, believed to be in perfect condition, fell under a crowd who had gathered to witness a baptism, and many persons were horribly crushed and drowned. Other bridges that have unaccountably given away with less terrible results will be brought to mind by every railroad man or builder. There is no doubt that if security from falling is alone considered, no sort of bridge is so safe as a properly built wooden one, kept in good repair. The reason is that the strength of timbers is easily estimated and un-soundness readily detected, while on the other hand the strength of iron is dependent on subtle chemical and molecular laws, about which physicists are still in doubt. Constant jarring, for example, creates a peculiar crystallization among the particles of an iron bar or wheel which, without giving the slightest indication of itself, renders the metal liable to give way at any time. That iron is more brittle in intense cold is a fact as certain as experience can make it. The scientists may be correct in claiming that is not owing to changes in molecular system of the iron itself, but it may in many cases be accounted for by the inelastic condition of road beds and the earth generally, which throws a much harder strain upon iron rails or any iron structures in zero weather. Moreover, the cases where fractured cannon, broken car wheels, axles, or other iron fabrics, show old cracks, rust-marked, half destroying the strength of the article, and yet which have, again and again, escaped detection from the closest examination, show how difficult it is to tell when iron becomes unsound, even from the simplest causes. It is not likely, however, that wood will ever come back into general use for bridges. And such being the case, this Ashtabula horror emphasizes once more the necessity of a more exhaustive study of the chemistry and molecular structure of iron. The vast and constantly increasing extent to which it is entering into use for every species of building, makes this the most practical problem of modern science. But while the scientists are about their task, the Legislatures have something to do. There is at present no federal or State law requiring any particular strength in bridges. Builders may make what they please. Legislation of course cannot adequately deal with this complex matter, but what guaranty a proper law can afford, should promptly be given.

GOOD HEALTH.

Treatment for an Ulcerated Tooth.

Dr. Geo. L. Parmelee, of Harvard University, writes to the *Journal of Chemistry*, telling the cause of ulcerated teeth and the treatment therefor. If a longitudinal section be made of a tooth, a cavity nearly corresponding in shape to the external contour of the tooth will be found. This cavity is prolonged into the root, or roots, if there be more than one, and opens by minute orifice at the extremity of each. This is called the pulp cavity or chamber, while those portions extending into the roots are distinguished by the name of pulp canals. This pulp cavity is occupied by a highly vascular and nervous tissue, the dental pulp, which is continuous through the opening at the end of the root, with the vessels and nerves which supply the teeth and adjacent parts.

When from any cause the pulp of a tooth dies, what happens? The pulp being dead, of course decomposes; and if allowed to remain in the tooth, the gases arising from this decomposition must find a means of exit. If a cavity of decay exists, freely open, the gases arising from the dead pulp will escape through the cavity, and no trouble results. But should this cavity be closed, either by the impaction of food, a filling, or any other cause, the gases, finding no other vent, are forced through the minute orifice at the end of the root, where the vessels entered which supplied it with life, irritating the root membrane of the tooth and the surrounding parts. This irritation causes inflammation, and as this progresses pus is formed.

The first indication we have of this variety of toothache, is a slight soreness on shutting the teeth together, or on striking the affected tooth.

Soon the soreness increases, the tooth feels as if it was more prominent than the others, and one has a desire to be continually feeling of it, to see how things are progressing. The pain is dull, throbbing, and, owing to the parts being confined by hard, bony walls, severely intense, the whole jaw sympathizing.

As it is often necessary to destroy these pulps, what should be done to guard against toothache of this variety? After the life of a pulp has been destroyed, by the application of medicine to it, or any other cause, it should be hardened and withdrawn from its cavity—which is not a painful operation—the parts thoroughly disinfected, and the cavity carefully filled. If teeth are treated in this way, the chances of trouble are greatly lessened, and they may be retained as useful organs for many years and perhaps for a lifetime. What shall we do if this trouble does arise? Consult a competent dentist, not one who has picked up a little knowledge of teeth, and is a mere extractor and plugger of these organs, but one who has been thoroughly and scientifically educated for his calling, and he will know what to do. In case for any reason this is impossible, you may be able to relieve yourself.

In the first place do not delay in hope that the tooth may feel better, but attend to it at once. Remove if you can all foreign matter from the cavity, thoroughly washing it with tepid water, and get an opening into the pulp chamber. This alone will often cure it. Paint the gum freely all around the tooth with strong tincture of iodine, first drying off the moisture from the gum. Hold ice-cold water or lumps of ice continually in the mouth, but should you start on this cold water method of treatment you must keep it up for several hours, or it will be worse than useless. Hot foot-baths and saline cathartics. Let the tooth alone, do not keep feeling of it, thus keeping up the irritation which you are trying to allay. Remember that this form of treatment is not applicable to an exposed living pulp, but only in cases where this organ is dead. Cold water applied to an inflamed living pulp would only increase your agony.

Should you find that you cannot arrest the inflammation after a sufficient trial, you will have to take the other course, and that is, to hasten suppuration by warm applications directly to the part. For this purpose nothing is better than a split fig, roasted and laid on the gum. Warm fluids held in the mouth will sometimes afford relief. But it is wiser to go at once to a competent dentist, as serious trouble often arises from this form of disease. Never, on any consideration, apply poultices to the outside of the face, for should the abscess point and break there, a permanent and unsightly scar would be the result.

In closing I would say, that as "an ounce of prevention is worth a pound of cure," it would be much better to attend to your teeth in time, before the pulps become exposed, and save your teeth and yourself all this pain and trouble. You will never find any artificial teeth that will be the source of as much comfort as your own natural organs properly taken care of.

Analyses of Hair Dyes.

It is well for the public to know that most of the preparations for changing the color of the hair are vile poisons, though they are advertised as harmless. The *Medical and Surgical Reporter* says that the London *Lancet* had recently 21 "hair restorers," "hair dyes," analyzed. Out of the 21 examples examined, no less than 14 were practically identical in their nature. They contained sulphur, in suspension, and also lead in varying, but always very considerable, quantity. Three of these preparations have American labels, the rest were English. The descriptions varied a good deal. Only one was plainly described on the label as poisonous, if taken internally, while many were described as "perfectly harmless," "free from injurious substances," and so on. The prices varied from 25 cents to \$1.50 per bottle.

Two more samples, one of them American, were found to contain lead and sulphur, but in a different form. The sulphur was present as hyposulphite, and, in fact, these preparations may be substantially imitated by adding hyposulphite of soda to a solution of a lead salt. A white precipitate first appears, which dissolves in excess, and the solution so obtained does not give a precipitate with iodide of potassium. This is noteworthy, because in the handbill which accompanies one of the samples, purchasers are warned against the dangerous hair preparations which contain lead, as likely to lead to paralysis of the brain and insanity, and are directed to test all preparations with iodide of potassium.

In another sample, an American one, no free or loosely combined sulphur was found, but only lead, in considerable quantity.

Another of the preparations was contained in two bottles; in one of which ammonio-nitrate of silver, and in the other pyro-gallic acid was detected. This, therefore, belongs to an entirely different class from the preceding.

The remaining three preparations analyzed were intended for lightening, instead of darkening the color of the hair. No substantial difference between these samples was detected. Each was found to contain a tolerably concentrated and slightly acidulated solution of peroxide of hydrogen. It is well known that this is the active agent in preparations of this kind. It can hardly be considered as poisonous, but its action on the hair is said to be injurious.

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SAN FRANCISCO:

Saturday Morning, March 17, 1877.

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NEW ADVERTISEMENTS.

The Golden Piano; Mining Engineer and Metallurgist, Guido Kustel, S. F.; Tuolumne Hydraulic Mining Co.

MINING DECISION BY THE U. S. SUPREME COURT.—The decision rendered a few days ago by the United States Supreme Court, in the case of Solomon Heydenfeldt vs. the Daney gold and silver mining company, is the first mining case ever decided by that court. The opinion, delivered by Justice Davis, affirms the Nevada Supreme Court's decision, with costs, and that court affirmed the decision of Richard Reising, District Judge for Storey county. Judge Davis, speaking for the United States Supreme Court, held that the act of Congress, of March 21st, 1864, authorizing the people of Nevada to form a Constitution, under which act Nevada selected and conveyed the lands in controversy to the grantees of Heydenfeldt, did not constitute a grant in present of the premises; but that the grant remained inchoate and incomplete until the land was surveyed by United States authorities and the survey properly approved. Secondly, that survey and approval not having been made prior to entry to the company's predecessors in interest for mining purposes, the land was not by act of Congress, or in any other manner, ever granted by the United States to Nevada. Third, that under the entry of the company's grantees and their rights thereto, having become established prior to the survey of section 16 by the United States, the land was not included in nor did not pass to Nevada by the granting clause of the act of 1864, but, on the contrary, was excluded therefrom because previously possessed and occupied by defendant's grantees for mining purposes in conformity with the mining laws, rules and customs of miners in the locality where it is situated, and in conformity with the mining act of Congress approved July 26th, 1866.

The Egyptian Finance Committee have accepted the proposals of M. de Lesseps, made in the name of the Suez Canal Company, to complete and work the canal between Cairo and Ismailia, provided the company be authorized to levy certain dues upon vessels passing through the canal. Nearly completed works were formerly abandoned for want of funds. By the execution of Lesseps's plan, large tracts of desert land will be reclaimed to cultivation.

Foundry Notes.

The foundry business in San Francisco has been very dull during the past winter, but the foundrymen hope for better things with the advent of spring. Last summer trade was quite brisk, as a great deal of heavy machinery was sent to the Comstock. Of course in the winter months it cannot be expected that the manufacturers of machinery will have as much to do as in the summer when the roads are all open, but the past winter has been exceptionally dull. There is, naturally, small work of various kinds to do at all seasons of the year, but jobs, even of this kind, have not been as plenty as usual this winter. The depression which has existed for so long a time in the mining stock market has exercised an influence detrimental to the foundry business. It has created a distrust among capitalists, and prevented their investing any money in mining machinery, even in places where it was in contemplation to do so. The foundrymen in this city are mainly dependent on the mines for their very large jobs, and when the mining business is dull the foundry business is also. Most of the prominent mines on the Comstock are now supplied with first-class machinery, made at the San Francisco shops, and as new mines come into prominence they too must have good machinery. Still, with a dull stock market, very little new work of this character is ordered. The excitement in regard to Arizona mines at present may shortly make a market for mining machinery in that direction. One of our prominent foundrymen expresses the opinion that as much machinery will go this year to Arizona as to Nevada, as capitalists seem to be manifesting a desire to invest in Arizona mines, and there are plenty of good ones there to put money into.

The Union Iron Works have taken advantage of slack times to build a very fine new crane or derrick. It is quite an imposing structure, strongly built, and capable of lifting a weight of 40 tons; and Mr. Scott says he would not hesitate to trust it with 50 tons if occasion required. It is supported with seven braces of one and a half inch wire rope, running from the top of the upright to as many different supports. Where not convenient or judicious to fasten to the buildings, heavy beams are raised on end to take the outer ends of the wire ropes. These are on the extreme edges of the foundry lot outside of the buildings. The derrick is 40 feet high, and the arm is, from the mast, 40 feet long. The upper timber is made of wood 26 inches deep and 10 inches wide, and the whole structure is of corresponding strength. The derrick is handled by two small engines, but can be handled by hand when necessary. It is arranged to run 12 different speeds. The main chain for holding the weight is one and seven-eighths inches in size. The arrangement for swinging the crane is a friction device, similar to that used on an ordinary mining brake so that if there is too much momentum the weight has no chance to do any damage, as is the case when toothed gear are used. This a very useful addition to the outfit of this foundry, already very complete.

The Pacific Iron Works are comparatively busy just at present, although they have shared in the dullness felt by the other works of late. They are just shipping a 10-stamp mill to the Black Warrior silver mine in Peck district, Arizona, and building a full 10-stamp silver mill for the Hackberry mine, Arizona. With the latter goes a White rotary furnace for roasting ore. They have just put in place a new boiler for the steamship *California*, and shipped a 16-inch hoisting engine for the Gover mine in Amador county. The works recently built a new furnace for the New Coso mining company in Inyo county, with a capacity of 60 tons per day. This was built with cast-iron sectional water jackets. They also built a furnace for the Richmond mine in Nevada. They built the engine, boiler, winding-gear, etc., for the Sutter Street wire cable road, which recently went into operation in this city. Beside the mill for the Hackberry mine, referred to above, they have now in hand a furnace, engine, boiler and outfit for the Edith quicksilver mine in Lake county. This furnace has a capacity of 10 tons per day, and the owners of the mine intend putting up three or four more after this is started. A 14-inch engine and boiler are being built for the flour mill of Dorman & Co., corner of Sacramento and Drumm streets, in this city. They are doing some repair work on the steamer *Idaho*, and have considerable small work on hand.

JUMPING mining claims has been so successful of late that some people imagine that they can "jump" the whole property of a mining company. A case of this kind recently occurred in Alpine county, where some wisecracks relocated the Pittsburg mill, with boiler, engine, pans, battery, etc.

THE miners' strike at Wellington continues. There is no hope of a speedy adjustment of the difficulties. The 42 men who went up in the *City of Panama* to fill the strikers' places are still at Victoria.

PATENTS.—The Committee on Patents in the U. S. Senate is as follows: Wadleigh, Chairman; Booth, Chaffee, Kernan and Morgan.

Comstock Papers.—No. 19.

They go Actively Into the Business of Exploring The Country and Locating Claims.

In the last number of these Papers, we were led to remark upon the manner in which the Washoe miners, through an over-estimate of the mineral wealth of the country, were at the start betrayed into many wild schemes and much prodigal expenditure. In nothing did this excessive confidence display itself more signally than in the expedition with which the region for many miles around was explored, the numerous mining districts that were organized, and the multitude of claims that were taken up. Not until the month of September, 1859, did the new crop of adventurers begin to arrive in the Territory in considerable numbers, and yet within 16 months from that time as many as 25 or 30 different mining districts had been formed, the country from Esmeralda to Humboldt, and from the base of the Sierra Nevada east for a long distance having been run over and settled with scattering mining camps. The area thus partially explored and populated amounted to some 10,000 or 12,000 square miles, while the number of linear feet located might be literally counted by the million. That not much attention was paid to the

Mineralogical Character of the Ledges Located

It is needless to say, very little pains having been taken to determine whether they were ore-bearing or not. It was enough that there was a ledge or the semblance of one, the inexperienced and excited prospector concluding that any, even the smallest and most barren quartz croppings, were worth taking up, if indeed they did not present conclusive evidence of valuable mineral deposits below. The more claims of whatever kind a man was able to get hold of, the better were considered his chances for making a fortune, or rather the greater the fortune he might be supposed to have already secured. Unacquainted with the character of silver-bearing ores and lodes, without the skill or means for making assays, every reef of rocks met with and sometimes even the boulders found on top of the ground were located under some fitting name significant of their supposed great wealth, the sole ambition of these prospecting "tramps" being the securing of numerous "feet," as attested by the certificate of the accommodating recorder.

What Led to this Extreme Activity, and Tended to Foster These Illusory Notions

Of the vast mineral resources of the country, was the fact that the Comstock lode, which was made the standard for measuring the probable value of all others, was in no wise remarkable either in its surface dimensions or other external features. Its outcrop was neither large nor continuous, while the rich ores had as yet shown themselves at only two points along it. In the vicinity were other ledges to all outward appearance equally valuable; the Virginia, lying only a few hundred feet further west, presenting even bolder croppings at many places along it. The prospector found, in fact, fully as good looking ledges as this at Gold Hill and Virginia City wherever he went, wherefore it was not at all strange that he should, in his ignorance and inexperience, have attached to them an equal prospective value, and eagerly sought to secure as many of them as possible, an end that could be attained without much trouble or cost; and so the whole country was rapidly run over and locations made everywhere. It was unfortunate for the future of this industry that the business of silver mining amongst our people should have been inaugurated by the discovery of such an exceptionally rich lode as the Comstock proved to be, inasmuch as it led to an undue excitement at first, whereby both the miner and the general public were betrayed into all kinds of follies and prevented afterwards from exercising that degree of patience, industry and economy that would otherwise have been observed, rendering the business, most likely, a success from the start. Had we commenced on a lode carrying a low grade ore, we should have escaped the unhealthy excitement that ensued, while we would have been more apt to apply our labor and means with diligence and care in opening up the mines, satisfied to work hard and reap a moderate return. As it was, with our ideas inflated and our expectations exalted to the highest pitch, we commenced building at the top, converting the business, as it were, into a pyramid standing on its apex instead of its base, hence much of the disappointment and disaster that followed.

Developments Delayed, and Disappointment All Round.

The winter of 1859-60 set in early and proved to be a long and severe one, wherefore but little work was done on any of the numerous ledges taken up the fall before. The cold and stormy weather continued with snow and sleet quite into the summer, in the early part of which the Indian war broke out, still further delaying the work that would otherwise have been done and postponing it for another year. Not until the spring of 1861, therefore, did the business of active development begin, after which another year was required to prosecute this work to anything like determinate results, and when

these were reached they generally turned out to be unsatisfactory. Then came a reaction and for a time "feet" were in disfavor, till the glowing accounts from Reese river again revived the furor, and the business of prospecting for and locating claims became as active as ever, to be followed in a year or two by another decade, and this by the White Pine stampede, which without ending may justly be considered the culminating point in these vein mining excitements, Schell creek, Panamint and latest and least of all, Coso and Darwin, having all been movements of a milder type.

Nevada County Prospects.

The mining interests of Nevada county have been attracting much more attention of late than for some years. That county takes the lead in the mining industry of California. Prospecting and mining is prosecuted with good success, and a good many men have gone there to enter the field. The local papers say that the companies are now able to raise capital right at home to work promising enterprises. Several old claims have been started up again which were abandoned some time since. We are glad to see this spirit manifested anywhere in California, feeling sure that those who invest in home properties, economically managed, will do better with their money than by risking it in the stocks of mines of which they know nothing, and which are oftener run in the interests of the stock market than for legitimate mining. Nevada county has many good mines, and with home capital and good management they can be made to pay better than the ordinary run of mines.

A correspondent tells us in a letter written from Nevada City that quartz mining in that section of country promises well for the coming summer. Among the most promising of new developments may be mentioned that of the New England, under the superintendence of Mr. Lockhart. The first crushing averaged over \$60 per ton. They are now crushing again with even better prospects. The Mountaineer mine, situated about 1,000 feet from the Nevada and Providence mines, is looking well and is taking out better rock now than for some time past, the last crushing paying \$25 per ton. Our correspondent says further: in a back issue of the Press I notice a statement in regard to the contract let by the Mountaineer company; it was stated that the contract was let to John Stiles and Thomas Miner, this was incorrect, it was let to John Stiles and Wm. Dower to take out 500 tons of rock. They have sold their contract and the parties buying it are going down under the tunnel level and getting out very fine rock. The Providence company will start up their new works with full capacity this week. The Spanish mine is looking well and hauling ore to the Oriental mill for reduction. The mill gives the most satisfactory results of any in this section and is owned by Mr. Kitts. The Deadwood is looking well and has been incorporated.

Hale & Norcross.

The annual meeting of the Hale & Norcross mining company was held on Wednesday, when the following Board of Trustees was elected: George Congdon (President), John G. Congdon (Vice President), Solomon Heydenfeldt (Counsel), Wm. S. O'Brien, R. H. Follis, Con. O'Connor. Afterwards, Joel F. Lightner was re-elected Secretary and Philip Deidesheimer Superintendent.

James G. Fair, the retiring Superintendent, submitted the following report: Since my last report the energies of the Hale & Norcross company have been applied to the freeing of the mine of water, then nearly up to the 1700-foot level. During the year, heavy and expensive machinery has been erected, which is now in successful operation, and the water has been lowered 54 feet below the 1900-foot level, with the prospect of the mine being entirely freed from overflow in a short time, as the combined pumps of the Savage and Hale & Norcross have no difficulty in lowering it as against its present pressure or head; showing that its principal source of supply has been lessened. The drift connecting the Savage and the Hale & Norcross, on the 1900-foot level, has been cleaned out and repaired its entire length, which gives a free and perfect ventilation at that depth, and will facilitate the work of opening the mine below that point. With the mine free from water prospecting in the 2200-foot level and in the winze below that level will be resumed, where the work done over a year ago promised a change for the better.

Joel F. Lightner, Secretary, submitted a report showing the receipts of the year to have been \$579,725.78, the main items of which were: From assessments, \$567,890 (which includes a balance of \$78,550 from assessment No. 49, of the previous fiscal year); miscellaneous sources, \$3,695.52; Nevada Bank, \$7,537.34. The principal items of the disbursements were: Construction account, \$283,048.31; mine account, \$131,714.30; Chollar-Norcross-Savage shaft, \$86,110.04; general expenses, taxes and minor items making up the balance of expenses, which amounted to \$579,724.89.

At the Exchequer mill, Alpine county, the O'Hara Champion furnace is finished and running. There are about 2,000 tons of ore ready for working. The furnace is expected to solve the question of working the rebellious ores of the Exchequer mine.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

VALVE FOR STEAM ENGINES. Samuel H. Wheeler, San Francisco. The object of this invention is to give such a distribution of steam or other fluid in reciprocating engines that the motions of the main piston of the engine shall correspond both in extent and time of movement with the motion impressed upon the distribution valve of the engine; the distribution valve being operated by any means independent of the main engine, as, for instance, by manual force or by an auxiliary or supplemental engine. This is accomplished by placing a movable seat under the distribution valve and connecting it to the main piston in such a manner that when the motion of the distribution valve upon this seat gives steam behind the main piston, the motion thus impressed upon the piston will be communicated to the movable seat and will cause it so to move under the distribution valve as to cut off the steam supply. By this means the motions of the main piston are made to correspond with those of the distribution valve, the piston moving while the valve is in motion and coming to rest when the valve is arrested. This valve motion, while it has for its object the regulation of the motion of the main piston of the engine to correspond with the motion of the piston of a supplemental engine or the hand of an operator, as in the United States letters patent issued to the same inventor, July 25th, 1876, and in those issued to H. Davey, September 7th, 1875, has this difference from them; that in this invention the distribution valve always makes its full stroke forward and backward during the continuous working of the engine, while, by the combination described in those patents the valve is constrained by the motion of the main piston to remain very near to its middle position. Mr. Wheeler, therefore, claims that in this invention, on account of the combination of parts that he uses in it, the motion of the main piston corresponds, both in extent and time, with the motion impressed upon the main valve. The drawings accompanying Mr. Wheeler's patent illustrate the application of his invention to a pair of rotative engines designed to be used on a foundry crane. In this instance motion is given to the distribution valves through the medium of a shaft and eccentric operated by a crank handle, the crank handle being turned by the attendant; the engine shaft will receive a corresponding motion, and will continue its motion, stop or reverse, just as the hand of the attendant may be moved. This arrangement Mr. Wheeler considers to be particularly well adapted to this and similar purposes, as for instance, steering gear for ships, etc., since the motion of the engine is under complete control.

BED BOTTOM.—Robt. M. Grunwell and Casey Newhouse, Santa Rosa, Sonoma Co. This invention relates to that class of bed bottoms in which an upper and lower frame is used. The improvements relate, first, to an improved spring connector for sustaining the upper frame in its proper relation to the lower frame; secondly, to an adjustable strap connector for adjusting the tension of the entire series of the springs in the bed in order to convert the bed into a hard or soft bed as desired; thirdly, to an improved arrangement for attaching the upper ends of the outside or border spring to the upper frame; fourthly, an improvement in forming and connecting the upper rings of spiral springs; and, lastly, in the arrangement of the springs so that the number of springs in the bed can be increased in a very simple manner.

VALVE AND CUT-OFF.—John C. H. Stat, S. F. This is an improved balance slide valve and drop cut-off, and it consists mainly in a novel construction of a hollow valve balance by receiving the steam to its interior and, provided with cut-off plates which regulate the steam ports. These plates are operated by means of exterior and interior levers, and a peculiar arrangement of angular plates over which the end of the exterior lever moves alternately, so as to form a drop cut-off, which is caused to act instantly by means of a steam cushion or spring. The point at which the steam is cut off is regulated by means of an inclined plane or other device, which is operated by the governor and adjusts the angular plates in proportion to the speed of the engine.

RE-SAWING MACHINE.—Samuel Putnam, Emigrant Gap, Placer Co. This invention relates to an improved machine for accomplishing that class of work known as re-sawing, in which ordinary boards such as are turned out by saw-mills are split into thin boards for special uses, such as for making boxes, etc. The improved machine is adapted for accomplishing the work with a circular saw and the operation is automatic and continuous; this is accomplished by a combination of devices.

MINING COMMITTEE.—The Committee on Mines and Mining in the U. S. Senate is composed of the following: Sharon, Chairman; Chaffee, Kirkwood, Plumb, Hereford, Cook and Hill.

Ancient Ruins in Colorado and Utah.

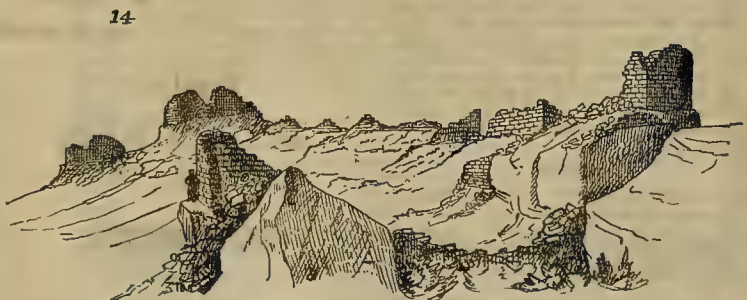
In our last two numbers we have devoted considerable space to a description of the very interesting ruins found in Colorado and Utah by the Hayden survey party, and now conclude the subject with a further description of some of the most curious of the structures found in the region referred to. While going down the canyon of the Mancos, one of the party discovered, far up the cliff, what appeared to be a house with a square wall, and apertures indicating two stories, but so far up that only the very sharpest eyes could define anything satisfactorily. They had no field-glass with them and to this fact is probably due the reason that they had not seen others during the day on the same line; for there is no doubt that ruins exist throughout the entire length of the canyon far above and out of the reach of ordinary observation. Cedar and pines also grow thickly along the ledge upon which they are built, hiding completely anything behind them.

The discovery of this house, so far above anything heretofore seen, inspired them immediately

tying it to a tree, the others easily ascended.

The house shown in Fig. 12, on this page, stood upon a narrow ledge which formed the floor and was overhung by the rocks of the cliff. The depth of this ledge was about ten feet by 20 in length, and the vertical space between ledge and overhanging rock some 15 feet. The house occupied the left hand half, the rest being reserved as a sort of esplanade, a small portion of the wall remaining, which cut it off from the narrow ledge running beyond. The edges of the ledge upon which the house stood were rounded off so that its outside wall had to be built upon an incline of about 45°. The esplanade, too, had been extended by three abutments, built out flush with the walls of the house upon the steeply inclined slope and giving support probably to a balustrade.

The house itself, perched up in its little crevice like a swallow's nest, consisted of two stories, with a total height of about 12 feet, leaving a space of two or three feet between the tops of the walls and the overhanging rock. The ground plan showed a front room about six by nine feet in dimensions, and back of it two smaller ones, the face of the rock forming their back walls. These were each about five by seven feet square. The cedar beams which had divided the house into two floors were gone, ex-



ANCIENT RUINS IN COLORADO AND UTAH.

with an ambition to scale the high and explore it, although night was drawing on. All hands started up, but only two persevered to the end. The first 500 feet of ascent was over a long steep slope of debris, overgrown with cedar. Then came alternate perpendiculars and slopes. Immediately below the house was a nearly perpendicular ascent of 100 feet, which they were only able to surmount by finding cracks and crevices into which the fingers and toes could be inserted. From the little ledges occasionally found, and by stepping upon each other's shoulders, and grasping tufts of yucca, one would draw himself up to another shelf, and then, by letting down a stick of cedar, or a hand, would assist the other up. Soon they reached a smooth steep slope, in which there had been cut a series of steps, now weathered away into a series of undulating hummocks, by which it was easy to ascend, but without them almost an impossibility. Another short, steep slope and they were under the ledge upon which was the house. As it was now quite dark they returned, waited and ascended again. They hauled the boxes containing the camera and chemicals up the precipice with ropes; one man was pushed up ahead, over the worst place with the rope, and

cept a few splintered pieces in the wall. In the lower front room are two apertures, one serving as a door and the other, up near the ceiling, as an outlook over the canyon beneath. In the upper story a window corresponding in size, shape and position to the door below, commands an extended view down the canyon. Directly opposite this window is a similar one opening into a large reservoir or cistern, the upper walls of which come nearly to the top of the window. From the window and extending down to the bottom of the reservoir are a series of cedar pegs about a foot apart, enabling the occupants to easily reach the bottom.

The entire construction of this little human eyrie displays wonderful ingenuity, perseverance and some taste. Perpendiculars are well regarded, and angles carefully squared. Stones of the outer room or front were squared and carefully faced, but were not laid in regular courses as they were not uniform in size. About the corner of the windows considerable care and judgment were evident in the overlapping of the joints so that all was held firmly together. The back portion is built of rough stone firmly cemented. The mortar is compact and hard; a grayish white, not resembling lime but cracking

all over. All the interstices between the larger stones were carefully chinked in with small chips of the same material. The partitions were of the same character as the walls outside, having somewhat the appearance of having been rubbed down smooth after they were laid. Most peculiar, however, is the dressing of the walls of the upper and lower front rooms, both being plastered with a thin layer of firm adobe cement of about an eighth of an inch in thickness and colored a deep maroon red, with a dingy white band about eight inches in breadth running around floor, sides and ceiling. No signs of ornamentation other than the band alluded to were visible. The floor had been evened up with cement similar to that used in the walls.

The party prospected the ledge upon which this house was found and came upon the ruins of half a dozen houses of smaller size. One little house in particular, at the extremity of the ledge, was especially unique in the daring of its site, filling the mind with amazement at the temerity of the builders and the extremity to which they must have been pushed.

The party continued on down the canyon, the features being much alike. At some distance down, however, the scenery changes, the highest level of the mesa coming forward and towering over the valley with a thousand feet of altitude; the bottom lands widening out to a half and three-quarters of a mile in breadth. Everything is dry, dusty and barren, the stream itself losing in volume and becoming more turbid. Figure 13 represents in outline the characteristics of the canyon or valley at this point. In the high bluff on the right hand of the sketch are many curious and unique habitations. The position of these houses can be seen in Fig. 13, in dark heavy lines near the summit, just above the most precipitous portion of the bluff, generally at a height of from 600 to 800 feet above the level of the canyon. The house shown in Fig. 12 is in the same sort of a position. Fig. 14 shows a sketch of some of the larger of the ruins which we have described.

Aside from the interest attaching to the ruins themselves there are thrown around them the romance and charm of legendary association. The story runs thus, as given to Mr. Jackson's party by the guide: Formerly the aborigines inhabited all this country. They had been over as far west as the headwaters of the San Juan, as far north as the Rio Dolores, west some distance into Utah and south and southwest throughout Arizona and on down into Mexico. They had lived there from time immemorial. They cultivated the valley, fashioned whatever tools and utensils they needed very neatly and handsomely out of clay and wood and stone, not knowing any of the useful metals; built their homes and kept their flocks and herds in the fertile river bottoms and worshipped the sun. About 1,000 years ago, however, they were visited by savage strangers from the north, whom they treated hospitably. Soon these visits became more frequent and annoying. Then their troublesome neighbors—ancestors of the present Utes—began to forage upon them and, at last, to massacre them and to devastate their farms; so, to save their lives at least, they built houses high upon the cliffs, where they could store food and hide away till the raiders left. But one summer the invaders did not go back to the mountains, as the people expected, but brought their families with them and settled down. So, driven from their homes and land, starving in their little niches in the high cliffs, they could only steal away during the night and wander across the cheerless uplands. At the canyon of the Hovenweep, Utah, they halted and probably found friends, for the rocks and caves are full of the nests of these human wrens and swallows. Here they collected, erected stone fortifications and watch-towers, dug reservoirs in the rocks to hold a supply of water and once more stood at bay. Their foes came and for one long month fought and were beaten back, and returned day after day to the attack as merciless and inevitable as the tide. Meanwhile, the families of the defenders were evacuating and moving south, and bravely did their protectors shield them till they were safely 100 miles away. But the narrative tells us that the hollows of the rocks were filled to the brim with the mingled blood of besiegers and besieged, and red veins of it ran into the canyon. It was such a victory as they could not afford to get again, and they were glad to follow their wives and little ones to the south. There, in the deserts of Arizona, on well-nigh unapproachable and isolated bluffs, they built new towns, and a few descendants—the Moquis—live in them to this day, preserving more carefully and purely the history and veneration of their forefathers than their skill and wisdom. It was from one of their old men that this traditional sketch was obtained. The floor, of nearly white sandstone, upon which the butte stands, is stained in gory streaks and blotches by the action of an iron constituent in the rocks of another portion of the adjoining bluffs, and this feature gives rise, probably, to the legend. Half a mile back, or north, from this historic butte, is a group of small cave houses. A long bluff line, about 100 feet in height, of alternating bands of red and white sandstone, has, along a line of its upper strata, quite a number of shallow caves, in which are snug little retreats, securely walled in, the masonry perfect and substantial. Along the top of the bluff are traces of old walls, but now well-nigh obliterated.

SOME of the principal coal mines of Pennsylvania, after being idle for many months, have resumed work again.

The Marble Range of Calaveras County.

A correspondent of the *Calaveras Chronicle* says: I believe it is not generally known that there is in the county of Calaveras immense deposits of that peculiar formation of limestone known as marble. Thinking that a description of the different localities where it exists may be interesting, I propose briefly describing them, hoping that it may attract the attention of those interested in the development of the natural resources of the Pacific slope to the fact that there is in the marble quarries of this county an opportunity to invest capital that would increase in value for all time to come, for I consider the deposits of marble in this county actually inexhaustible. The vast quantity that is exposed to view upon the surface, added to that which is met with in the various mining operations under ground where there are no indications of it upon the surface, goes to confirm me in the belief that the profitable quarrying of marble will, at no distant day, be one of the leading interests of this county. The great variety of marble in color and fineness of grain, indicates that marble can be obtained here for any and every purpose for which it is or may be required. The large amount that lies in solid ledges and in large boulders—not under the surface of the earth but on and above the surface—offers facilities for quarrying at a much less expense than can be done at any of the marble quarries in the Eastern States.

Before entering upon a detailed account of the marble localities in this county I propose giving a short account of what has been done towards developing the marble interest in Tuolumne county, as the same ledge of marble that runs through Calaveras extends across that county. What has been done there to open the only quarry that has been worked upon the vein will indicate what will be the cost of opening 100 quarries that might be opened in the two counties. About 16 years ago one of Devine's marble cutters, of Sacramento county, came into this county prospecting for "California marble" with which to build the monument to the memory of Broderick. Devine left his mark on many of the ledges in this county. At several places he quarried and worked into shape large blocks to prove the quality of the marble. Crossing the Stanislaus river into Tuolumne county he found better facilities for getting the marble to market by reason of the great number of teams engaged in hauling freight from Stockton to Columbia. They would take the marble for the down trip at a comparatively low price.

He decided to open a quarry on that side of the river, and selected the site where the marble known as "Columbia marble" is now quarried. It is about half way from Abbey ferry to Gold Spring, some three miles west of Columbia. The quarry is now owned by John Grant, of San Francisco, by whose energy and perseverance the marble has been brought into demand. A small mill has been erected, where the marble is sawed into slabs and sent to San Francisco. Also many blocks are sent there, too, to be sawed by the marble mills in that city. From the day that Mr. Grant took hold of that quarry he has had the whole marble interest of the world to contend with. The great distance of the quarry from water carriage necessitating a long and expensive hauling by team, together with the continued opposition of marble dealers and workers in San Francisco, put obstacles in the way of its introduction that would have deterred any one possessing less energy and perseverance than Mr. Grant. But he has triumphed over all opposition. The value of it is acknowledged by all. He has done the prospecting—those who may take hold of the business will reap the benefit of his expensive labor. It is due, perhaps, in a great measure to the late Mr. Ralston that the marble has been brought into demand to the extent that it has. He saw the value of it, and the necessity of encouraging its development. He contracted for a large quantity and used it in the construction of the Palace hotel. I have been told that \$10,000 was paid out before a block was sent to San Francisco. Large as that may appear it is but a small amount, in comparison to what it costs to open quarries in other places.

In an article on the marble of Rutland county, Vermont, by S. M. Dorr, he says, "it is not an unusual thing for a quarryman to spend \$60,000 in uncovering and preparing a quarry before finding blocks good enough to pay the expense of sawing." The mill at the quarry is built close alongside of the main ledge, on the south side of it. The work that has been done in opening the quarry is at the east end of the mill, extending about 75 feet from the mill, 100 feet south of the ledge, and about 20 feet below the surface. That depth was necessary to reach the bottom of a boulder that has occupied two seasons in quarrying. A plain statement is that the ground worked out, as the miners say, is 100 feet by 75 feet, and 20 feet deep. The solid ledge stands about 10 feet high, against the back of the mill, rising gradually for 500 feet until it is about 100 feet high above the mill. At the east end of the opening the solid ledge rises about 100 feet perpendicularly, and of all the marble that has been quarried in the 16 years not a block has been taken from the main ledge. It has been all taken from boulders measuring from 10 to 30 feet in diameter. It is said that when Governor Irwin vetoed the Oakdale and Columbia railroad bill he gave the Tuolumne delegation, as one of his reasons, "that the marble and lumber would soon be exhausted and then they would be worse off than they are

now." The Superintendent, Mr. McNamee, tells me that it will take two years more to work up the boulders between the mill and the solid ledge, so as to get a good face upon it. Now, Mr. Grant has a claim of 160 acres. If it will take 18 years to work out a space 100 feet square and 20 feet deep, how long will it take to work out the 160 acres?

Lake County Mines.

The *Lower Lake Bulletin*, in an article on the mineral resources of the county, speaks as follows of the

Sulphur Bank Property.

This mine is located in Lake county on the east bank of the east arm of Clear lake, and about 10 miles from the town of Lower Lake. It is perhaps one of the most remarkable deposits of cinnabar in the known world, being 1,800 feet long by 750 wide, and the lowest depth yet reached is probably 100 feet. The ore is better at this depth than at the surface. The assayer, Mr. M. J. Walsh, informs us that they had no means of ascertaining its thickness, but supposed it to be several hundred feet, and that the deeper they dig the higher the grade of ore, and all the cinnabar found thus far contains a greater quantity of sulphur than any other known, but notwithstanding this fact, it has yielded a large per cent. of silver from the surface.

The mine is worked by large open cuts, and quarried direct into carts—thus doing away with all the expensive machinery needed in other quicksilver mines.

Conveniences.

Not only is the Sulphur Bank fabulously rich, but has conveniences which no other mine possesses. Near by, between four and five miles, are five limestone quarries, to which there are fine wagon roads. The rock is hauled and burnt on the premises for lime. All the brick needed is also made on the grounds.

The Works

Are extensive—consisting of six furnaces, five of which, of the Lightner patent, are for fine ores, the other is for coarse ores, and is made after the Knox & Osborn patent. They have just finished another, different in construction from either one of above, for the purpose of burning soots, patented by the superintendent, Mr. Lightner. There are three benches of retorts, and when they will have completed all the works now in course of construction, they will be able to reduce 100 tons of ore per day. The company have just finished the building of a large flume four by four, and 1,500 feet long. Also six rotary driers for the purpose of drying the ore before it is put in the furnaces. The company have about 4,000 acres of land, and it is used for grazing and farming purposes, and extends along the water front some 10 miles. An extra large steam tank-pump of the Hooker patent, with a five-inch pipe 750 feet long, which forces the water from the lake to 15 large tanks above the works on the hill, has just been put up. This supplies all the water needed, which is conducted to all parts of the mine through pipes. The number of men employed to carry on this extensive mining operation is 175, most of whom are Chinamen, and do the principal part of the work, with white men for overseers. The Sulphur Bank produces from 900 to 1,000 flasks per month, and when all the works are fully completed, the product will be largely increased. One good feature, which is worth mentioning, is that no bar-rooms, or loafers, are allowed on or about the premises. The officers and owners of this mine are: President, John Parrott; Vice-President, J. W. Burling; Secretary and Treasurer, Lucian Herman. Directors—John Parrott, Tiburcio Parrott, J. W. Burling, H. L. Lightner, W. Burling. Superintendent—H. L. Lightner; Assistant Superintendent, J. E. Tucker; Assayer, M. J. Walsh.

Abbott Mine.

The Abbott quicksilver mining company, located about 10 miles southeast of town, near Morgan valley, is prospecting well. A tunnel some 300 feet long, which the company has just run, struck rich paying ore of about three per cent. grade. The ledge runs northeast and southwest. Plenty of wood and water, and easy of access.

Manzanita Gold Mine.

This mine, located on Sulphur creek, Colusa county, 23 miles from this town, is said to be one of the best in the Coast range. It has been prospected for years, and is owned by a San Francisco company. Recently a 10-stamp mill was erected on the mine, and is said to be paying well. Placer mines have been discovered in the neighborhood, and quite an excitement prevails thereabouts.

Sulphur Bank, No. 2.

The Sulphur Bank No. 2, 10 miles from Lower Lake, on the Lakeport road, shows a splendid prospect. A tunnel some 300 feet long has been run, and a large deposit of high graded ore found.

ERICH G. GAERTNER, MINING ENGINEER.

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Cost of Roasting and Chloridizing by this Process:

Two cords of wood at \$30.....	\$12.00
Two brenen at \$4.....	8.00
1,500 lbs of salt at 14c.....	22.50
Wear of shoes and power.....	1.50

Cost for 15 tons.....\$44.00
Cost for one ton.....2.93 1/3

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Consolidated Co.'s mines, in the Peavine District. For further information, apply to

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REVOLVING FURNACE,

For Chloridizing, Desulphurizing and
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STEAM ENGINES, SAWMILLS, SHAFTING, GEAR-
ING AND MINING MACHINERY.

Send for our Illustrated catalogue.

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The Great Western Scroll Saw Co.'s new and improved \$5.00 Foot and Steam Power Scroll and Bracket Saw is the best one yet invented. With it men and boys are making from \$3 to \$10 per day. We will send you a Machine, six Saws, 15 Patterns and two feet of prepared wood, on receipt of \$5. Address,

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Leavenworth, Kansas.

SUTTER CREEK, February 26th, 1875.

Messrs. Dewey & Co.—I have received my Letters Patent through your agency. And, for your promptness, accept my thanks. Yours,
S. N. KNIGHT.

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ASBESTOS CEMENT FOR LEAKY ROOFS,
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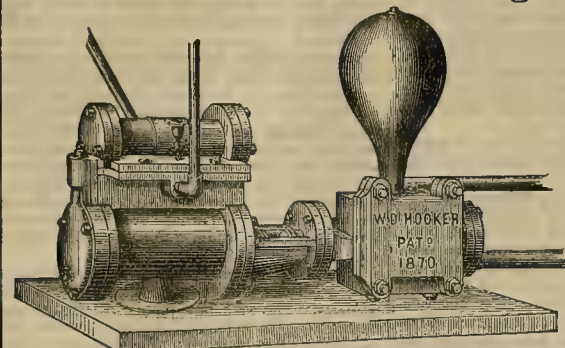
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SIMPLE, CHEAP AND DURABLE.

Adapted for all purposes for which Steam Pump are used.

The Best Pump in Use.

Send for CIRCULAR.

N. B.—Also manufacturer of Hooker's Deep Well and Double-Acting Force Pump. Received the Silver Medal awarded at the last Mechanics' Fair in San Francisco.

"SPEAKS WELL," ETC.—We would return thanks for an exchange and back numbers of the MINING AND SCIENTIFIC PRESS, published by Dewey & Co., of San Francisco, Cal. It is a well edited, interesting, and valuable journal and speaks well for our Pacific neighbors.—U. S. Mining and Manufacturing Journal.

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Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCH SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

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Manufacturer of ARTIFICIAL LIMBS,

Of 166 Tehama street, has removed to No. 3 Geary street; office, room 2, fronting on Market, opposite the head of Third street.

Continued from page 165.

brought to some point as near as possible to the ground for the reduction of the ore.

Upon the Silver Glance, more familiarly known as the Johnson mine, there is a force of men stopping for ore. A large supply of charcoal has been laid in and the furnace was to be started up for its second run last Monday. The last run resulted in the production of 16 tons of bullion, the aggregate value of which amounted to over \$40,000. The Silver Glance mining company is a Boston company, and has gone to work in earnest, paying greenbacks for everything it gets and giving satisfaction to everybody. It now employs a force of 40 men.

COL. DAVE BUEL has left Mohave county and gone to Utah to engage in mining there.

In Cedar valley work is being done upon the Arnold ledge by Messrs. Orr & Jerome, and the Kimball Bros., who are at work on the original location and are getting out some high-grade ore, which will go about \$600 per ton, which they are sacking and sending to San Francisco.

DIFFERENT DISTRICTS.—William Jackson and R. A. Arnold have been on an extended hunting and prospecting trip. They left here in December, in company with R. H. Marn, and went to the Black Canyon country, where they found an excellent mineral region, and from thence to Phoenix and then to Globe City. At Globe and in the other mining districts of Pinal county they found quite a thriving community of miners, all of whom seemed to be sanguine as to the prospects of the country. Arnold and Jackson both agree in saying that the world cannot beat some of the Pinal mines for the richness of their ores. From thence they went to the Aravaipa country in Pima county, and they say that the mines in Guizut district have more indications of being true fissure veins than any they saw on the trip. The ores are low grade, but the ledges are large and well defined, having good walls and being traceable for miles. Several Mexican arastras are running in Globe City.

PECK.—Arizona *Enterprise*, Feb. 24: In the Peck district things are now booming. Work is being steadily done in the Peck mine, which is showing splendidly. In the main tunnel north from the shaft, some of the richest ore yet taken from the mine is being extracted. Old miners, familiar with the leading mines on the coast, admit that they have rarely seen it equaled and never excelled. And there is lots of it. A tunnel has been started on the north side of the hill, and will be put through, as fast as men and giant powder can do it, until it reaches the main shaft. The completion of this tunnel will open a large section of ground and give greater facilities for the extraction of ore. The water in the main shaft is increasing, though no difficulty is yet experienced in keeping it from hindering work.

TURKEY CREEK.—Our miners are all hard at work in this district and the different claims are all looking well. The Goodwin is producing some very rich ore. The Trinity, owned by Simmons, Hall & Co., has reached a depth of 25 feet, showing in the bottom of the shaft, a vein two feet thick. Assorted ore from this mine gives a yield all the way from \$500 to \$1,500 per ton. There are three veins in this location, which, from their general course, eventually come together. At present the work is confined to one. It is the intention, however, to commence on the others in a short time. The smelter at this place, owned by Rouse & Munson, will shortly be started up. They have let a contract for a large quantity of charcoal, and men are at work burning it.

BRADSHAW.—From Bradshaw district I learn of active operations all over the district. The expected early arrival of C. A. Luke's mill has inspired everybody with new hope, and all hands have started to extract ore and be prepared to have it reduced when the mill is set up.

Colorado.

ORE MARKET.—Colorado *Miner*, March 10: One of the most encouraging features of this camp is that the facilities for selling every grade of ore that can be mined are unequalled by any other locality in the State. Low grade stuffs find ready sale at the various concentrating works at living figures. High-grade ore is eagerly sought for by all dealers, and brings prices that would surprise the denizens of slow-going camps, where there is no competition and but a little capital invested in the business. Here no one need stop work for want of a market for his product. Buyers are ready and have plenty of money.

THE DIAMOND TUNNEL.—After undergoing a thorough repairing of ventilating machinery, timbering and extending of tramming facilities, the Diamond tunnel has started up work with unusual activity. This tunnel is now in splendid condition, and accommodating a large number of lease workings, from which the company will in a short time realize a good profit. The tunnel is being driven ahead by a large force, on a contract, to the intersection of the Dives-Pelican, Cory City and other lodes, and there are four lodes besides the Baxter now being worked through the tunnel. Superintendent J. A. Fish has applications for leases nearly every day, and is kept quite busy.

THE BURLEIGH TUNNEL.—In the general revival that is going on in the district, this noted tunnel is coming to its full measure of praise. Under the management of Col. Ivers Phillips, Superintendent, it is being driven forward rapidly; it is already in a distance of over 2,000 feet, and is going along into the heart of the mountain at a very satisfactory rate of progress. It is seven feet high by eight feet wide. Two of the Burleigh improved drills have been put at work in the heading. Mr. John Green has charge of the heading, and Mr. C. N. Loring has charge, under the Superintendent. In the lode now worked there is from 15 inches to three feet of solid mineral, 65% lead. The first-class is shipping ore, the remainder sold to concentrating works. A drift has been run 200 feet west of the tunnel. In the west workings there are 14 men employed, in the east, two. Outside, in the tunnel, there are 19 men employed.

Idaho.

THE MINES.—Owyhee *Advertiser*, March 10: The outlook for the coming season in Owyhee is still somewhat mystified, and there is a feeling of uncertainty regarding future prospects, in consequence of the large number of mining suits to be decided here within the coming three months. In some instances there will be a change of ownership in the mines, many of which will be worked only on a small scale during the summer. There are reports that the companies below, interested in some of the leading mines, will not allow their valuable property here to go by default, and will take steps soon to adjust the claims and renew operations. It would, unquestionably, be for the interest of the capitalists having something at stake here to take this course. Our mines cannot be worked successfully on a small scale. Local capital is insufficient to meet the requirements of the times. Work these mines on a small scale commensurate with their merits, and work them honestly, and there are no better investments anywhere in the shape of mining propositions. Immense sums of money have already been spent in building valuable hoisting works over these mines, and those interested will make a great mistake if they allow such valuable property to be sacrificed. The limited work that has been performed on these mines during the past few months was attended with very good results, in so far as the quality of the ore taken out is concerned. There is a mine on War Eagle mountain but what will pay handsomely if judiciously worked, and all our old miners left here are fully convinced of the truth of this, and will not be slow to take advantage of any emergency looking to the prospects of their being interested in property about to be sold. As the prospects of the prospects are progressing very favorably and the prospects are brightening every day. The Belle Peck is looking first-rate. There is a large force of men at work sinking the shaft and running levels. Work continues at the Potosi as usual. A considerable quantity of rock has been shipped to the Golden Chariot mill for crushing the past week. The developments at the Hidden Treasure ledge, Empire City, are still creating a great excitement. We learn that operations will soon be resumed at South Mountain, some new machinery being on the way there. At the Wagonator camp preparations are being made for a busy season. The quartz mill there will resume operations in a week or two.

Montana.

BUTTE.—New Northwest, March 7: One principal thing remains yet to be determined by practical workings in the camp—the character of ores below water level. Expert miners hold there is no reason why there should not be as good below as above water, and the copper leads worked have maintained or improved their value. But this matter will soon be solved, and if the result is favorable, it will create such a furor about Montana mines as has not yet been seen. Three-fourths of a mile north of town and lying within pistol shot of each other, are the Rainbow, Lexington and La Plina leads, now developed to water, each owned by those abundantly able to develop, and each ready to begin sinking in water. These three leads alone if they are worked and hold good as they appear now will support a town of 5,000 people. The four mills of the camp are all pounding ore and Judge Davis is reducing Lexington ore in mill at \$14 per ton, with his facilities for economical handling not yet complete. For all, we have never seen a more prosperous camp than Butte, or any with so evident a substantial basis. A few months more will work wonders in the mines.

Utah.

SALE.—Correspondent Salt Lake *Tribune*, March 3: The Live Yankee mine, in Bingham, was sold yesterday to a Michigan company for \$35,000. It is a property which has the reputation of being first-class, and in the hands of men from Michigan, who as a class have the most successfully managed Utah mines, it will doubtless prove a remunerative investment.

DUGWAY MINES.—Smith & Co., of Chicago, who have erected furnaces, own some of the best developed property in this district. Their Mayflower mine is down about 160 feet, laying bare a large body of ore, showing a true vein. The Commonwealth, owned by Clark & Co., of Dry canyon, is also producing some good ore, and work is being prosecuted vigorously. They have considerable ore out waiting for the smelter to commence work. The Alpey mine is down 40 feet, showing a vein of two feet of ore assaying 40 oz. of silver to the ton. About the first of April the furnaces erected by the Chicago company, will commence reducing ore, and Dugway will undoubtedly be one of the liveliest camps in the Territory. There are a number of prospects that are being developed, and promise valuable returns, and as soon as the smelters get to work, the district will swarm with hardy miners.

DRY CANYON MINES.—Cor. Salt Lake *Tribune*, March 10: The most reliable index to a wholesome revival of mining affairs is the fact that numerous new prospects are being vigorously worked. With due deference to the many valuable mines in the various districts of Utah, it is an established belief that the thoroughly tested mineral veins, lodes and deposits of this camp will ever be incorporated upon the roll of genuine merit as peerless. A sorted depth of 500 feet, the Desert is yielding such masses of ruby silver as, perhaps, have never before been known in the annals of mines. In consequence of the inclement weather, work on the horse tramway has been temporarily suspended. I am informed that this tramway will be extended around to Mahogany hill, to further facilitate the shipment of ore from the Queen of the Hills, Florida, Herschel and other mines located in that region of mineral wealth, making the circuit of the environs of Jacob City.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

HEMLOCK CONS. S. M. Co.—March 9th. Location: Nevada. Capital stock, \$10,000,000. Directors—B. F. Fish, William Whalen, J. J. Dolan, T. G. McLaren and S. E. Holcombe.

SAN FRANCISCO PAVEMENT CO.—March 10th. Object: To deal in patent pavements. Capital stock, \$100,000. Directors—James C. Truman, Charles M. Gilmore, George L. Edgar, Charles F. Howland, Charles S. Fitch.

GERMANIA CONS. G. & S. M. Co.—March 10th. Location: Washington and Prince Edward mines, Sierra county, Cal. Capital stock, \$300,000. Directors—H. H. Flodo, H. W. Schurnd, Philip Wahlheim, Joseph Feld and Chas. Ruppel.

RICHMOND BASIN M. Co.—March 13th. Location: Globe district, Arizona. Capital stock, \$1,000,000. Directors—Franklin Lawton, A. P. Brynton, B. Lingley, E. P. Gaertner and A. G. Sialoff.

ORANGE M. Co.—March 13th. Location: Arizona. Trustees—John Burke, Martin Y. B. Gardiner, Daniel C. Van Nostrand, George W. Van Horenberg and John McCafferty. Officers—President, John Burke; Treasurer, Daniel C. Van Nostrand; Secretary, Henry S. Burke; Superintendent, John McCafferty.

NABOB M. Co.—March 13th. Location: Arizona. Capital stock, \$10,000,000. Directors—A. W. Blair, W. F. Peabody, C. H. Swain, W. H. Booth and W. H. Long.

Black Sands.

EDITORS PRESS:—Experiments with the black sands of this coast lead me to the belief that the gold contained in them is the result of the contact of gold-bearing sulphurets with the black sand. The gold being dissolved in the gold-bearing sulphurets by a weak solution of chlorine which exists in the bottom of our rivers, is brought into a solution and deposited on the black sand in a plated form. The plated part scales off and forms the float gold, which is so hard to save because it floats on the surface of the water.

The black sand is a metallic sand composed of different metals, and the plating of it with gold is easily accounted for by the same process by which copper or silver ornaments are plated with gold. They are put into a vessel containing a solution of gold and connected with an electric battery; the thickness of the plating is regulated by the strength of the gold solution and the battery. The earth acts as electric battery for the black sands.

One can form no idea of the millions of dollars of this fine scaly gold that is washed down our rivers and deposited on the sea sands on our coast. It cannot be saved by the wet process, for it swims on the surface of water; it must be saved by a dry process, where the friction of the sand breaks up all those scales into fine powder and allows it to settle through the sand and to deposit itself with the heaviest of the gold-bearing sands on the riffle of the machine. Having the heaviest of the gold-bearing sands concentrated, it will pay to leach the gold out with acids; and it will bring in use our large sulphur deposits.

JOHN VINCENT.

COLLAPSED.—The *Times* says the New York Exchange is about to close. The heaviest operators will be received in the old Board. Commissions will be raised again, but not so high as before.

Investment in California.

According to our own advices and the knowledge which we obtain from our interior exchanges, we are assured that there will be a very gratifying investment in California real estate during the coming spring time, on the part of our Eastern friends and comers from abroad. At the East the two great exciting events, the Centennial and the presidential election, will not this year restrain those contemplating change of residence. A winter of unusual severity has frozen into resolutions the desires for the luxury of our climate which have been growing during the late years in many minds. The depression in business of all kinds at the East, though now happily showing signs of dissolution, still has force enough to induce men to escape from it if they are able. These things, coupled with the general desirability which nearly all outsiders justly look upon as the characteristic of a California home, will tend to gain for us this year the coming of that class of citizens whom we most desire, men who come with hands and hearts for enterprises and pockets heavy enough to materialize their projects.

As we write of the tendency to investment in California we are reminded that one great barrier, which has held much Eastern capital aloof from us during the last decade, and longer, is now so reduced that it is an obstacle exceedingly small. We refer to the price of gold as compared with the greenback currency. This difference in the purchasing medium has restrained many from purchasing homes in this State. They had the disposition, but they could not submit to have the heads cut from their dollars by the money brokers. No one will ever know just how much this influence has militated against us, but the extent is considerable. Had it not been for this we have no doubt at all that the heavy immigration of 1874-5-6 would have been increased by thousands of men who would have come with the capital to work farms and start manufactories, and thus the great labor influx of those years would have been attended by a flow of capital to employ it and the return of many a discouraged laborer would have been obviated. The proof that the difference in the medium of exchange is now small, as compared with former years, may be seen in the daily reports of the price of gold in New York. It is also evident in the rumors which are sent abroad by the commercial newspapers of New York, that the black-hearted Gold Board, which has excited the country by its gold gambling, and more than once paralyzed industry by its "Black Friday" panics, is contemplating disincorporation from the fact that its occupation is nearly gone, and the opportunities for its scheming reduced to too narrow limits. These facts, coupled with the declared intent of the country to replace currency upon a specie basis, prove not only that the country is coming upon California ground in its financial ideas, but will open the way for coming upon California soil to many who have both the means and the inclination.

The mind starts itself when it begins to picture the possibilities for growth and progress in trade and production which this coast possesses. Our metropolis is pressing over the third line of hills toward the Pacific, and at the same time turns from its third hundred thousand of population into the coming hundreds of thousands. Our trade belts the world and has for a special possession the Asiatic and Oceanic millions. Our agriculture is just entering upon its true life, when system and economy shall rule, and the finer and more precious products shall replace the coarse and bulky; when England shall pay us more for 10 pounds of fruit or honey than for a cental of grain; when Australia and Ohio shall no longer sell wool at 60 cents to our 20 cents; when we shall turn back upon Europe her shower of raisins and floods of wine, and when the increased expenditure for preparing such productions shall support in comfort ten times our present agricultural laboring population. Such may be the result in many parts of our wide domain, when land and law monopolies shall be pushed aside, and when agricultural enterprise, now budding, shall bear its perfect fruit. Beyond this lies our field for manufacturing and for placing the stamp of utility upon the varied materials which we possess. When to the cost of production we shall add the manufacturer's profits, a population of skilled laborers will live upon them, and thus advance our agriculturists by increasing tenfold the home consumption of the products of the fields. All these things lie within easy reach of this coast, and when we remember that we have but lately turned the first quarter of a century of our permanent growth, it is plain to see that the doubling of our growth hitherto will realize all we have described, perhaps are the bright California baby, now in his cradle, casts his maiden vote.

It is easy to make friends with California. Her greetings, like her skies, are warm and winning. She asks but manly attributes and power to give them play and her rewards, like her future, will be great. We are glad to note that the passing months are bringing her nearer to those who admire her from afar, and that by the rules of value which exchanges regulate, the offerings which they will bring this year to establish themselves on her domain will have a power to purchase here nearer to that at which they were obtained in the States whence our new friends shall come.

Book Notices.

PROPERTIES OF CONTINUOUS BRIDGES.—This is a practical treatise on the properties of continuous bridges, by Chas. Bender, C. E., and constitutes No. 26 of Van Nostrand's Science Series. A paper by the author on the merits of continuous girders, was presented to the American Society of Civil Engineers last spring. In this paper the subject for the first time is found to be based without the use of higher calculus on one simple geometrical relation, forming the connecting link between single spans and continuous bridges. The same paper, increased with further data resulting from its discussion, is compiled into the short treatise of which we speak. The author says that the subject having never before been treated in this light, it is believed that railroad engineers will not unfavorably receive the results of special studies which have occupied a period of many years and which in the main are: that in addition to the sensitiveness of continuous bridges, the economy claimed for them does not exist either theoretically or practically in all instances in which the construction of properly designed compound single span trusses is not limited as to their depths. This book is for sale by Payot, Upham & Co.

ADVENTURES OF TOM SAWYER.—This is Mark Twain's last book, and is written in his peculiar and well known style. A paragraph from the preface will give an idea of the work. "Although my book is intended mainly for the entertainment of boys and girls, I hope it will not be shunned by men and women on that account, for part of my plan has been to try to pleasantly remind adults of what they once were themselves, and how they felt and thought and talked, and what queer enterprises they were sometimes engaged in." The book is handsomely bound, printed and illustrated. It is for sale by Roman.

General News Items.

CAPTAIN BOTTON has accomplished the feat of swimming from Naples to Capri. He was followed by several steamers bearing the American flag, and landed in presence of Victor Emanuel.

The first of the series of eight promenade vocal and instrumental concerts at the Mechanics' Pavilion, will take place on Saturday evening, March 24th. The orchestra will consist of 35 musicians under the direction of Mr. R. Herold.

The *Times's* Belgrade dispatch says: Reports reach Belgrade through trustworthy channels relative to immense armaments in the interior of Russia. It is asserted that 1,000,000 men will be in arms by the 16th of March. It is supposed that Russia has other purposes besides an attack on Turkey.

ADVICES from Peru confirm the report that Henry Meiggs has closed a contract with the Peruvian government for completing the Oroya railway and opening the Cerro de Pasco mines. The contract for introducing Chinese laborers into Peru is also confirmed, but it is doubtful if it can be carried out by the contractors.

A TELEGRAM from St. Petersburg says: "The past winter was the severest for many years. The thermometer on Sunday was nearly 20° below zero. A report comes from Pesth, in Austro-Hungary, that the railways are blocked and traffic stopped, and the snow is from three to twelve feet deep in the streets."

OBJECTIONS to the will of Commodore Vanderbilt have been filed by his son, Cornelius J. Vanderbilt. They aver that the document offered for probate is not the last will of the deceased; that it was not executed either by the testator or by witnesses at his request; that the deceased was not in sound mind when the document purported to have been signed; that it was procured by the fraud and undue influence of Wm. H. Vanderbilt; and that by a desire to concentrate his fortune in the person of Wm. H. Vanderbilt, the deceased had become incapacitated from making a fair will and disregarded his own children.

THE GRAND HOTEL OF THE NORTHWEST.—Chicago has the most imposing hotel in the United States, considering its outward magnitude and number and completeness of its interior departments. We speak of the Grand Pacific hotel. It is both the wonder and pride of its American guests. Its proprietors, John B. Drake & Co., are meeting with popular and permanent success in its management. We were more than satisfied with our recent stay at the Grand Pacific. We will quote some facts concerning the hotel as the best way to illustrate some of its grand features. It occupies a whole square, opposite the Federal buildings. Cost of elegant furniture, \$360,000; building, \$1,300,000. It is 130 feet high, 400 feet long. Contains 500 rooms. Main halls 12 feet wide and 325 feet in length. The parlors are 25x100 feet; grand dining room 130x60 feet; ladies' ordinary 60x60 feet square; ladies' promenade 130x30 feet; office rotunda 75x70 feet; exchange 100x60; kitchen 103x35 feet; billiard and bar room 80x80 feet. The arrangements for ventilation, prevention of fire and other provisions for safety and comfort seem to be perfect. It is worth a visit from all strangers who go to Chicago.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

FOR WEEK ENDING MARCH 9TH, 1877.

188,042. THILL COUPLING.—J. L. and W. E. Crist and G. H. Smith, Sacramento, Cal.
188,050. GRAIN-SEPARATOR.—H. Kelly, East Portland, Ore.
188,098. SHARP FURNACE FOR TREATING ORE.—N. D. Brett, Boulder, Col.
188,100. AWNING FOR BIRD CAGES.—S. P. Burton, S. F.
188,124. EXPLOSIVE COMPOUNDS.—J. Goetz, S. F.
188,126. SAWING MACHINE.—F. W. Krough, Tulare, Cal.
188,167. CAR-SKAT.—J. L. Mitchell, Pueblo, Col.
188,182. TOBACCO PRESS.—B. McGill, S. F.
188,191. HORSE COLLAR.—A. Rutherford, Walla Walla, W. T.
188,206. BUTTON FASTENING.—J. C. Teters, S. F.

DEVICES.

9,770. COMBINED MATCH-HOLDER AND FRICTION MAT.—P. L. Davis, S. F.
9,840. CENTER-PIECE.—S. Killet, S. F.

TRADE-MARKS.

4,434. TRAB.—Walker Bros., Salt Lake City and Ogden, U. T.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Perseverance in Mining.

The St. Lawrence mine, El Dorado county, has made its first clean-up under the new management. The total amount was 1,370 ounces, worth about \$17.50 per ounce. This would give for the run of twenty-five days the sum of \$24,275, and give as an average for the ore from the recently opened pay shute a yield of over \$92 per ton.

This is, of course, exceptionally rich ore anywhere; but in this instance the good clean-up for the first run under the new management will teach a lesson to miners who have no faith unless they see the contents of the ore in solid coin before them. The story is not very consoling to the members of the English company who deserted the mine, allowed it to fill up with water and pass into the hands of the present owners for a mere bagatelle. The *Mountain Democrat*, published in El Dorado Co., says: "Not an ounce, not a dime's worth of the \$24,275 of this clean-up was so much as 50 feet from the point where the English company suspended operations on the 800-foot level. Much of it was extracted from ore taken out within six feet of where they quit. Their Superintendent, W. H. Rodda, was sanguine that there was good ore near by, and implored them to allow him to cross-cut in search of it. But no, they were unwilling to expend any more money on the mine. And this shute, which at the 800-foot level was only 20 feet wide, has at the further depth of 42 feet widened to 44 feet, with every indication of proportionate increase at greater depths. Patience and perseverance are essential to success in mining."

THE Murchie mine, Nevada county, has been sold. The property consists of seven ledges. The principal ones are the Independence, Wide West and Big Blue, on the lower part of the ground, and the Alice Bell and Lone Star on the upper part. The other two ledges have, the *Transcript* says, only been prospected a little. The hoisting works on the Independence were burned two years ago, and on account of peculiar embarrassments, the original owners have suspended work on all of them since. Work was commenced to erect new hoisting works on the Independence on Wednesday last, and will be pushed ahead as fast as possible until completed. More stamps will be put up at the mill, and the Lone Star and the Alice Bell will be thoroughly opened by tunnels, which have already been commenced. The Murchie property is well known by miners here to be one of the most valuable in the district.

PISCICULTURE.—The Fish Commissioners, at their hatchery near the State University at Berkeley, have recently produced 100,000 mountain trout, which will be distributed throughout the State wherever suitable streams are found. A carload of young shad is shortly expected from the East, when the experiment of propagating this delicious fish in the waters of California will be tried. The Sacramento river will be the first tried, and another effort will be made to introduce lobsters to our waters.

THE losses of American ships has been so great this winter, that the ship-yards of New England are looking forward to a busy year, especially those which build wooden vessels of the best class.

INFORMATION has been received at Winnipeg of the arrival of Sitting Bull at Wood Mountain, British possessions. He has 1,000 captured horses and mules.

"TESTING ORES."—A. B. Roberts, of Boise City, says: I am very much pleased with Chas. H. Aaron's work on "Testing and Working of Silver Ores." It will be the cause of new life and great advancement in silver ore prospecting if miners and prospectors would procure a copy and put in their pockets when they start for the mountains.

METALS.

THURSDAY, M., March 15, 1877.

IRON.	No. Certificate.	No. Shares.	Amount.
American Pig, ton.	29	00	32 00
Scotch Pig, ton.	31	00	32 00
White Pig, ton.	30	00	—
Oregon Pig, ton.	4	00	—
Refined Bar.	4	00	44
Boiler, 1.	4	00	—
Plate, 13 to 20.	7	00	81
Sheet, 10 to 14.	—	—	—
Sheet, 16 to 20.	54	00	—
Sheet, 22 to 34.	6	00	—
Sheet, 26 to 28.	6	00	—
Horse Shoes, keg.	6	00	—
Nail Rod.	8	00	9
Norway, Oval.	8	00	9
Roller.	8	00	9
COPPER.			
Copper Tinned.	37	00	40
Sheathing, lb.	37	00	40
Sheathing, Yellow.	21	00	29
Sheathing, Old Yellow.	10	00	11
Composition Nails.	21	00	—
Composition Bolts.	24	00	—
STEEL.			
English Cast, lb.	14	00	25
Anderson & Wooda, ordinary sizes.	16	00	—
Drill.	16	00	—
Flat Bar.	15	00	20
Flue Steel.	84	00	123
TIN PLATES.			
10x14 10 Charcoal.	9	00	9 50
Rancho Tin.	24	00	—
Australian.	18	00	183
ZINC.			
By the Cask.	11	00	—
Zinc Sheet 7x3 ft, 7 to 10, lb.	11	00	—
7x3 ft, 11 to 14.	12	00	—
8x4 ft, 13 to 10.	12	00	—
8x4 ft, 11 to 10.	12	00	—
NAILS.			
Assorted sizes.	3	37	40
CORRUGATED.			
By the lb.	42	00	45

LEATHER.

(WHOLESALE.)

WEDNESDAY M., March 14, 1877.

Sole Leather, heavy, lb.	26	00	29
Light.	22	00	24
Jodot 8 Kil, doz.	43	00	50
11 to 13 Kil.	58	00	69
14 to 19 Kil.	52	00	64
Second Choice, 11 to 16 Kil.	57	00	67
Cornellian, 12 to 13 Kil.	57	00	67
Females, 12 to 13 Kil.	53	00	67
14 to 16 Kil.	71	00	76
Simon Ulmo, Females, 12 to 13 Kil.	58	00	62
14 to 15 Kil.	56	00	62
16 to 17 Kil.	62	00	67
Simon, 18 Kil.	61	00	63
20 Kil.	65	00	67
24 Kil.	72	00	74
Robert Cal, 7 and 9 Kil.	35	00	40
Kips, French, lb.	1	00	1 35
Cal. doz.	40	00	46
French Sheep, all colors.	8	00	15
Eastern Calf for Backs, lb.	1	00	1 25
Sheep Roams for Topping, all colors.	9	00	13
For Linings.	5	50	10 50
Cal. Russet Sheep Linings.	1	75	4 50
Boot Lega, French Calf, pair.	4	00	4 75
Good French Calf.	4	00	4 75
Best Jodot Calf.	5	00	5 25
Leather, Harness, lb.	35	00	38
Fair Bridle, doz.	48	00	72
Skinning, lb.	33	00	37
Wet, doz.	30	00	60
Buff, ft.	18	00	20
Wax Side.	17	00	18

LUMBER.

WEDNESDAY M., March 14, 1877.

CARGO PRICES	OFFICET SOUND PINE.
REDWOOD.	RETAIL PRICE.
Rough, M.	22 50
Refuse.	18 00
Clear.	20 00
Clear Refuse.	20 00
Rustic.	32 50
Refuse.	22 50
Stuffed.	30 00
Refuse.	20 00
Flooring.	28 00
Refuse.	18 00
Beaded Flooring.	30 00
Refuse.	20 00
Half-inch Siding.	20 00
Refuse.	16 00
Half-inch Surfaced.	35 00
Refuse.	20 00
Half-inch Battens.	20 00
Pickets, Rough.	1 00
Rough, Pointed.	13 00
Pancy, Pointed.	25 00
Shingles.	35 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]
SAN FRANCISCO, March 14, 3 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 95¢ @ 96¢ SILVER.
56¢ @ 60¢ GOLD IN New York 104.
GOLD BARS, 890 @ 890. SILVER BARS, 70 @ 70 cent discount.
EXCHANGE ON New York, 50 @ 55-100 cent premium for gold; on London bankers, 49½ Commercial, 49½ Paris, five francs \$ dollar, Mexican dollar, 37 @ 38½.
LONDON Consols, 94½; Bonds, 102½.
QUICKSILVER IN S. F., by the flask, 3½ lb, 43 @ 44c.

Newspaper Fileholders.

Dewey's new elastic fileholders (black walnut), size of the Press, *Harper's Weekly* and *Scientific American*, for 50¢ cents. Larger sizes to suit any newspaper, 75¢ cents. By mail, postpaid, 10¢ extra. Cash with all orders. Patent allowed. Address, Dewey & Co., Publishers, San Francisco.

Mining and Other Companies.

Aetna Tunnel Company.—Location of

principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of January, A. D. 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
O G Sawyer.	17	10	\$ 30
O G Sawyer.	18	10	30
O G Sawyer.	50	5	15
J A Van Pelt.	19	10	30
J A Van Pelt.	47	5	15
P Casson.	67	750	22 50
P Casson.	68	750	22 50
P Casson.	69	100	3 00
P Casson.	70	150	4 50
P Casson.	71	175	5 25
J B Cooper.	74	50	1 50
O Cutter.	77	25	75
O Cutter.	78	25	75
O Cutter.	79	25	75
O Cutter.	80	25	75
O Cutter.	81	25	75

Names.	No. Certificate.	No. Shares.	Amount.
B O Cutter.	82	25	75
B O Cutter.	83	25	75
B O Cutter.	84	25	75
B O Cutter.	85	25	75
B O Cutter.	86	25	75
B O Cutter.	87	25	75
B O Cutter.	88	25	75
B O Cutter.	89	50	1 50
B O Cutter.	90	50	1 50
B O Cutter.	91	50	1 50
B O Cutter.	92	50	1 50
B O Cutter.	93	50	1 50
B O Cutter.	94	50	1 50
B O Cutter.	95	50	1 50
B O Cutter.	96	60	1 50
B O Cutter.	97	100	3 00
B O Cutter.	98	100	3 00
B O Cutter.	99	100	3 00
B O Cutter.	100	100	3 00
B O Cutter.	101	100	3 00
Miss Mattie Guion.	48	5	15

And in accordance with law and an order of the Board of Directors, made on the second day of January, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room No. 6, No. 420 California street, San Francisco, California, on Monday, the nineteenth day of March, A. D. 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

JAMES M. HAVEN, Secretary.
Office, Room No. 6, No. 420 California street, San Francisco, California.

Dolores Consolidated Mining Company

Location of principal place of business, San Francisco, Cal. Location of works, Dolores Mining District, Esmeralda County, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 17th day of February, A. D. 1877, an assessment, No. 1, of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 418 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 26th day of March, A. D. 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 16th day of April, A. D. 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. CLARK, Secretary.
Office, Room No. 2, 418 California street, San Francisco, California.

Excelsior Silver Mining Company, Nye

County, Nevada. A meeting of the stockholders of the above company will be held on the 28th day of March, 1877, at the office of the company, 308 Post street, San Francisco, California, to elect Trustees.

W. A. KOLLMYER, Secretary.

Howland Tunnel Company.—Location of

principal place of business, San Francisco, California. Location of works, Alta City, Salt Lake County, Territory of Utah.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of January, A. D. 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
O G Sawyer.	17	10	\$ 30
O G Sawyer.	18	10	30
O G Sawyer.	50	5	15
J A Van Pelt.	19	10	30
J A Van Pelt.	47	5	15
P Casson.	67	750	22 50
P Casson.	68	750	22 50
P Casson.	69	100	3 00
P Casson.	70	150	4 50
P Casson.	71	175	5 25
J B Cooper.	74	50	1 50
O Cutter.	77	25	75
O Cutter.	78	25	75
O Cutter.	79	25	75
O Cutter.	80	25	75
O Cutter.	81	25	75
O Cutter.	82	25	75
O Cutter.	83	25	75
O Cutter.	84	25	75
O Cutter.	85	25	75
O Cutter.	86	25	75
O Cutter.	87	50	1 50
O Cutter.	88	50	1 50
O Cutter.	89	50	1 50
O Cutter.	90	50	1 50
O Cutter.	91	50	1 50
O Cutter.	92	50	1 50
O Cutter.	93	50	1 50
O Cutter.	94	50	1 50
O Cutter.	95	50	1 50
O Cutter.	96	50	1 50
O Cutter.	97	100	3 00
O Cutter.	98	100	3 00
O Cutter.	99	100	3 00
O Cutter.	100	100	3 00
O Cutter.	101	100	3 00
Miss Mattie Guion.	48	5	15
George Guion.	20	10	30
Mrs Sarah Guion.	21	10	30

And in accordance with law, and an order of the Board of Directors, made on the second day of January, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the company, Room No. 6, No. 420 California street, San Francisco, California, on Monday, the nineteenth day of March, 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.

JAMES M. HAVEN, Secretary.
Office, Room No. 6, No. 420 California street, San Francisco, California.

Mariposa Land and Mining Company

of California. Location of principal place of business, San Francisco, California. Location of works, Mariposa county, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 9), levied on the 18th day of January, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Brumagin, J. H.	unissued	550	\$550 00
Brumagin, J. H.	1342	100	100 00
Brumagin, J. H.	1381	100	100 00
Birmingham, D. Walton.	1478	100	100 00
Collins, C. A.	1200	100	100 00
Collins, C. A.	1203	100	100 00
Collins, C. A.	1206	100	100 00
Curles, W. B.	272	100	100 00
Colborn, W. T.	473	100	100 00
Colborn, W. T.	474	100	100 00
Durbrow, Lamont.	unissued	100	100 00
Hallgarten & Co.	unissued	50	50 00
Hoyt, E. P.	1223	100	100 00
Hoyt, E. P.	1224	100	100 00
Hoyt, E. P.	1225	100	100 00
Kennedy, Hutchinson & Co.	473	100	100 00
Loth, M.	411	50	50 00
Loth, M.	412	50	50 00
Moore, Silas H.	1215	100	100 00
Oppenheimer, Ed L.	1339	100	100 00
Peabody, A. S.	unissued	100	100 00
Rathborne, R. Wm.	121	100	100 00
Rathborne, R. Wm.	122	100	100 00
Rathborne, R. Wm.	314	100	100 00
Rathborne, R. Wm.	315	100	100 00

Names.	No. Certificate.	No. shares.	Amount.
Rathborne, R. Wm.	319	100	100 00
Ryce, A. Thordylke.	1230	100	100 00
Stern, Chas.	unissued	100	100 00
Taylor, W. & J.	unissued	100	100 00
Thorp, Louis W.	A 7	1	1 00
Thorp, Louis W.	A 8	1	1 00
Thorp, Caroline A. M.	A 12	1	1 00
Stern, Morris H.	unissued	100	100 00
Van Schick & Co.	unissued	1000	1000 00
Van Schick & Co.	89	100	100 00
Van Schick & Co.	70	100	100 00
Van Schick & Co.	1	100	100 00
Van Schick & Co.	1333	100	100 00
Wellburg & Co.	unissued	100	100 00
Weeks, W. A.	unissued	100	100 00
Warner, Geo.	1413	100	100 00
Wern, J. J.	1096	100	100 00
Stern, Joseph	1597	100	100 00
Stern, Joseph	1598	100	100 00
Vanderhof, H. B.	1599	100	100 00
Vanderhof, H. B.	1600	100	100 00
Cowles, Jos N.	A 32	25	25 00
Cowles, Jos N.	A 33	25	25 00
Bernheimer, I and S.	1601	100	100 00
PREFERRED STOCK			

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LEWIS R. MEAD.....Secretary

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year for my patent Straw Burning Threshing Engines give splendid satisfaction. They
far surpass for regularity of speed any Governor that I have ever seen, and I have
seen all the best kinds; I have seen the main belt fly off the pulley several times this season
while threshing, and the engineer did not discover it, so perfectly was the speed main-
tained, until he was told of it; this I consider something wonderful; I consider the Gov-
ernor absolutely perfect, so far as speed is concerned. I bought and put on to one of
my engines a Shive Governor, to see which was the best, and after one season's trial I
have no hesitation in saying they are far superior to any other Governor that I have seen or
used. I wish you would send me the lowest price that you can furnish 25 Governors for
next season's engines. Yours respectfully,
J. L. HEALD.

The only Governor that has received awards at each of the International Exhibitions.
American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Bal-
timore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals;
International Exposition, Paris, 1867, One Bronze and Two Special Medals; In-
ternational Exposition, Vienna, 1873, Medal of Progress and Decoration;
International Exhibition, Philadelphia, 1876, Medal and Diploma.

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in use. It effects a LARGE SAVING OF FUEL, LASTS AS
LONG AS THE IRON to which it is applied, and is reason-
able in cost.

REFERENCES: United States Government Buildings and
the principal manufacturing establishments in the East and
on the Pacific Coast; the principal mines and mills in Nevada,
etc., etc.

United States and Foreign

SALAMANDER FELTING COMPANY.

PACIFIC BRANCH,

(Patents issued September 4, 1869; October 5, 1869; October 4,
1870; May 9, 1871.)

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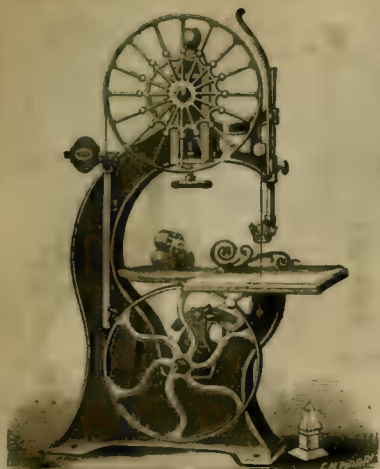
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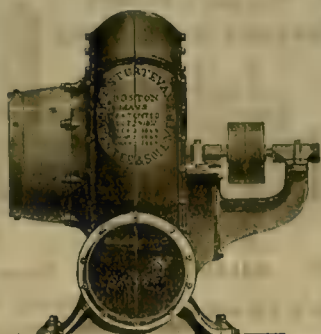
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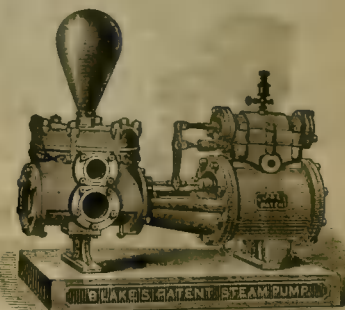
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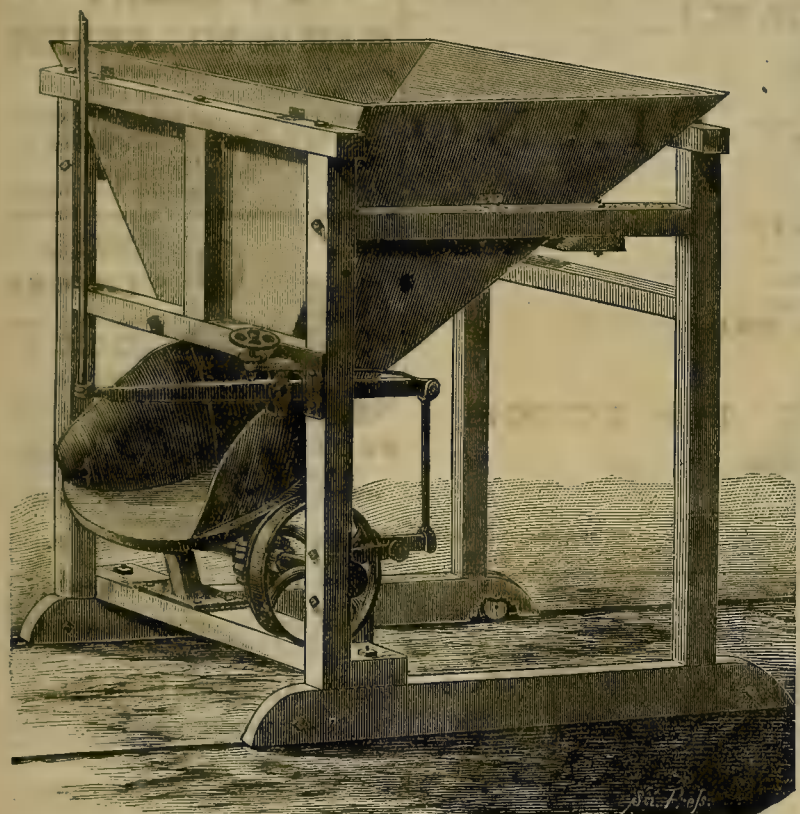


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A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them." A letter from Mr. C. C. Belding, of Amador County, speaks in the highest terms of them. Two of the machines were shipped to the Bunker Hill Mill, also Gover Mill, Amador County. Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen. Soulsby Mill, Tuolumne County. California Company, Nevada City. Omaha Gold Mining Company, Grass Valley. St. Patrick Mill, Placer County.

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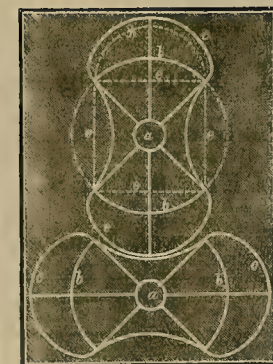
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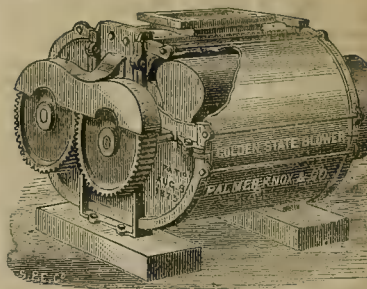
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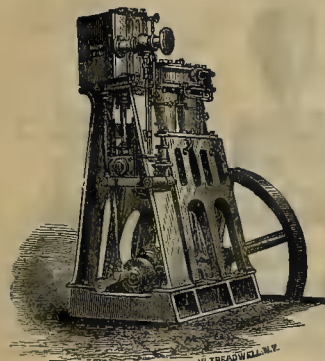
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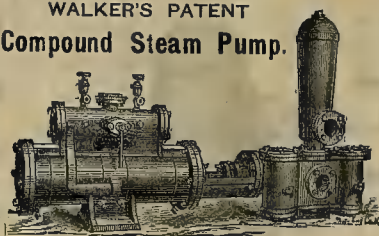
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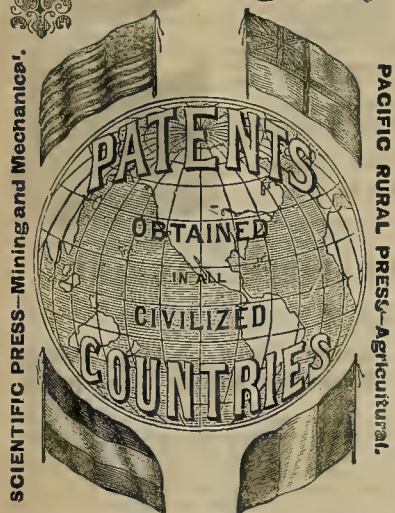
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MARCH 24, 1877.

VOLUME XXXIV.
Number 12.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

BIRD CAGE AWNING.—Susannah P. Burton, S. F. This patent covers certain improvements in awnings or shelters such as are used to protect birds in cages from the wind, rain and particularly the sun. As usually made they have a hole made to fit closely over the knob at the top of the cage, and the awning thus fits closely down over the cage, so that when a hot sun beats upon it the air is confined and the heat of the interior of the cage becomes unendurable and is sometimes fatal to the birds. This invention consists in constructing an awning-frame with standards, which elevate the awning some distance above the cage, thus providing a free circulation of air, and not only sheltering the bird from the direct action of the sun's rays but protecting it from the fatal results of over-heating and sunstroke.

EXPLOSIVE COMPOUND.—Julius Goetz, S. F. This is a novel method of forming explosive compounds and rendering them safe from accident or explosion under ordinary circumstances of handling or transportation. It consists in the employment of glucosides, whether in the form of ordinary molasses or the syrup of glucose of commerce, or any solution of uncrystallizable grape sugar, when mixed with compounds of gas-producing or explosive substances. These syrupy solutions when mixed in suitable proportions with chlorate of potash and other combustible and explosive substances will form a permanently plastic mass, the elasticity of which prevents explosion under ordinary circumstances and requires strong concussion under suitable confinement to explode it. The proportion of the ingredients may vary and the ingredients themselves may be replaced by others which are well known as equivalents, but the essential feature of all the compounds covered by the patent is the employment of the uncrystallizable solution of sugar.

SKIMMING MILK.—Hiram Clifford, S. F. When cream is removed from the surface of milk by the usual method of skimming, either much of the cream is stirred into the milk again or a quantity of milk is taken up with the cream; and besides this, much time and labor is required to collect the cream where the milk from a large number of cows has to be skimmed daily. This invention contemplates the separation of the cream from the milk by drawing the milk off underneath the cream, so as to leave the cream in the vessel from which the milk was withdrawn.

MATCH SAFE.—(Design). Percy L. Davis, S. F. This is a design for a combined match holder and a friction mat. It consists of a flat diamond-shaped block of wood. To the front side of the block is secured a star-shaped glass mat, the outside face of which is roughened to form a friction surface to scratch matches upon. On each side of the star, near the acute angles of the diamond-shaped block, is secured a semi-circular box for the reception of matches. This design is very pretty and ornamental.

TOBACCO PRESS.—Bong Moon, S. F. The patent covers an improvement in a machine for compressing leaf tobacco into plugs or cakes, so that it can be readily cut into what is known as long-cut tobacco, for smoking purposes. The device is quite simple and takes up but very little room; it can also be cheaply constructed. The device not only presses the plugs flat but also presses the edges smooth.

BUTTON FASTENER.—James C. Teters, S. F. This invention relates to that class of devices for attaching buttons to clothing and other articles of wear, in which the eye of the button, after being passed through a hole in the material, is secured by a tongue which is formed on or attached to a metal plate.

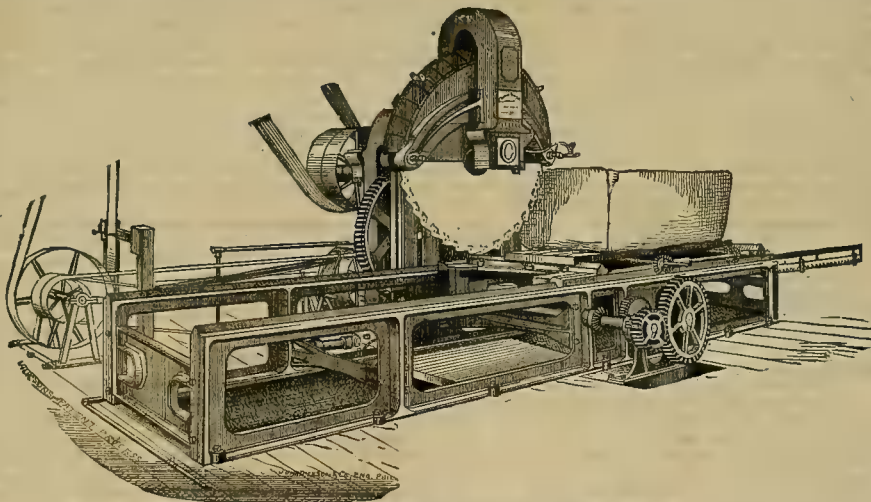
UNLOADING AND STACKING HAY.—Geo. F. Kelly, Susanville, Lassen county. This invention relates to a novel mechanism which is designed to expedite the unloading and stacking of hay, grain, straw, etc., so that as the teams come from the fields they are relieved of their load at once and can return; and those in charge of the stacking apparatus can transfer the load to its proper place in time for the next team. It consists of a platform mounted upon wheels and having a proper mechanism so that it may be inclined to either side to dump its load when it has arrived at the proper point. The wagons are provided with a netting into which the load is placed and when the wagon arrives at the platform the load is rolled out of the wagon upon the platform. This latter is then hauled up an inclined tramway and when it reaches the top the load is dumped and a stack is thus formed in better shape than can be made by ordinary pitching, and much more expeditiously. The details of construction would be difficult to describe without the aid of engravings.

SAWING MACHINE.—F. W. Krogh, Tulare City, Tulare county. This invention relates to a novel portable device for sawing logs and heavy timber, working upon uneven ground and in places which are difficult of access. A trian-

Diamond Stone Saw.

We give herewith an illustration of the Diamond stone saw which was in operation daily at Centennial. This wonderful machine is made by the Emerson Stone Saw Company, of Pittsburgh, Pa. Doing regular work this machine cuts, in ordinary sandstone, at the rate of 250 surface square feet per hour (counting both sides of the cut). Other stone is cut in proportion, according to the relative density or hardness, leaving the stone perfectly true and in line, beautifully finished and free from "stuns" and "spalls." In fact, when the stone comes from the machine it is ready to be placed in buildings, the work being accomplished in a superior manner, to that done by hand or ordinary machines. This is more than can be accomplished by 100 men in the same space of time and at an expense not exceeding the cost of sharpening and wear of tools necessary to do the same amount of work.

This machine is a triumph of human skill as far as the work it accomplishes is concerned, as in construction it is quite simple. The engraving will show the principle of the device. In the teeth of the circular saw are set diamonds, such as are used in diamond drills. A rapid



EMERSON'S STONE SAWING MACHINE.

gular frame is mounted upon suitable wheels so that it can be easily drawn from place to place. It is made to rest on three wheels in order to accommodate it to uneven surfaces, in such places as are most likely to be occupied by fallen trees. On this frame are all the contrivances necessary to accomplish the objects of the device. The saw and pitman are raised by a rope; the frame is moved forward on its wheels parallel with the tree or log to be cut, and when the proper point is reached the frame is secured by pins. The saw, pitman and guides being next lowered to the log, the guide is secured by driving a pin or spike into the log, as this steadies the log and prevents vibration. By the peculiar construction, the sawing frame can always be supported solidly at any point upon inclined or uneven ground, the motion of the saw itself will be steady, and by a can action, the most favorable movement for sawing will be given it.

SPRING MATTRESS.—A. C. McMains, S. F. This patent covers certain improvements in that class of spring mattresses in which a number of spiral springs, sufficient to form the entire body and surface of the mattress, are simply connected together by a suitably connecting device. The improvements are on a patent previously granted to the same inventor, in the method of joining these springs together, thus greatly improving this class of mattresses.

THE Post-Office Department has made provision for tri-weekly mail communications with the Black hills country, commencing on May 1st.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city.

The Calaveras cleaned up \$2,550 last week, the result of 14 days run.

The Lookout winz of the Modoc, now down 80 feet below the Lookout lower tunnel all the way in good ore, shows continued improvement. Both the furnaces at the mine are running.

The Ophir main incline is being sunk rapidly and the Superintendent expects to be opening the 1900-foot level by the 10th of next month.

The Eureka Con. furnace is running on a lower grade of ore than usual, so the bullion will fall off in quantity this month.

The body of water struck in the Barcelona tunnel is steadily increasing.

Operations at the Chollar for the week ending the 17th, were as follows: 680 tons of ore extracted, assaying \$25 per ton; bullion shipped, \$13,757.

The last weekly clean up of the Eureka (G. V.) was 215 ounces of amalgam.

In the Manhattan the 571 crosscut has cut a portion of the ledge; the ledge seems to have been pinched out by the hard rock and contains no ore; the crosscut will be continued a short distance to prove the formation. In 500 west drift the rock has become very hard, the ledge being pinched to a seam, although the ore in the stope above continues good. In Curtis shaft the 560-foot east drift is still in very rich ore with a small ledge.

The Superintendent of the California says in his letter that the bullion shipments will increase from this time, and he fully expects they will exceed those of February before April 1st.

In the Con. Virginia the west drift from the C. & C. shaft on the 1650-foot level is being put in thorough repair and they are breasting out about 50 tons of ore daily, and expect by the first of next month to have the sill in condition to breast out the amount of ore desired for all requirements. The south drift on this level designed to connect with the Con. Virginia deep winze is now advanced 25 feet south of the 1050-foot level west drift and is in very fine ore.

A WARNING.—An accident occurred in Ward district, Nev., the other day, which may serve as a warning to other miners. The *Miner* says that an employee in the Defiance, named Halver Olsen, placed a can of water upon the forge of the blacksmith shop at the Defiance mine for the purpose of thawing out some giant powder caps. The water in the can had previously been used for the purpose of thawing out cartridges, and the nitro-glycerine in the powder, in the process of thawing, had mixed with the water. Olsen began blowing the fire to warm the water, when suddenly an explosion took place, shattering the can to fragments. Mr. Olsen received the full charge in his body, from his head to his hips. His face and chin are frightfully cut, and his hand and arm blown to pieces. Portions of the can entered near the seventh rib, one in the groin and a piece, two inches long, below the umbilicus. He carried a heavy silver watch in his pocket, which perhaps was the means of saving his life, as a piece struck the watch, taking a piece out as large as an acorn. Several pieces from an inch to an inch and a half in length were taken from his body. It is supposed that pieces are still in the man's legs, stomach and lungs. The end of the shop was blown out, also the forge. Mr. Olsen had five cartridges in his pocket, which fortunately did not explode.

LECTURE BY DR. LEWIS.—Dr. Dio Lewis will give us his famous lecture on "Our Girls," at the First Congregational church in Oakland, on Friday evening, March 30th, for the benefit of the free reading-room in Oakland. It will be worth going from San Francisco to hear and doubtless many of our readers in the towns of Alameda county will enjoy the treat. Music, both vocal and instrumental, suitable to the occasion, may be expected.

motion is imparted to the saw, which forthwith cuts its way through the hardest rock in an amazingly short space of time. This stone saw was one of the principal features of Machinery hall of the late International exhibition.

CHROMIUM.—"A reader" asks for information with regard to the value of chromium. He says he has "a prospect" of this metal, but is undecided as to its value. Some say it is worth \$15 per ton, some say \$20 and others \$30. Where there are so many different opinions he is unable to decide what to do. He says he has a large body of the ore and finds float in various places on the surface. In answer to the query, we may state that it is worth from \$15 to \$40 and \$45 per ton, according to the percentage of chromic acid in the ore. This is when there is any sale for the ore. At present the supply greatly exceeds the demand and there is no sale here for it. Our advice is, if our correspondent has a good prospect, to patent the mine to save paying the annual expenditure required by law, and hold on to it until such a time as the ore can be sold. A mine of this substance will be valuable in the future, although it may be of little value now.

ACETIC ACID.—A correspondent in Chicago asks us whether acetic acid (to corrode white lead), is manufactured in this city or State in quantities. This acid used to be made here in large quantities, but none of it has been made for some time, the venture, we believe, not proving profitable.

CORRESPONDENCE.

Tintic Mining District, Utah.

This seat of the principal operations is within 100 miles of Salt Lake City. The mines are reached by the Utah Southern railroad, with the exception at present of a little less than 20 miles of staging.

Matters Geological and Mineralogical

Pertaining to the district are substantially the views of Mr. Camero, an experienced mining engineer, and for some years a resident of Tintic, to whom, in conjunction with Captain Johnson, A. G. Sutherland, District Recorder, and other trustworthy gentlemen, your correspondent is indebted for favors, more particularly in the way of aid to much valuable information.

Tintic, proper, is composed chiefly of a zone of porphyritic and syenitic granite, from four to five miles in width and coursing with the mountain range for distances not yet determined. It is flanked east and west in several instances by beds of limestone, resting upon quartzite, evidently belonging to the silurian series. The porphyries and syenites contain a number of parallel metalliferous dykes, some 500 feet apart, with dip nearly vertical and strike from 10° to 15° east of north, following instead of cutting the general course of the veins. Some of the best ore veins are found in close proximity to these dykes and exist as true fissures, carrying silver ore of the milling class in quartz matrix, containing iron and gold in appreciable quantities. Occasionally the matrix is partially decomposed, with green and blue copper carbonates in some portions of the vein, and here and there bunches of galena and carbonate lead carrying silver and gold in fair values.

Professor J. E. Clayton, reporting on the district, says: "The peculiarity of the Tintic lodes consists in the fact that their contents belong to two geological ages; the oldest vein formation being a true quartz vein, carrying free gold and antimonial silver, with traces of copper only. Subsequent disturbances reopened the fissure and brecciated the old quartz vein and formed a new deposit of copper in the broken spaces and enlargements of the fissure. Portions of the old quartz lode remain in place, carrying gold and silver in high values."

Iron Ore

Is represented to be found of good grade and in quantities apparently inexhaustible in the north-eastern part of the district. It runs from 40% to 60%, besides carrying a small percentage in silver, making it much sought for by the smelters. From five to six claims are steadily at work, and making daily shipments of five or more carloads of 10 tons each, furnishing in itself a strong argument for the extension of the railroad in this direction.

The remaining portion of the field of active mining operations is confined chiefly to the production of the precious metals, and might be well represented as oval in form, with the mines of

Eureka Hill,

In the apex at the northern end. The lodes here appear as parallel veins between the strata of limestone, and are often irregular, not unfrequently breaking from one stratum to another, to again resume their usual course. The hill is not only remarkable for the form of its veins, but also for its quantities of rich ores, in combination with arsenic, antimony, copper and lead.

South of Eureka hill, and on the westerly slope of the mountains at no great distance from the quartzite on one hand, and not far from the junction of the limestone and granite on the other, may be found one of

The Most Remarkable Veins

Of the district and territory for the quantity, variety and richness of its ores. The full width of the vein, or rather ore deposit, has not been definitely ascertained. It is found in the limestone and courses nearly north and south, with the strata. Several locations have been made, among them

The Mammoth Copperopolis,

Located as early as 1871. From the surface to the depth of 100 feet, it was a copper producing mine, having yielded the first two years (when it was closed down,) about 8,000 tons of first-class copper ore, at that time worth \$80 per ton. Yielding in the aggregate, in the neighborhood of \$640,000. It is at present worked by Mr. T. E. Clohecy, of Salt Lake, under lease. A promising silver-bearing vein was discovered in the mine by the lessee in 1875, which has been prospected to the depth of 183 feet by shaft, and incline and level run at the greatest depth. The average width of ore is now 20 feet, all of which is extracted and worked. It samples \$30 in silver, to say nothing of some very rich streaks of chloride silver ore, giving promise of leading to larger deposits.

The greatest attraction in Tintic and one of the most valuable properties in the Territory

is the north extension on this great vein, better known as

The Crismon Mammoth,

The property of Samuel McIntyre & Co. The greatest depth by shafts, 500 feet, two main working tunnels, with other levels and drifts, making a total of 1,250 linear feet. Ore has been traced on the course of the vein in the different levels from 100 to 400 feet, and found in chambers from 6 to 30 feet in width. Fifty feet below the level of the lower tunnel and upward of 300 feet from the surface, a cross-cut was made all through quartz, striking the wall at the distance of 61 feet from the shaft. Thirty-five feet lower, another cross-cut has been extended through ore 51 feet to the west, without reaching the wall. In addition to large reserves of 26% copper ore, there are immense bodies of auriferous and argentiferous ores, some of which is of exceedingly high grade. The great mass of the silver ore works from \$40 to \$100, and a considerable amount of first-class, selected, runs from \$1,000 to \$1,500. A very rich vein of gold quartz was not long since struck and cut on the different levels, from 10 to 14 feet in width. The ore has an average working value of \$250 per ton; selected lots have sampled from \$25,000 to \$100,000, single assays reaching \$400,000. The yield last year was 2,500 tons, with gross value of \$125,000.

It is to be regretted that no calculation was made on the ground of the number of tons of ore in sight. When properly opened the mine will give employment to hundreds of men, where now only a score is employed. The facts need no comment, they speak for themselves. Two good locations have been made, one adjoining on the north, and another on the south, from which much is expected, from their position as well as from present indications.

Moore & Co. have also located 1,500 feet on the ridge immediately above the Mammoth and adjoining on the east. A 20-foot shaft discloses a four and a half foot vein of iron ore, carrying copper, that is said to look exceedingly promising.

The La Fayette M. Co.,

Of Salt Lake City, have sunk a shaft 135 feet on the Red Wolf, south of the great bonanza—Jode, four feet from wall to wall. A small vein of argentiferous galena, worth 30 ounces silver and running 30% in lead. The Swansea and the Lucky Boy, not far from Silver City, have both yielded large amounts of ore and paid well, the former having shipped about \$40,000.

The Porphyritic and Syenitic Belt

Constitutes the largest area of the mineralized portion of the district, the principal mines now worked being found in close proximity to five metalliferous dykes, which have been designated as the Sunbeam, Undine, Victor, Joe Bowers and Rising Sun.

The Sunbeam,

Lying on the west side of the belt, was located in 1869 and the first mineral bearing lode discovered in the district. It has been worked continuously and profitably, the ores usually exceeding \$100 in silver and shipped in very considerable quantity—the Moore claim alone having yielded about \$100,000.

The claims known as the O. K., Whitney, Moore and Huntington have been consolidated and are now owned by Col. J. H. Locke, who is making preparations to open up in good style.

The Peck claim, next north, belonging to Mrs. Kinsey, of Salt Lake City, has a shaft 330 feet following the ore vein, which is somewhat narrow but containing ore that runs from 40 to 160 ounces in silver. The south extension of 1,500 feet, adjoining the property of Col. Locke, is owned by Messrs. Lewis & Moore. Working shaft 150 feet. A 20-foot quartz vein. Ore, free milling and works from \$15 to \$45 per ton.

The Undine,

Situated east of the Sunbeam, was located by Mr. A. B. Jackman and others in 1871, since which a great deal of high grade free milling ore has been taken out near the surface. Vein from two to 18 inches and ore worth from \$75 to \$500 per ton in silver. The last two shipments by Mr. R. S. Hines averaged, on dump, for 1st class, \$168, and for 2d class, \$56.50. It is understood to have paid from the outset.

The Western Union,

(A. Ethier), near the center of the district. Two shafts 41 feet and 65 feet respectively. Ore, high grade carbonates, running 150 oz. of silver and 40% of lead. Width of vein matter, three feet.

The Hidden Treasure,

(N. Groesbeck), has two veins—the smallest from one to 10 inches, containing very high grade ore containing from \$200 to \$1,000 in silver. The larger has two feet of solid ore, in character somewhat refractory and worth from \$20 to \$50. It has yielded ore to the amount of \$13,000.

The Black Dragon,

The property of the Shoebridge S. M. company, on the same range further north, is a large lode from six to 20 feet wide in the limestone, and is said to have been pronounced by Prof. Clayton a true fissure vein. The ores are rather loose, carrying copper and antimony with some arsenic. Some small lots, worked as a test, showed a value in silver of from \$25 to \$60 per ton.

The Sydney,

A little south on the same lode, belonging to Mr. W. Huntington, has yielded, to date, some \$20,000. It is rich in chloride and horn sil-

ver, the ore being found chiefly in pockets and running from \$90 to \$700. A tunnel will soon tap the vein at 250 feet from the surface. The Great Eastern and the Great Western, both owned by Wm. Jones, one mile east of Silver City, are promising—the latter has two feet of \$80 silver-lead ore.

About half a mile east of the Undine is

The Victor Dyke,

Containing a number of very valuable mines. The assay value of the ores sold ranges from \$50 to \$250 silver and from \$10 to \$100 gold per ton. Fifteen mining claims have been located successively on its ore veins to the extent of nearly three miles, the great majority only partially developed. This metalliferous dyke is perhaps the most distinctly marked of any in the district. Beginning with

The Golden Treasure Mine,

On Chloride hill, one of the largest and best developed, a few details will be presented from which an idea can be formed as to the general character and prospective value of the others.

Messrs. Hathaway & Souci, two of the co-partners, are at present extracting and shipping ore, valued at \$80 per ton, silver. The mine is opened to the depth of 400 feet on the vein and embraces over 3,000 linear feet of workings. A cross-cut at one point, 70 feet through vein matter, had not reached the foot-wall, so that its full width is not yet ascertained. The ore veins are from six inches to as many feet, with deposits of ore 30 feet in width, a single chamber having produced 20,000 tons, estimated to average \$100 per ton.

The Julian Lane,

Adjoining the Golden Treasure on the south, has been continuously worked from its discovery. Its owners, while laboring under many disadvantages from lack of capital, have made it pay a considerable amount over the expenses of sinking a 350-foot shaft and running levels, drifts and winzes to the extent of over 2,000 linear feet. Its full width from wall to wall is not fully known. The workings show that it cannot be less than 40 feet, probably very much wider. The ore vein is in many places from six to ten feet. The ore is usually found in chimneys, first-class milling from \$100 to \$250 in silver. It is owned by Mr. M. H. Schock and others, of Diamond City, and like its neighbor, the Golden Treasure, may be booked as a property well worth the possessing in any country.

The Cherokee and Vesuvius mines, one-half mile north, belonging to Dr. Pickman and others, show free milling ore that averages 40 ounces silver.

Lying south of the Julian Lane are the Victor, Norwegian, Lily of the West, Ohno, California, Lily Greenough, Charter, Georgia, Allie Townsend and Hammarskold on the same vein and presenting substantially the same characteristics. The Victor has been opened by a tunnel over 200 feet in length, from which small quantities of ore have been shipped from time to time, and sold to the mills in the vicinity, averaging, in lots of five to ten tons, for first class, \$150; second, \$75; besides a third, and at present an unsaleable class, worth from \$25 to \$30. All these claims carry small values in gold, for which nothing is allowed under \$15 per ton. In this connection may be mentioned the Pismuth Chief, 200 feet west of the Julian Lane, on a parallel lode, that promises to be a paying mine, the property of Dr. Pickman, Sutherland and others.

A mile east of the Victor is

The Joe Bowers Dyke.

The most prominent of the claims are the Joe Bowers, North and South extensions, the North Star and Charter—all evidently located on one continuous vein. The ore is free milling, assaying \$100 and upwards in silver and \$30 in gold. On the east and west of the dyke are found veins of smelting ore, assaying from \$40 to \$50 in silver, and 30% lead in the average, the most prominent of the group being the Showers, the North Bowers and the Estella.

The Showers

(Walker Bros.), leased and worked by A. W. McIntosh, is paying well; shaft in 150 feet, lode, 5 feet; ore vein from four inches to two feet, yielding silver ore from 45 oz. to 60 oz., gold, \$2 to \$9 per ton, lead, 32% to 48%, and iron 5% to 35%, and in demand at the smelters. The Spar, running parallel, and owned by the same, is narrower but much richer.

The North Bowers

(Mathews, Bernham & Sons), shaft 186 feet. The richest streak, from eight to twelve inches, ore averaging \$115 silver and \$12 in gold. The vein at foot of shaft is 18 inches—the ore running from 8% to 13% copper, from \$10 to \$15 gold, and \$100 in silver. Some ore on dump will sample 13% copper, and \$230 silver. It is thought that 30 tons can be extracted per month which will pay a fine profit.

Returning to the main dyke is

The Joe Bowers Proper,

Remarkable for its large outcrop, and the most prominent and promising on the lode. In the spring of 1872 the Wendigo company, of Michigan, purchased 1,300 feet of the claim. Considerable prospecting was done without finding the vein, and finally work was suspended, to be resumed last year with better success, under the superintendence of Captain G. D. Johnson, a member of the company. The shaft has been sunk 300 feet on a spur near its junction with the main lode and proves the position to be well taken. It is carried down through a vein five feet in width containing a clay matrix carrying

minerals the entire depth, consisting of galena, carbonate lead, green copper carbonates, silver and gold. The ores are found in deposits intimately mixed with the matrix in a finely particled condition, requiring dressing before reduction. Experiments have been made in separating the ores from the gangue by water with very satisfactory results. The ore residue assays from \$60 to \$200 silver, and 30% lead, and occasionally a small percentage of copper carrying gold.

At the 300-foot level, the shaft has evidently made connection with the Bowers dyke, and the water has increased beyond the present means of discharge. Of 358 assays made by Mr. J. M. Wayne, assayer of the company, from ores taken from surface downwards, the average was \$122.13 in silver. The outcrop for the width of 20 feet and upwards giving an average value of \$15 silver and \$16 in gold. In view of the immense body of ore, the facility of handling, and the satisfactory results from assays, the Captain was about making a working test of from 25 to 50 tons, with the view of erecting a mill if justified by the returns.

East of the Joe Bowers one-third of a mile is situated

The Rising Sun Dyke,

Cutting a mountain of the same name, rising some 1,500 feet above the general plane of the district, with mines of more or less promise, but not generally much developed. The Rising Sun, owned by Mr. H. C. Wilkin and others, has a vertical shaft 200 feet and has also been cross-cut by a tunnel at a depth from surface of 300 feet. Vein from two to seven feet, ore both milling and smelting, in a quartz matrix, yielding 30% of black oxide of manganese, 30% lead and \$60 per ton silver.

The Jefferson, the General Meade, are located on the same lode, and probably the Southern Belle, Rio del Norte, Alice, Michigan and others, which are said to average well in silver and lead. The Calumet, belonging to Mr. Sutherland and others, and Pewabic, Dr. Pickman and others, at the head of Diamond Hollow, southeast of the Crismon, and believed to be on the same lode, but forgotten to be mentioned in proper order, are said to contain gray sulphurets of copper, averaging 42% copper and 100 ounces silver. The Morning Glory, belonging to Messrs. Brooks, Bee, Lawrence and others, was also overlooked. It is situated not far from Diamond City, is one of the oldest locations, has produced \$25,000 in the gross, shaft 200 feet in depth, lode five feet at foot of shaft, carrying ore, principally silver, with an average working value for unassorted of \$23 per ton, first class being worth about \$90.

The Shoebridge S. M. Co.,

Have opened a mine one-half mile north of Diamond by shaft 350 feet and cross-cut to vein, which shows a width from wall to wall of 20 feet, the ore rather base in character and intermixed with porphyritic granite. Some of it is of high grade, although giving a general average of only about \$50 per ton. A lot shipped some time since to Colorado and worked by the Hunt & Douglas process yielded \$56 per ton, the basest ore having been selected for the purpose of a test. This fact, probably, suggested to Captain Lusk, Superintendent of the mine and of the mill, the idea of introducing this comparatively new process, as an auxiliary to the reduction of the ores in the district.

The company's mill consists of 15 stamps (dry crushing), one Stewart (five hearth) roasting furnace, one Akin roasting furnace, and the usual appliances of all well appointed mills. The mode of working is similar to like mills where roasting is resorted to, with one noticeable exception. The ore, before it is amalgamated, is treated in separate sets of pans, lined with wrought iron, where the chlorides are decomposed, thereby causing (it is claimed) a great saving of quicksilver.

A brief description of

The Hunt & Douglas Process

For the working of ores containing copper and the baser metals, in successful operation here, may not be uninteresting to some of your readers. After the ore is crushed and roasted, it is introduced into large tubs furnished with agitators with revolving arms. They have a capacity for a charge of two tons of ore, and five tons of a saturated solution of salt and chloride of iron, the same being contained in tanks placed immediately over the agitators. The temperature of the contents of the tubs is raised by steam to 130° Fah., and kept in constant agitation for six hours, when it is allowed to settle. On becoming clear the solution is drawn off into a series of smaller tubs charged with metallic copper, which precipitates the silver dissolved by the solution. It then flows through another set of tubs, charged with scrap iron, which in turn precipitates the copper dissolved by the original solution together with that dissolved with the precipitation of the silver, at the same time forming chloride of iron, which regenerates or brings back the solution to its normal state, to be used over and over again. There is still another series of tanks into which the pulp is drawn for the purpose of draining, by means of powerful pumps, the remaining portions of the solution, after which the tailings are removed.

An improvement in conveyors was seen here, the invention of Mr. G. S. Neu, in charge of the works. The principle of its operation and construction is withheld from the public until right is secured, but the whole conveyor, united in sections and 96 feet in length, is driven by a

Continued on page 182.

MECHANICAL PROGRESS.

Hydraulic Welding.

English mechanics are pushing the improvement of hydraulic mechanism for the shaping, welding and upsetting metal. We read of a contrivance by Mr. J. H. Johnson to be employed for actuating the shaping and welding die and the upsetting ram, and it consists, (1.) Of means for operating the same in such a manner as to avoid the frictional resistance incident to the opening of the die when closed by mechanical power; and also of a means for locking the die when closed; so that a pressure within greater than that required to close it will not open it, and for unlocking it with such increased pressure within the die without exerting any appreciably increased power over that required to lock it. (2.) Constructing hydraulic drawbacks to be employed in combination with the shaping and welding die and the upsetting ram, with two passages or conduits, one of which connects the inner end of the inner cylinder with the back end of the drawback cylinder, whilst the other connects the inner end of the drawback cylinder with the accumulator or with the pumps. (3.) In combining with the shaping and welding die and upsetting ram, an apparatus consisting of a holder and a clamp for holding bars of metal as close as practicable to the die against the pressure required to upset them, such apparatus being operated by hydraulic power, which may be regulated according to the work to be performed. (4.) In constructing and arranging the hydraulic accumulators to be employed in combination with the said machinery or apparatus in such a manner that easy access may be obtained to the whole of the moving parts, and packing and facility afforded for the safe and rapid removal and replacing of the weights. (5.) Of improvements in hydraulic machines, to be employed for the before-mentioned purpose, of that class in which the power is produced by a continuously-operating pump, and applied through other mechanism operating intermittently, the object of this part of the invention being to maintain the pump in continuous operation and ready to meet the demands upon it, and to relieve it at all other times, and while thus relieved to maintain a circulation of water through the pump chamber in combination. (6.) Of improvements in the application and regulation of hydraulic power in that class of hydraulic machine referred to under the fifth head of this invention, such improvements consisting in combining with the valves of the pump a system of levers and weights so arranged and operated that the defined movements of the mechanism determine the direction of the pressure upon the pump, also in interposing between the inlet and outlet valves of the pump, a supplemental valve which, when closed, will be held to its seat by the pressure within the pump chamber, and when open will permit the free escape of the fluid from the pump chamber in such a manner as to prevent any accumulation of air therein, also in the employment of a system of lever and weights for regulating the speed of the pumping engine.

THE PROMETHOR.—Although we take no stock in the many marvelous things which are proposed by over-zealous theorists still we believe in presenting the news about the topics as they occur. We read that Philadelphians are to be given a sight of a new machine, invented by a clergyman in Maryland, which is called the Bradley Promethor, and is described at length by a correspondent. The writer claims that "the motor employed in this invention is a well known agent, and one that is beyond comparison powerful in action and easy of management. Second, that the mode of utilizing it is marvelously simple, original and perfect. Third, that its economy is marked, being as one to five, if not six or eight, in comparison with steam. Fourth, that it is managed so as to be positively non-explosive and without danger at any stage. Fifth, that the machine is suitable for all mechanical purposes; and finally, it is unlike anything else in the world of mechanics and will excite an interest in economics and revolutionize the present mode of propulsion in every department of mechanical motion. The machine and its capacities are not simply a great invention, they are an inspiration, utilizing the forces of nature by the principles of natural laws, and confirming to the conception of man the perfections of the divine intelligence in His works. In a few weeks the people will have an opportunity of seeing in operation in Philadelphia, a promethor of the power of 50 horses, which is now nearly ready for exhibition."

A NEW MODE OF SHIPPING GUNS.—According to a contemporary, a smart firm of American engineers in London, who do not believe in peace, have hit upon a novel mode of sending small cannon to any place where they may be required, and where, perhaps, the powers in command might object to their introduction. The plan in question consists of taking two small guns and placing a round bar of strong wood down the bore of each, so as to hold them together, the muzzle joining. They then bind the whole with straw rope, and cover that with a coat of fire-clay. This forms a perfect core, and round it is cast an iron column, like those used in building purposes. When complete they would not excite the suspicions of the most cautious customs officers,

Gauging Cylindrical Bodies.

Jesse Lord takes ground in the *Polytechnic Review* against the ordinary callipers, the wire gauges and the special gauges used for determining the size, diameter and circumference of cylindrical bodies, as shafting, studs, screw blanks and similar objects. The measurement in each of these cases is determined by the sense of feeling alone; a sense that is more liable to variation in the same individual, even in a normal state of health, than any other, and is rarely the same in different persons. No two individuals, using the same pair of callipers on the same piece in the lathe of the machinist, will feel the same degree of resistance as the jaws pass over the two extremes of the diameter. The two jaws merely touch an almost infinitesimal point on either side of the object to be gauged, and if that object is cylindrical the act requires much caution and considerable experience. The apprentice invariably callipers large and he is irregular in his feeling, gauging hard in one place and light in another.

The whole system of measuring the diameter of cylindrical bodies by a gauge that touches only two sides is wrong. As the diameter is to the circumference as minus one to three, a gauge that measures the circumference rather than the diameter has just so much more chance of approximating the correctness than one that measures only the diameter. For detecting irregularities in cylindrical forms, as a lumpy or oval shaft, the callipers is sufficient; but a simpler tool will more accurately determine the size of one as compared with another. A piece of flattened copper wire makes an excellent gauge for measuring shafting. The wire is passed around the shaft, the ends held in the hands, and the edges of the wire laid side by side. A line drawn across both breadths gives the size which may remain as the gauge until the job is finished. If the shaft is too large the lines will not meet; if two small ones will be drawn past the other. Copper wire is preferable to steel, as yielding readily to the curvature of the shaft. Of course, this gauge should not be used while the shaft to be measured is turning, any more than callipers should, as the wire would become worn and so far inaccurate.

Filing to a Line.

Some of our machinist readers may like to give the apprentice a lesson on filing. This is the way the students in the Boston Institute of Technology are taught to file to a line as described by the *Builder*: A rectangular block of cast iron four inches long, two inches wide and one and a quarter inches thick, comes to the student with its two long, narrow sides planed. Two parallel lines have been drawn by the tool of the planer, one on each side, near the upper edge. The student is first instructed how he should remove the skin of the casting from the upper surface without unnecessary injury to his file. Then he is instructed how to remove all of the metal above the two lines with his coarse file, so that when he has removed the scratches produced by that tool with finer files, and draw-filed the surface, he will have accomplished the desired result. When it is finished he will have produced a plane surface parallel to the two lines, and so near them that the removal of more metal would have removed the lines.

To merely rasp the surface with a file will remove the superfluous metal neither expeditiously nor satisfactorily. The student is instructed to lay all the grooves produced by the file in one direction the first time, in a different direction the second time, and in another direction the third time that he passes over the surface. The result is that he can always judge, by the changing color of the metal, where and how deeply his file has just cut. As he watches the ever-varying effect, with its bright and regular mottle, not unlike Scotch plaid in shape, he experiences the same kind of pleasure as when shading in crayon by cross-hatching, or when tinting in color, and he finds that by producing this regular mottle he also produced an almost perfect plane without referring to his straight edge, and that this is part of the art in filing to line.

MILLIONS IN BUTTONS.—The first manufacturer of buttons in America was one Samuel Williston. While he was dragging along as a country storekeeper—his eyes having failed him while studying for the ministry—his wife thought that she could cover by hand the wooden buttons of the time, and thus earn an honest penny. From this the couple advanced in their ambition, until they had perfected machinery for covering buttons, the first employed for the purpose in America. From this sprang an immense factory, and then others, until Samuel Williston made half of the buttons used in the world. His factories are still running at Easthampton, coining wealth for the proprietors, and known to every dealer in buttons all over the world. Samuel Williston is now between 70 and 80 years of age and is worth from five to six millions of dollars, and has given \$400,000 to Easthampton for a seminary and churches, \$200,000 for the founding of a female seminary and \$200,000 to Amherst College, besides lesser gifts to other kindred institutions.

A USED-UP RAILROAD.—A locomotive engineer, who had just been discharged for some cause, gave vent to his spite in a way eminently characteristic of American humor. He said it was about time he left the company anyhow, for the sake of his life, for "there was nothing left of the track but two streaks of rust and the right of way."

SCIENTIFIC PROGRESS.

"Late Theories on the Earth's State."

EDITORS PRESS:—In your late issue of February 24th I observed an article under the above title by Prof. Roscoe, in which he implies that the explanation of underground heat, ancient upheavals or modern volcanoes, by the supposed existence of a comparatively thin shell resting on an interior liquid mass, must now be given up as untenable; giving as the reason therefor the fact that Mr. Mallet's investigations go to prove that this liquefaction of the rocks which we observed may be produced at no very great depth from the earth's surface by the shifting and rubbing together of the rocks, owing to cracking due to the alteration of the temperature, and believes that the friction produced is a sufficient and satisfactory explanation of the occurrence of volcanic action.

Not being acquainted with Mr. Mallet's investigations I cannot understand what circumstance leads him to infer that the heat produced by the secular cooling and shrinkage of the earth should be sufficient to give rise to the molten masses ejected as lava, nor is it to me apparent how on this supposition volcanic action should almost invariably take place at the same localities. Is there not an improbability on the face of the theory? I should imagine that the rocks having once, by their own friction upon each other, become melted and ejected, they could scarce go through the same process of slipping, melting, and ejection again; accordingly no two eruptions would take place at the same locality, but would take place at various parts of the surface wherever such slipping of the rocks should occur.

If Prof. Roscoe thinks that the heat produced according to the theory he advocates is sufficient to cause the phenomenon of volcanic action, how does he explain the fact that the coal beds found in disturbed regions are not consumed? It is certainly to be inferred that such distortions and faults as are found in the rocks of our Middle States should have in their formation developed sufficient heat to ignite the coal beds, instead of merely driving off the more volatile hydro-carbon compounds. That our anthracite coal is so formed, we are led to infer from the fact that in all undisturbed regions the coal is soft or bituminous.

Some years past a chemical theory of volcanic action was advanced, which endeavored to account for volcanic action upon the hypothesis of a chemical combination of the materials of the inside of the earth with water from the outside, i. e., of the existence of an unoxidized metallic nucleus.

Some appearance of truth was given to this supposition, by the fact that the constitution of the lava was found to be of such a nature as to admit of oxidation by the means supposed. This oxidation was, of course, to supply the necessary heat.

When Professor Bunsen made his celebrated tour to Iceland, he investigated, among other things, the truth of this volcanic theory. True to the supposition, he found hydrogen to be emitted from the volcanic vent, but declared that it could not have been due to the decomposition of infiltrated water, since at the temperature necessary to produce such a decomposition it would be impossible for the carbonic acid generated from the fused rocks by the hydrochloric acid supplied by the salt water, to remain in contact with the hydrogen without being reduced to carbonic oxide, and not a single trace of this gas was ever discovered. This seemed to be universally accepted as a final answer, for now the chemical theory is but rarely advocated.

Perhaps Professor Roscoe will favor us with some of Mr. Mallet's proofs, as well as a further explanation of his quaint theory.

OTTO C. WOLF.

Philadelphia, March 5th, 1877.

ESSAY PRIZES, DANISH ACADEMY OF SCIENCES.

—The Royal Academy of Sciences of Denmark offers a gold medal for researches into the numbers which have served as a basis for astronomical science from the time of Ptolemy to the end of the eighteenth century; another for an investigation of the refraction of light, as dependent on the various conditions of bodies, with the object of elucidating the refractive and dispersive power of certain volatile bodies in the condition of vapor; the Thott prize of £20 for an investigation into the laws which regulate the progress of chemical reaction in chosen cases; the Classen prize of £20 for an investigation of the question, are the salts of soda as necessary for the normal development of plants as the salts of potash, lime, magnesia and iron? A prize of £40 for an investigation into the reason why Danish barley is often unfit for making good malt. The competition is open to all the world, excepting members of the Danish Academy resident in Denmark. Essays may be written in Latin, French, English, German, Danish or Swedish, and must be sent in (except for one or two essays) before the end of October, 1877, to Mr. Japetus Steenstrup, at the University of Copenhagen.

Limestone Formations.

Dr. Carpenter recently delivered a lecture on this subject, in England, in which he said there was more resemblance between a piece of limestone and a piece of chalk than most people would suppose. Persons acquainted with the chemistry of things knew perfectly well that they were the same substances chemically. He explained the various kinds of limestone, particularly mentioning the crystal and the marble formation. But all four—chalk, limestone, marble and the large crystal—were exactly the same chemically, though they differed in form. Geologists had reason to believe that nearly all limestone had been formed in the same manner—from the remains of marine animals. In different parts of the various series there were beds of limestone obviously entirely formed of the remains of animals, and this was particularly noticed in the later beds. He explained at length the formation of the Giant's Causeway, and pointed out more remarkable illustrations of metamorphosis, and upon the evidence thus adduced he came to the conclusion that the great mass of the carboniferous limestone was originally a chalk deposit. He was aware of the doctrine that this carboniferous limestone was all coral, but upon various grounds he disbelieved this theory and adhered to his conclusion that this limestone formation was originally a sort of chalk at the bottom of the sea. He pointed out the marvelous utility of the microscope in determining the nature of limestone, and said that from a little specimen in his possession, which was not larger than a pin's head, he had no doubt that the great mass of the Serpentine series was composed of an organic structure.

THE BRAINS OF CRIMINALS.—Says the *British Medical Journal*: In our last issue we published a very interesting letter from our Vienna correspondent, in which a brief summary was given of Prof. Benedict's researches on the brains and skulls of criminals. The subject is an important one, both from a physiological and a psychological point of view, and it is to be hoped that more extended and more precise inquiry will be made upon it, for the results which Dr. Benedict has obtained, though very important, are not sufficiently numerous to warrant any large induction. Up to the present time Dr. Benedict has examined the brains of 16 criminals, all of which, on comparison with the healthy brain, he finds to be abnormal. Not only has he found that these brains deviate from the normal type, and approach that of lower animals, but he has been able to classify them, and with them the skulls in which they were contained, in three categories: These consist in: First, absence of symmetry between the two halves of the brain; second, an obliquity of the interior part of the brain or skull—in fact, a continuation upward of what we term a sloping forehead; third, a distinct lessening of the posterior cerebral lobes, so that, as in the lower animals, they are not large enough to hide the cerebellum. In all these peculiarities the criminal's brain and skull are distinctly of a lower type than those of normal men, and the interesting question arises, how far are evil effects of the criminal to be attributed to this retrograde development?

A PROBLEM IN OIL GAS.—In an address before the N. E. Gas Engineers' Convention, Mr. Price stated the following concerning the manufacture of gas from oil: Oil gas is much better than either candles or lamps. A very small works for making gas from oil may be constructed for a little money. In such a case I should recommend the use of oil. I have never known a community that was satisfied with oil gas. The inevitable smoke deposits soot upon walls, and ruins frescoes and pictures. If air is used there will be blowing. I visited works at Reading, Penn., last autumn for the purpose of seeing oil gas, which was said to be free from objection. I went with the gentleman who superintended the construction of the works, and who thought them very complete. On leaving the cars we went down to the works and, in passing through the grounds, I saw several lanterns badly smoked. They have tried to overcome the difficulty by using small burners, but the smoke was there, and I am convinced it is a difficulty hard to obviate. The soot produced by oil gas is the meanest soot in the world. It sticks like oil and lampblack; it cannot be removed.

A WONDERFUL SPECIES OF THE COTTON PLANT.—A cable dispatch from London to one of our daily papers says: A remarkable discovery has been made in Egypt by Signor Giacomo Rossi, Austrian Consular Agent at Alexandria. He has found a new cotton plant, which is so wonderfully prolific that it may prove a dangerous enemy, the report says, to the American cotton raising interests. Signor Rossi, in his report of the discovery, says that about two years ago he accidentally came across the new plant on the property of a captain in the Menulia district, who collected the seed and sold it to his neighbors at twelvelfold the price obtained for the ordinary kind. The plant has a long stem, and being without branches much space is saved. It bears on an average 50 pods on each bush, while the usual yield of the plant is about 30. A smaller quantity of seed is needed, but the great drawback in Egypt is that it requires much more water, which necessitates the alternating of the crops with grain and vegetables. In the sea islands of the Atlantic coast or along the lower Mississippi it would prove wonderfully prolific.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 1.	Week Ending Mar. 8.	Week Ending Mar. 15.	Week Ending Mar. 22.
Alpha.	204 193	20 191	19 173	17 16
Alta.	2 40	2 10	1 175	3 1
Andes.	1 1	1 1	1 135	1 20
Baltimore Con.	1 40	1 8	1 1	1 95
Belcher.	1 1	1 1	1 1	1 1
Belmont.	1 1	1 1	1 1	1 1
Best & Belcher.	34 33	34 32	34 27	31 21
Bullion.	18 17	17 18	17 18	15 12
Caledonia.	9 9	9 9	9 9	9 9
California.	48 49	47 48	47 48	45 42
Challenge.	1 1	1 1	1 1	1 1
Chollar-Potosi.	66 64	65 65	65 64	60 49
Confidence.	8 8	8 8	8 8	8 8
Con Imperial.	48 47	48 48	48 48	47 40
Crown Point.	9 9	9 9	9 9	9 9
Coso Con.	25 15	25 15	25 15	25 15
Dayton.	1 1	1 1	1 1	1 1
Eureka Con.	1 1	1 1	1 1	1 1
Exchequer.	1 1	1 1	1 1	1 1
Geddes & Bertrand.	35 35	35 35	35 35	35 35
Gen Thomas.	35 35	35 35	35 35	35 35
Grand Prize.	5 5	5 5	5 5	5 5
Globe Con.	5 5	5 5	5 5	5 5
Golden Chariot.	3 35	3 3	3 3	3 3
Gould & Curry.	13 12	13 12	13 12	13 12
Hale & Norcross.	30 25	30 25	30 25	30 25
Julia.	6 6	6 6	6 6	6 6
Justice.	13 13	13 13	13 13	13 13
K. K. Con.	1 1	1 1	1 1	1 1
Knickerbocker.	7 7	7 7	7 7	7 7
Kosuth.	1 75	60 50	50 45	45 40
Lady Bryan.	50 50	50 50	50 50	50 50
Lady Wash.	2 75	2 60	2 50	2 40
Leopard.	5 4	4 5	4 4	4 4
Leviathan.	55 50	50 50	50 50	50 50
Leeds.	4 4	3 30	3 30	3 30
Modoc.	9 9	9 9	9 9	9 9
Manhattan.	9 8	8 7	7 7	7 7
Mansfield.	55 50	50 50	50 50	50 50
Meadow Valley.	50 50	50 50	50 50	50 50
Mexican.	18 18	18 18	18 18	18 18
North Con Virg.	75 60	75 60	75 60	75 60
New York.	85 50	85 50	85 50	85 50
Niagara.	28 26	28 26	28 26	28 26
Northern Belle.	4 40	4 4	4 4	4 4
New Coso.	1 1	1 1	1 1	1 1
Occidental.	26 25	26 25	26 25	26 25
Ophir.	26 25	26 25	26 25	26 25
Overman.	89 88	88 84	84 82	72 55
Pacific.	10 10	6 8	6 8	6 8
Phil Sheridan.	45 45	45 45	45 45	45 45
Panther.	45 45	45 45	45 45	45 45
Poorman.	45 45	45 45	45 45	45 45
Prospect.	50 40	45 40	40 35	25 20
Raymond & Ely.	6 5	5 5	5 5	5 5
Rock Island.	8 8	8 8	8 8	8 8
Sage.	84 84	84 84	84 84	84 84
Seg Belcher.	6 6	6 6	6 6	6 6
Sierra Nevada.	7 7	7 7	7 7	7 7
Silver Hill.	6 6	6 6	6 6	6 6
South Chariot.	6 6	6 6	6 6	6 6
Sucor.	60 60	1 55	90 90	70 80
Trojan.	1 1	1 1	1 1	1 1
Union Con.	1 1	1 1	1 1	1 1
Utah.	16 16	16 16	16 16	16 16
Wells-Fargo.	10 10	10 10	10 10	10 10
Woodville.	75 60	60 50	50 50	55 55
Yellow Jacket.	14 14	14 14	14 14	14 14

Sales at S. F. Stock Exchange.

FRIDAY, A. M., MAR. 16.	30 Hale & Norcross.....	51	
30 Alpha.....	173 174	40 Harrisburg.....	5
215 Andes.....	1 10	380 Julia.....	42 40
445 Belcher.....	30 31	185 Justice.....	12
545 Belcher.....	61 66	330 Kosuth.....	50
130 Bullion.....	1 1	250 Lady Wash.....	2 40
220 Baltimore Con.....	1 30	550 Lady Bryan.....	15
950 Con Imperial.....	1 60	100 Leeds.....	2 95
655 Crown Point.....	1 1	150 Leopard.....	2 95
420 California.....	45 46	30 Mexican.....	17
610 Con Virginia.....	43 44	240 Manhattan.....	8 8
120 Chollar.....	7 7	100 Meadow Valley.....	40
25 Confidence.....	71 72	450 Modoc.....	2 85
1920 Caledonia.....	71 72	250 New Coso.....	4 85
635 Gould & Curry.....	12 12	65 Northern Belle.....	25
135 Hale & Norcross.....	5 5	50 New York.....	85
380 Justice.....	12 12	170 North Con Virg.....	55
140 Julia.....	4 85	200 Ophir.....	1
25 Kentuck.....	6 6	215 Ophir.....	23 23
3300 Lady Bryan.....	10 10	160 Panther.....	50
325 Lady Wash.....	2 40	500 Poorman.....	10
50 Leviathan.....	40 42	110 Rye Patch.....	3 30
705 Mexican.....	17 17	130 Raymond & Ely.....	5
55 New York.....	60 60	50 Rock Island.....	45
250 North Con Vir.....	60 60	40 Savage.....	7 7
975 Ophir.....	24 23	30 Sierra Nevada.....	51 50
755 Overman.....	69 72	80 Silver Hill.....	6
50 Phil Sheridan.....	8 8	5300 Trojan.....	1 10
330 Sierra Nevada.....	7 7	160 Utah.....	17 17
520 Sierra Nevada.....	51 52	95 Union Con.....	8
95 Silver Hill.....	51 52	300 Ward.....	8
500 Trojan.....	1 30		
95 Utah.....	18 18		
680 Union Con.....	8 8		
150 Ward.....	8 8		
100 Woodville.....	55 55		
435 Yellow Jacket.....	12 12		

590 Utah.....	130	21	350	Yellow Jacket.....	10	
600 Trojan.....	1	1	355	Yellow Jacket.....	10	
150 Ward.....	85	5	55	Alpha.....	17	
100 Woodville.....	5	5	50	Alpha.....	17	
435	Yellow Jacket.....	12	12	50	Andes.....	1
AFTERNOON SESSION.						
1840	Alpha.....	135	40	55	Baltimore Con.....	135
220	Belcher.....	7	6	535	Belcher.....	2
190	Best & Belcher.....	30	30	570	Bullion.....	15
220	Bullion.....	16	16	1210	Caledonia.....	6
90	Caledonia.....	7	7	1235	Con Imperial.....	150
390	Con Virginia.....	4	4	1300	California.....	4
150	California.....	4	4	1300	Con Virginia.....	4
50	Crown Point.....	9	9	3805	Con Virginia.....	42
1100	Coso Con.....	10	10	255	Crown Point.....	4
170	Eureka Con.....	17	17	100	Dayton.....	45
140	Grand Prize.....	180	180	1700	Exchequer.....	6
580	Gould Chariot.....	3	3	180	Harrisburg.....	11
285	General Thomas.....	30	30	335	Hale & Norcross.....	4
25	Gila.....	6	6	300	Justice.....	11
875	Gould & Curry.....	12	12	415	Julia.....	4
290	Harrisburg.....	35	35	40	Knickerbocker.....	2
85	Justice.....	12	25	115	Kentuck.....	6
445	Leopard.....	4	4	25	Kosuth.....	40
445	Leeds.....	4	4	1400	Lady Bryan.....	15
295	Manhattan.....	6	6	50	Lady Washington.....	2
100	Northern Belle.....	25	20	180	Mexican.....	18
20	New Coso.....	5	320	200	Occidental.....	11
510	Ophir.....	234	5	470	Ophir.....	21
350	Overman.....	68	150	100	Phil Sheridan.....	8
200	Panther.....	45	60	150	Prospect.....	20
1125	Rye Patch.....	3	3	490	Savage.....	6
250	Sierra Nevada.....	5	520	Sierra Nevada.....	6	
80	Utah.....	12	300	Silver Hill.....	50	
50	Yellow Jacket.....	12	800	Trojan.....	1	
SATURDAY, A. M., MAR. 17.						
10	Alpha.....	17	270	Utah.....	16	
915	Alps.....	1	310	Union Con.....	8	

570 Andes.....	1.10@.20	120 Ward.....	80@
400 Alta.....	.....	100 Woodville.....	55s
330 Belcher.....	.....	.....	.....
80 Belcher.....	.....	AFTERNOON SESSION.	
20 Bullion.....	16s	795A Alps.....	.....
70 Baltimore Con.....	13	80 Belcher.....	56s
300 Belmont.....	2@.90	110 Best & Belcher.....	25@
235 California.....	45@45s	220 Con Imperial.....	13@
155 Crown Point.....	9	340 Dayton.....	45
255 Con Virginia.....	4	340 California.....	.....
350 Con Imperial.....	1.55@.60	185 Crown Point.....	8@
200 Coso Con.....	10c	535 Con Virginia.....	42@
1180 Caledonia.....	73@71	320 Eureka Con.....	17@
10 Challenge.....	.....	410 General Thomas.....	.....
600 Dayton.....	55@15	400 Golden Chariot.....	30c
140 Exchequer.....	6	310 Gould & Curry.....	12
370 Eureka Con.....	17	200 Grand Prize.....	.....
350 General Thomas.....	30c	100 Harrisburg.....	.....
10 Gila.....	50c	90 Justice.....	12@
380 Gould & Curry.....	12s	250 Leeds.....	20
200 Grand Prize.....	180	200 Lexington.....	41@
745 Golden Chariot.....	35	220 Manhattan.....	.....

2845 Modoc.	34 33	50 Savage.	6 6
325 Mexican.	15 15	WEDNESDAY, A. M., MAR. 21.	
120 Northern Belle.	25 25	330 Alpha.	12 12
200 Ophir.	21 21	140 Andes.	1 1
140 Overman.	60 60	270 Best & Belcher.	23 23
10 Raymond & Ely.	4 4	435 Bullion.	13 13
515 Rye Patch.	3 3	315 Belcher.	5 5
85 Sierra Nevada.	6 6	360 Baltimore Con.	35 35
375 Union Con.	7 7	1210 Crown Point.	8 8
255 Yellow Jacket.	11 11	1240 Con Imperial.	10 10
TUESDAY, A. M., MAR. 20.		1240 Caledonia.	6 6
560 Alpha.	12 12	2455 Con Virginia.	4 4
250 Andes.	1 1	925 California.	44 44
445 Belcher.	6 6	115 Confidence.	5 5
320 Best & Belcher.	28 28	100 Con Imperial.	10 10
490 Bullion.	15 15	100 Exchequer.	5 5
50 Baltimore Con.	1 1	575 Gould & Curry.	11 11
1085 Caledonia.	6 6	435 Hale & Norcross.	4 4
1230 Con Virginia.	4 4	745 Justice.	10 10
725 Con Imperial.	10 10	200 Kosuth.	40
330 California.	45 45	170 Knickerbocker.	5 5
230 Chollar.	5 5	170 Kentuck.	6 6
140 Confidence.	7 7	170 Knickerbocker.	5 5
200 Dayton.	6 6	100 New York.	85
510 Exchequer.	6 6	265 Ophir.	20 20
705 Gould & Curry.	12 12	1085 Overman.	55 55
315 Hale & Norcross.	4 4	100 Occidental.	10 10
125 Justice.	11 11	120 Phil Sheridan.	8 8
120 Lady Bryan.	10 10	195 Savage.	5 5
200 Leviathan.	50 50	2 600 Sierra Nevada.	5 5
150 Lady Wash.	2 2	500 Sucor.	80 80
130 Mexican.	16 16	170 Silver Hill.	70 70
100 Mint.	20 20	100 Utah.	15 15
160 New York.	50 50	225 Union Con.	55 55
130 North Con Virg.	55 55	100 Ward.	8 8
40 Occidental.	1 1	100 Yellow Jacket.	10 10
230 Ophir.	22 22	1000 Alps.	1 1
490 Overman.	55 55	455 Best & Belcher.	26 26
270 Phil Sheridan.	9 9	450 Bullion.	13 13
140 Prospect.	25 25	140 Belcher.	5 5
140 Savare.	6 6	150 Bonanza.	3 3
525 Sierra Nevada.	5 5	170 Crown Point.	8 8
100 Silver Hill.	15 15	470 Caledonia.	6 6
2215 Sucor.	75 75	345 California.	43 43
2215 Trojan.	10 10	470 Chollar.	5 5
330 Utah.	15 15	1010 Con Virginia.	4 4
280 Union Con.	7 7	45 Chollar.	5 5
100 Woodville.	60 60	225 Hale & Norcross.	4 4
280 Yellow Jacket.	11 11	1250 Harrisburg.	40 40

SALES OF LAST WEEK AND THIS COMPARED.

THURSDAY, A. M., MAR. 15.	THURSDAY, A. M., MAR. 22.
30 Alpha.	173 174
215 Andes.	1 10
140 Alpha.	173 174
330 Bullion.	1 1
465 Best & Belcher.	28 28
115 Belcher.	5 5
330 California.	45 45
250 Crown Point.	9 9
1685 Con Imperial.	1 55
155 Chollar.	6 6
330 Con Virginia.	4 4
50 Challenge.	30 30
1405 Con Virginia.	4 4
780 Caledonia.	7 7
160 Confidence.	7 7
220 Dayton.	6 6
475 Exchequer.	6 6
580 Globe.	20 20
140 Gould & Curry.	11 11
30 Hale & Norcross.	5 5
280 Justice.	12 12
280 Julia.	4 4
160 Kentuck.	6 6
100 Knickerbocker.	5 5
300 Lady Bryan.	15 15
120 Lady Wash.	2 2
220 Leviathan.	50 50
695 Mexican.	16 16
275 North Con Virg.	55 55
100 Occidental.	1 1
875 Ophir.	22 22
625 Overman.	55 55
65 Phil Sheridan.	7 7
35 Savage.	7 7
215 Sierra Nevada.	6 6
50 Silver Hill.	5 5
150 Sucor.	80 80
255 Trojan.	1 1
320 Utah.	16 16
645 Union Con.	7 7
300 Wells-Fargo.	5 5
20 Ward.	8 8
330 Yellow Jacket.	11 11

129 Utah.	173		
645 Union Con.	73	68	
30 Wells Fargo.	56		
20 Wildcat.	10	100 Alps.	
330 Yellow Jacket.	111	200 Andes.	105
AFTERNOON SESSION.			
100 Alps.	1.40	150 Belmont.	
50 Alpha.	173	730 Best & Belcher.	230
15 Belmont.	10	220 Belcher.	50
33 Bullion.	162	2060 Coso Con.	50
265 Best & Belcher.	231	2910 Con Imperial.	11
160 Belcher.	61	445 Caledonia.	60
230 Con Virginia.	43	500 California.	410
265 California.	44	440 Con.	30
115 Crown Point.	58	195 Eureka Con.	35
305 Caledonia.	73	725 Exchequer.	4.80
80 Eureka Con.	134	200 Gila.	
50 Empire Id.	60	250 General Thomas.	30
110 Exchequer.	60	220 Grand Prize.	40
100 Gila.	60	300 Golden Chariot.	10
100 Gen Thomas.	35	760 Gould & Curry.	10
1030 Grand Prize.	4.50	100 Harrisburg.	
1150 Golden Chariot.	3.30	50 Hussey.	
100 Harrisburg.	40	210 Jackson.	
250 Imperial.	1	625 Justice.	10
10 Jefferson.	10	75 Leviathan.	
125 Justice.	12	240 Leopard.	4
85 Julia.	4	195 Leeds.	
580 Leeds.	3.10	385 Modoc.	2
100 Leopard.	4	230 Manhattan.	
320 Modoc.	2.60	260 Northern Belle.	24
930 New Coso.	4	150 North Con Virginia.	
330 Northern Belle.	24	385 Overman.	56
225 Manhattan.	58	100 Occidental.	11
65 Ophir.	22	35 Raymond & Ely.	
240 Overman.	65	100 Rye Patch.	
450 Rye Patch.	2.55	700 Panther.	50
155 Raymond & Ely.	4	425 Ward.	
240 Union Con.	73	100 Yellow Jacket.	10

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

MOUNTAIN CLAIM.—Alpine Chronicle, March 17: The Mountain No. 1 company having let a contract to run their tunnel 200 feet, Monday's staff brought in a crew of miners to do the work. They commenced work on the outside on Wednesday and soon had the road to the tunnel laid in good condition. As soon as a new track can be laid, and some new air boxes placed in the tunnel, the contractors will commence driving the tunnel.

SILVER CLOUD.—Miners to start up work on the Silver Cloud claim in the Raymond district, arrived at Markleville a few days since, and we presume they have commenced.

LADY FRANKLIN.—The old tunnel has been cleaned out and now a run of about 20 feet must be made to cut the incline, now 85 feet in depth.

MILL REFINING.—It is pleasing to know that the Exchequer mill is completed and now running, having been started up this morning. The mill has been entirely rebuilt. It has stamps and has in connection with it an O'Hara's Champion furnace, which is capable of working 30 tons of ore per day. This mill has been planned by Manager Chalmers with a view to its doing its work with as little manual labor as possible, and is one of the best appointed mills on the Pacific slope. It has been placed by Mr. Chalmers under the full control of E. B. Smith, of San Francisco. Mr. Smith had charge of the O'Hara's furnace at Nevada, and made the successful run on the Consolidated ore, and we are satisfied that the new mill will be run successfully under his management.

SILVER CREEK.—On Tuesday last this company broke ground for their tunnel, which is to cut the Mountain ledge. This tunnel is about half a mile north of the Mountain tunnel and a little south of opposite Fisk's hotel. This company commences work under favorable circumstances.

AN EVENTFUL WEEK.—The week ending with this day has been an eventful one in the history of Alpine. The week opened with a resumption of work on the Silver Cloud claim in the Raymond district, and then came the starting of the Silver Creek company's tunnel on the Mountain ledge, at Silver Mountain. On Wednesday afternoon work was resumed at the Mountain No. 1 claim, at Silver Mountain, and this morning the Exchequer mill and O'Hara's Champion furnace commenced work on Exchequer ore. The jumping of lots has been inaugurated at Monitor, the people of that town expecting "big things" when the Advance strikes the ledge. The most notable event of the week, however, is the starting up of the O'Hara furnace, the successful working of which cannot be doubted, its success at Peavine proving that such a process for reducing our rebellious ores is all that we require to place Alpine at the head of the mining counties of California.

Too Soon.—The great revival that is now progressing in our county—but more particularly in this (Silver Mountain) district—in mining is attracting attention on the outside, and daily we notice new faces on the street; and now that thousands of miners have been thrown out of employment on the Comstock, it is to be expected that a lot of them are yet struck by this town, with the natural expectation of getting work immediately. We regret to be compelled to warn such to stay away for a time, at least, as we now have too many idle men here—but we will admit that many now here will remain idle, as their habits will prevent their obtaining work in any of our mines, the managers having decided to employ none but sober, steady men. Our companies are preparing to find valuable mining camps, and the managers of these competent miners and mechanics—steady men—will find remunerative employment. So, to those contemplating coming here for work, we say: Stay away a while longer—unless you have money to live on while waiting for work.

AMADOR.

BECK.—Amador Ledger, March 17: Captain Beck reports satisfactory progress on this claim. The drift to determine the width of ore body is in 50 feet, and still no hanging wall appears. Parties who have inspected the mine lately, say it is the biggest mass of quartz they have seen anywhere in California. Throughout this vast vein scarcely a barren streak has been passed. The only spots of low grade ore yet struck in this town, a foot in width, and this is estimated to yield between 84 and 85 per ton. The remainder of the ledge is believed to be good paying rock. Some of it is immensely rich, its value running up into the hundreds of dollars. Captain Beck has negotiated for the Volunteer mill, for the purpose of demonstrating the value of the mine. The hauling of the rock will be commenced forthwith. Should the result approximate to the expectation of the owners, an impetus will be given to mining industry in this vicinity such as we have not witnessed in many years.

VOLCANO TUNNEL.—The great boring undertaking at Volcano makes slow progress. The rock is excessively hard.

TALISMAN.—The new 10-stamp mill of the Talisman mine near Amador City, was started last week, and works beautifully. It is run entirely by water, and is said to be one of the neatest pieces of workmanship in the State.

FIDDLERTOWN MINING.—All the gravel claims around Fiddletown are in full blast, giving the town quite a lively appearance. There are some excellent mines around here, the great drawback being the scarcity of water, the water supply only lasting a few months in the year. The companies that the supply will be exhausted probably in June. The American Flat claim made a clean-up last week from a run of nine days and realized \$1,500, a very gratifying yield.

BETWEEN PLYMOUTH AND AMADOR.—A correspondent writing from Plymouth on the mining prospects of that vicinity, says: This part of the county is passing through one of those periods of transition which occur every five or six years in our country. Parties, not only of prospectors but locators, are daily examining and locating quartz claims on the mining belt from Plymouth to the Cosumnes. The Enterprise mill will soon start up under the superintendency of Mr. Vaughan, and in our opinion in two years, from Dry Creek to the county line north, not less than ten quartz mills will be in successful operation.

OLIVE.—One hundred and thirty-seven tons of rock from this mine have been crushed at the Bonanza mill. The clean-up was made on Thursday. A parallel ledge was recently discovered 30 feet on the hanging wall side of the present vein. It is three feet in thickness, with the surface indications quite as favorable as those which marked the old ledge. The rock averaged \$18 per ton—a splendid showing.

BUTTE.

CAPITAL.—Oroville Mercury, March 16: Since the bonanza stocks of Virginia have played such havoc with the fortunes of men, who have dabbled in them, capitalists have turned their attention to the mining industry as part of the State. Fortunes are not made so quickly as in stock, but they are sure in the end to be made. Some gravel beds have been opened here that are of great value and are paying large profits; others are being developed and give promise of being rich. A few days since a party from San Francisco, consisting of E. Levy, J. M. Keeler and J. H. Ferguson, came up and bought what is known as the old Kent claims, some three miles below town, and are now engaged in building upon it. They will soon put up an engine to pump out the water, and will put a crew of men at work sluicing off the dirt. This is a rich spot of ground, and the only trouble has been to get fall enough to work it.

CALAVERAS.

ANOTHER BONANZA.—Calaveras Chronicle, March 17:

Mr. J. Lefoy, of this place, who has lately been engaged in mining out the old Estrade lot, on East Center street, says he has struck it big. The gravel yields from 25 cents to \$1 to the pan. It is no use of talking, you can find gold anywhere in Mokelumne hill.

RICH GRAVEL.—Peck, Vandel & Co., the young men who have been engaged in mining out the old Wentzel lot, at the junction of Lafayette street and Schoolhouse avenue, have struck a rich deposit of gravel. The boys cleaned up last Monday, realizing quite a large sum.

MINE NEWS.—At the Duryen mine the battery is kept in motion day and night. A large force of hands is constantly employed getting out gravel. The Duryen mine is giving a good account of itself. Brown's new tunnel, in Tunnel Ridge, opposite Duryen's, is fast approaching the channel. Brown is persevering and deserves success. Veith is plying away with renewed energy and is being well rewarded for his labors. Moser's hydraulic, on Tunnel Ridge, is in full blast. His claim runs smoothly in this vicinity. Everything is running smoothly in the Emerson hydraulic in Happy valley. We expect to hear of a large clean-up shortly. Cook's new hydraulic, near the French hospital, is in full blast. The prospects are flattering.

UPPER COUNTRY JOHN.—Champion stopping. Quality of rock improves as developments proceed. Vein, two feet wide, in granite, owned by White & Co., has been found 100 tons on the dump. Rock prospects well. Work on Hall's mill, at Skull Flat, is progressing rapidly. Chapman rock nearly all crushed. Field & Co. have struck rich rock. Peter Grass, near Mosquito, has recently struck a new lead. Rock averages \$45 per ton. Tiger mill, at Rich Gulch Flat, crushing.

EL DORADO.

FLUKE.—El Dorado Republican, March 15: We visited this week the claim of Knox, Evans & Varroza, on the north side of Hangtown hill, consisting of some 15 or 20 acres of gravel. We found them nearly ready to start up in splendid shape. They have in some 400 or 500 feet of substantial flume of a capacity to carry 400 inches of water with debris. They expect to be ready to turn on water next week. It is one of the easiest claims in the county to work as now arranged, and the boys will soon have more money than they will know what to do with.

KERN.

PROSPECTING.—Cor. Courier-Californian, March 10: Prospectors and miners about Kernville, in small parties, are out in all directions making claims and working them on their own account, thus opening up new mines. In dull times or any discipline would teach people not to place themselves in the power of a corporation, the experience could hardly be too dearly paid for. We can get no reliable information in regard to mining prospects. The mining companies choose to keep their business to themselves. They have it in their power to stop the work and have done so; it will stop, doubtless, until their work is completed, whatever that may be. Meantime, the people who are dependent upon work in the mines for a living must move away, do something else or starve.

NEVADA.

NORTH BANNER.—Nevada Transcript, March 15: One of the important mining enterprises which have been started during the past six months in this vicinity, is the opening of the north extension of the Banner mine, situated about three miles from this city. H. P. Conner and others commenced work on it some months since. Hoisting works were commenced and they expect to be ready to turn on water down 186 feet. The ledge at that depth varies from four to eight feet, and the rock looks remarkably well. Assays show that it contains all the way from \$100 to \$150 to the ton. It is the intention of the company to prosecute the work on an extensive scale, and to thoroughly develop the mine. Repeated assays of the rock, from the surface down, show that the shaft is being sunk on a rich shale, and there is not the least doubt that the company will open one of the best mines in the district. The original Banner mine has yielded large amounts of bullion, and is yet regarded by all who worked in it while running as a first-class mine. The indications thus far go to show that the north extension will be still better. The rock is heavily sulphureted from 115 feet below the surface, and the rock from that increases in value, every foot sunk, to the bottom of the shaft; and the size of the deposit is so large that an almost unlimited quantity of rock can be extracted when the levels are well opened.

THE RICH HILL LEDGE. situated on Ophir hill, was sold a few days ago, for \$8,000, to James Champion, of Grass Valley. The former owners were Wm. O'Donnell, Con. Reilly, M. Cloonan, Dennis Meagher, T. Cloonan and Lawrence Fahey.

SOME OF THE BEST ROCK EVER TAKEN OUT OF THE DISTRICT is now being taken out of the Mountaineer ledge, down Deer creek. It is nearly all sulphurets, and the ledge is two feet thick. The rock in the mine pays all the way from \$50 to \$100 to the ton.

INYO.

DEFIANCE.—Coso Mining News, March 17: One of the Defiance furnaces was started up last Wednesday, and is now running in an excellent manner. We visited the furnace last Thursday, and was kindly shown around by Mr. J. S. Gorman, the lessee, and found everything in fine condition for a long and successful run. There are about 600 tons of good ore on the furnace dumps at present, and the mine is now producing daily more than can be reduced with one furnace. In a short time, as soon as coal can be had in larger quantities, the other furnace will be started and both kept going as long as ore can be had. The class of ore now being extracted from the mine, as also that upon the furnace dumps, is superior to that heretofore smelted, and the bullion which is now being produced is greatly in excess in value per ton of that which was shipped on the last run.

OLIVE.—Mr. Water has been here on this week to report upon New Coso, as also the Emigrant company's mines, at Lee district. He returned to San Francisco last Wednesday, and we hope he will report favorably upon what he has seen. To show that it is not any easy matter to guess the true value of ore by a mere examination by the eye, we will incidentally mention that, while at the Lucky Jim mine, he picked up a piece of ore, not large enough to see the progress making. A party standing by said it would go about \$200. Mr. Skidmore wagged that it would not go over \$100. He brought the piece down, assayed it himself, and was surprised to find it go \$220. He thinks we have pretty good galena ore in this country.

MONO.

BODIE DISTRICT.—Cor. Inyo Independent: In the flush days of Aurora, Bodie was favorably known, but as Aurora died out so did Bodie. But a few still stuck to their claims, and at present the prospects are that they will be handsomely rewarded for their pluck and faith. The Syndicate mine in early days had such a good showing. A party standing by said it would go about \$200. Mr. Skidmore wagged that it would not go over \$100. He brought the piece down, assayed it himself, and was surprised to find it go \$220. He thinks we have pretty good galena ore in this country.

lots and watching mining claims that might be jumped has been commenced.

PLACER.

GRAVEL.—Dutch Flat Forum March 15: The Star & Union, Elmore Hill, Summerville, Central, Franklin, Southern Cross and Polar Star claims are washing. The Baker has turned off and is cleaning up a portion of the sluices in the tunnel below. Washing therein will be resumed today. Two powder drifts are being run, which when exploded will open the pit beyond the shaft and into the solid gravel, after which the drifted ground will be passed and good clean-ups may be expected. The Pacific claim cleaned up on Monday and is now re-fitting. At Gold run the Indiana Hill and Hoskin claims continue washing. The Cedar and Gold Run claims have refitted and are on again. The cement mill continues stamping the gold out of the blue gravel and is paying well. Our drifts are still running full.

ALTA MINES. The tunnel in the Shady Glen is extended over 100 feet in gravel. They are now passing over a channel several feet lower than the bottom of the tunnel and the gravel which it contains is found to be of sufficient richness to pay for drifting. The tunnel will be advanced until the rim rock on the opposite side of the channel is reached, drifts will then be opened, the bedrock, when breasting out of the rich gravel will be commenced. The channel will be drained by means of a siphon.

LITTLE YORK.—The Empire and Christmas Hill Co. continue to wash steadily.

GREEN VALLEY.—Work in the Opel claim has undergone a series of drawbacks, caused by the banks caving, plunging the tunnel a great many times. The work is now progressing under more favorable circumstances. The stop raised in the Novey Co. a cement mine was found to be in high rim rock; it was therefore abandoned, and the work of advancing the main tunnel is now progressing, and will be completed in a few days to a point from which it is thought the lowest part of the channel can be worked through.

REMINOTON HILL.—The Rhode Island Co. continue to ground sluice, as there is not sufficient water for hydraulic purposes. The work of advancing both tunnels in the Wide West mine is now progressing.

LOWELL HILL.—The Swamp Angel Co. continue to advance the main tunnel and open up new breasts, the work of excavating the old ones is being accomplished with success. The bedrock tunnel in the Wild Cat mine is advanced 700 feet, they expect to reach gravel soon.

QUARTZ.—Placer Argus, March 17: The St. Patrick cleaned up last Saturday, after a successful run of one month, the amount realized being a little over \$10,000. The mine is looking unusually well now, and everything indicates a dividend at an early day. Sinking the main shaft is progressing steadily, and at the same time ore of splendid quality is coming from the stopes in sufficient quantity to keep the mill running. The Good Friday is turning up pay rock now, and the prospect of the mine is reported excellent. Mr. Sharpleff has struck another pocket in his lead on Duncan hill, where he took out so much gold some months ago. Other ledges in the vicinity are looking well and prospect for a prosperous season in quartz mining never was better.

PLUMAS.

GENESSEE QUARTZ.—Plumas National, March 17: We learn that a company of men have been prospecting during the past winter for a quartz mine, on the opposite side of the creek from the Genessee mine, and a short distance up the canyon. Within the past month a ledge has been developed, the rock in which is of the same character as the Genessee and prospects richly. The owners are positive that they have found the extension of the old mine, and if it is as permanently good as has been the old mine, they are lucky indeed.

"GREAT SENSATION."—Several of our citizens have during the winter been running a prospect tunnel in the ridge north of Thompson's creek, and on Wednesday we paid a visit to the works. The tunnel is over 100 feet long, all the way in a very rich rim rock. The workmen have just cut away from the extension of the old mine, and they will soon have "pay grit." The wash is coarse and mixed with quartz and iron rock. Occasionally a few "colors" are found, but the bedrock being perfectly smooth and decidedly "on the pitch," would of course preclude the possibility of finding much pay until further developments are made. The "Great Sensation" is in a new district hitherto unprospected.

LEWIS.—Benjamin is running a new ditch from Indian creek to his claims near Upper Lone Rock. He has some good prospects. Morton commenced piling in his Light's canyon claims one day this week. O'Toole & Co. are still sinking their incline shaft in the big channel above Elizabethtown. They have found some good gravel which prospects well, and certainly will get good pay when they reach bedrock. Any quantity of prospectors in the Greenville and Wolf Creek section. The Bell company have decided to put up a quartz mill this spring.

SIERRA.

ORO M. Co.—Mountain Messenger, March 17: At a meeting of the Oro mining company, held on Wednesday evening, it was decided to go to the progress making. The mine, it is probable that a 12-stamp mill will be erected, though that has not been definitely decided upon yet. The ledge is known to be large, and to prospect fairly in every part. We do not think there is a doubt about its paying if properly managed.

THE IOWA COMPANY had not struck bedrock at last accounts, but were finding pay in the ground encountered. It is becoming more certain that there is a body of pay gravel there the lower the shaft goes.

THE AMERICAN HILL COMPANY is running full time, or was a few days since, using both monitors. They have already pipped off a large amount of ground.

THE SWALLOW COMPANY, Monte Cristo, declared a dividend of 18 cents to the share for the month of February. The Brush Creek mill will be started in a week or ten days, we are informed. They have some very rich quartz in the dump.

SONOMA.

SANTA ROSA COAL MINES.—Sonoma Democrat, March 17: We visited these promising mines yesterday, and found them not only in the progress of development, but we think a mine will be opened there which will prove of great value. The ledge is well defined between fire clay walls, and has every appearance of a true fissure vein. The coal is of very superior quality. Everything points to the speedy development of a large deposit of coal.

VENTURA.

GOLD.—Ventura Free Press, March 17: Messrs. Reis, Bledsoe and other gentlemen, who have just returned from a visit to the Calomeros district, represent that at a point on San Francisco creek, about nine miles north of Newhall, they found gold all over the hills, as well as in the bed of the stream. The gold some of which we have seen in small scales, and its rough appearance shows that it has originated from a vein somewhere in the immediate vicinity. That vein ought to be readily found. The absence of rain this year will prevent much work being done, though the creek affords a small sluice stream. The channel in places is narrow and easily dammed, so that in ordinary seasons a supply of water can be accumulated. Some parties are now at work by "dry washing" the dirt, using a winnowing machine.

Nevada.

WASHOE DISTRICT.

GOULD & CURRY.—Gold Hill News, March 25: The pump stations, tanks and pump holes are all completed, ready to put in the rods down to the 1500-ft level. The rods will all be in place ready to run by the 1st day of April. When that part of the work is finished everything will be in perfect order for the development of the lower levels. The main south drift will penetrate and prospect a portion of the ledge never yet reached by any of the prospecting drifts, and will open up quite an extent of entirely virgin ground.

BEST & BLECHER.—Three cross-cuts are now being run to the eastward on the 1700-ft level. Cross-cut No. 1, near the south line of the Consolidated Virginia, is in

about 40 feet, and is following the line of the diamond-drill hole recently sent out to the eastward at that point.

JEAN. The quartz and ore in the face of the main south drift on the 1600-ft level is steadily increasing in value as the drift advances to the southward. The same may be said of the ore in the face of the main south drift on the 1800-ft level, the ore in the face of the drift having increased in value until it is now almost of a milling quality. The ledge seems to be steadily widening on that level.

KNUCKENBOCKER.—The water in the shaft is reduced today to about 100 feet below the 1000-ft station. It is being reduced more rapidly at present, owing to decrease of flowage, and the bottom of the shaft, which is 865 feet deep, will be reached next week. Owing to the proper precautions which were made to secure the timbering of the mine before work was discontinued and the water allowed to fill the mine, the stations and drifts at the 400 and 600-ft levels are found to be uninjured.

YELLOW JACKET.—The two east cross-cuts on the 2040-ft level are being pushed vigorously forward, the face of the north drift being in favorable ground. At the new shaft the last five days have been employed in relieving the timbers in the shaft below the 500-ft level. This has been finished and sinking resumed. The shaft is now down 573 feet. The flow of water is not very strong.

MINT.—The dump below the 1400-ft station is finished and closed, boarded to the bottom, so as to keep it in an easy condition for cleaning out or recovering a water tank, should one be lost. A splendid double station has been completed at the 1400-ft level and a drift started to cut the ore vein.

OVERMAN.—Sinking the winze below the 1200-ft level is making the usual fair rate of progress, the bottom still in very favorable vein matter, carrying streaks of good ore. A discharge of water was stuck in the bottom yesterday morning. The stories put in circulation by interested parties to the effect that the ledge has been penetrated by diamond drills on either the 1300 or 1400-ft levels have not a word of truth in them. The only prospecting that has yet been done with the drills ahead of the drifts on either level, was the sending of the drill ahead of the face of the drift on the 1300-ft level to tap the water. There the drill was driven in until it struck and stuck fast in what is supposed to be the west vein. Finding it impossible to drive the drill further at that time, the water was allowed to drain and the drill again inserted, but stuck as badly as ever. The drilling was then abandoned and the drift started forward, but has not yet reached the clay. On the 1400-ft level the water has drained until the strong head recently encountered has weakened sufficiently to admit of again pushing the drift ahead.

CON. VIRGINIA.—Daily yield, 450 tons of ore. This is a decided increase in the quantity of ore produced, and begins to look as if the promised resumption of dividends would not be much longer delayed. The Trench and Bacon mills have been added to the crushing capacity of the mine, and notwithstanding the delay caused by the repairs to the Consolidated mill the first of the month, the bullion yield for the month of March was undoubtedly largely in excess of that of February. The west drift on the 1550-ft level is finished, making the extraction of the ore in the southwest portion of the mine on that level much easier. On the 1650-ft level the sills have been laid and the first sets of timbers put in, preparatory to stopping the ore. While doing this, about 50 tons of rich ore per day have been hoisted through the C. & S. shaft.

THE CON. VIRGINIA.—Owing to a stoppage of the Savage pumps during the first part of the week, the Hale & Norcross pumps have been unable to keep down the flow of water, which rose in the main incline to a short distance below the 1900-ft station. The pumps were, however, kept busily at work, and last evening the water was again drained to a distance of 35 feet below the 1900-ft level. At the rapid rate at which the water is now being reduced, the level of the main incline is being reached in a few days, and repairs again proceeded with. The great heat in the shaft, caused by the high temperature of the water, necessarily makes the prosecution of such work slow.

CALIFORNIA.—Daily yield, 550 tons of ore, keeping the mills running up to their full capacities. The yield of bullion, notwithstanding the delay experienced in its production the first of the month on account of the renovation of the California mill, is about in excess of the yield for the month of February at the same date, making sure the payment of the regular dividend of \$2 per share. The ore stopes in every part of the mine are yielding rich ore, and the future prospects were never as bright as at this time. On the 1650-ft level a double track has been laid in the drift connecting the deep winze with the west drift. This drift is to be extended northward through the ore vein of the California mill, and is to be reached in a few days for the month of February at the same date, making sure the payment of the regular dividend of \$2 per share. The ore stopes in every part of the mine are yielding rich ore, and the future prospects were never as bright as at this time. On the 1650-ft level a double track has been laid in the drift connecting the deep winze with the west drift. This drift is to be extended northward through the ore vein of the California mill, and is to be reached in a few days for the month of February at the same date, making sure the payment of the regular dividend of \$2 per share. The ore stopes in every part of the mine are yielding rich ore, and the future prospects were never as bright as at this time. On the 1650-ft level a double track has been laid in the drift connecting the deep winze with the west drift. This drift is to be extended northward through the ore vein of the California mill, and is to be reached in a few days for the month of February at the same date, making sure the payment of the regular dividend of \$2 per share.

LADY WASHINGTON.—A drift has been run 50 feet west from the 950-ft station at the bottom of the winze below the 850-ft level, almost the entire distance through quartz and low grade ore. The opinion of most of the experts who have heretofore examined the ledge on the 850-ft level, has been to the effect that the larger portion and better portion of the vein was most likely to be developed to the eastward. This quartz body opening out entirely west of the discoveries on the 850-ft level, at a depth of 100 feet or more, seems to rather upset these theories and looks as if the west wall of the ore vein had not yet been reached at all. It also carries the vein back nearer a direct line with the ledge in the Overman, which, on the lowest levels in that mine, has a strong tendency to the south and east or almost directly toward the Lady Washington ground.

BLITCHER.—Daily yield, 90 tons of ore. The ore is being crushed as fast as it is extracted, and is paying a better profit than for some time past. The yield for the month of March will not be far from \$80,000, and the profit on the ore crushed will nearly, if not quite, pay the running expenses of the mine for the month. Sinking the main incline was stopped by a breakage of one of the small pumps on Sunday last. The water rose 124 feet in the shaft before the damage could be repaired. The water was then pumped out and the pump shaft is making the best of progress. The 1800-ft station is in, ready to commence the prospecting of that level whenever the management desires to do it.

SILVER HILL.—Owing to some little detention, sinking the main incline has made only two feet per day for several days past. The incline is down 792 feet perpendicular, and lacks only 18 feet of reaching the point at which it is the intention to open the 800-ft station and level. The southeast prospecting drift on the 444-ft level from the bottom of the winze below the 334-ft level is steadily advancing, with very favorable and encouraging prospects.

OHIO.—Daily yield, 15 tons of ore. The Empire State mill is kept steadily crushing on the regular supply of ore from the mine and in the dumps. A vein of ore recently struck on the 1300-ft level continues about seven feet in width and of a fair milling quality.

BULLION.—The north drift on the 1500-ft level is steadily advancing, the face in very encouraging ledge matter. The east drift on the 1600-ft level is slowly advancing toward the ledge, the face in bad, shelly ground. The leakage of water from the mine is not at all in excess of the amount of its intense heat. The air is very bad, and the difficulties under which the advance is being made are of the worst character.

CALEDONIA.—Sinking the main shaft is being pressed ahead with the usual vigor, the bottom in good working ground. The flow of water is still quite strong, but it is easily handled by the pumps.

SAND STRAIT.—Work is resumed in this old mine on Cedar hill, under a change of management and more favorable auspices than ever.

DAYTON.—The greater part of the past week was employed in leveling up and putting in the best of working order the pumping and hoisting machinery of the mine.

Continued from page 178.

single six-inch belt, and delivers an uninterrupted stream of pulp the entire length of conveyor from battery to furnace.

Some interesting facts in reference to the Crismon Mammoth mill, the Wyoming, the property of Col. Locke, at Homansville, and other mills and methods for the reduction of the Tintic ores, are necessarily omitted, through fear of trespassing too much on your space. A few additional lines will be allowed, no doubt, for a short notice of an ingenious little machine, the invention of the proprietor of the Wyoming mill, that has been in successful operation here for the past two years. It is no more nor less than

An Automatic Ore Sampler,

Driven by the pulp falling from one conveyor to the other, at the same time sampling the stream of pulp, which sample is not only an exact representation of the ore worked, but being a definite fraction of the pulp, it gives by its weight the quantity of ore crushed in the battery. In conclusion, Tintic may be regarded as a success. Contrary to the adage that "it requires a fortune to work a mine," her claims have been opened without capital and are represented to have paid two dollars for every dollar invested. With more money and machinery, millions might be made where now only hundreds are hoarded. A. C. K.

The Mines of Eastern Oregon and Western Idaho.

EDITORS PRESS:—After many years of decadence the mines of this interior country are gradually looming up, and will ere long assume the grand proportions commensurate with their undoubted values. It is not the object of the writer at present to enter into an analysis of the causes that have for so long a period kept this vast mining region under a cloud; but simply to give to your readers a plain, unvarnished tale, and let them judge from their own common sense the worth of this country. Commencing at Grant county, in the old placer mining district of

Granite Creek,

Are many rich lodes of silver-bearing quartz, which have been brought to the light of day within a comparatively recent period, the first discovery being made about 20 months since. The ledge to which, at present, the faith of the country is pinned upon is the Monumental. This ledge is developed at a depth of 100 feet from the surface, and levels are run out 65 and 45 feet respectively from the bottom. From the start the width of the vein was but four inches wide, but of exceedingly rich rock. As depth was attained width and richness increased, and at the bottom of the shaft, at present, is a 10-inch streak of rich ruby silver, assaying from \$3,000 to \$5,000 per ton. The remainder of the ledge, two feet wide, will average about \$200. The ore is antimonial, but the extreme richness of the rock will more than compensate for the little extra expense attached to the working ores of such nature. This mine was sold some weeks since for \$50,000; half cash, balance in six months. Works for the proper reduction of the ore will be erected as soon as possible. With proper management in the works and on the ledge, failure seems impossible. There are other ledges in the district equally as good, so far as prospected, but work enough to prove the lasting richness has not yet been performed.

Work on the shaft on the

Old Virtue Mine,

Situated eight miles from Baker City, is at present suspended, owing to the inefficiency of the old-fashioned '49 pump. The shaft is down over 350 feet; as soon as possible a new Cornish pump will take the place of the old one, and operations will be resumed. When this undertaking is completed the old mine will show up grander than ever before, for the rock below the water level is of a richness that must be seen to be believed—it cannot be described. At present the old employees and "stand-bys" are working the upper levels on tribute. One company are taking out ore of such richness that they lock it up where thieves cannot break in and steal. A short time since a three days' run netted the amount of \$2,000 for another company of four men. This mine is under the management of Superintendent Hyde, who, as an economical, energetic general understander of all pertaining to the successful running of a mine, is unequalled in all this stretch of country.

The Mines of Rye Valley

Are dormant, they are in the hands of a set of old women (of the other sex) who are unable to do anything themselves and unwilling to allow those who would do anything toward making this a very lively little camp, take a hand toward its development. They have tons of ore lying on their dumps which will mill way up, and yet such is the character of many of these so-called miners that their credit is not good for even a paper of tea.

The Burnt River Mines

Are likely to turn out to be number one; while some of the ledges are very narrow and very rich, there are others that are magnificent in their proportions; many tons worked through arastras have yielded from \$10 to \$12 per ton. As a general thing they are sulphurets

bearing veins, and contain much gold that cannot be saved by the primitive method of working. The

Connor Creek

Mine, which well-nigh went to the dogs through mismanagement of one company and want of the necessary in another, is showing brighter even than in its palmy days. The different companies are now consolidated, a 24-stamp mill is in course of erection, and the forthcoming summer, under the superintendence of E. M. White, who has stuck to this bonanza through all its varied fortunes, will perform its allotted part in yielding the golden harvest that will place the status of this country beyond a peradventure.

Near the Oregon line, in Idaho, is the

Heath Silver Mining District,

Discovered about 30 months ago by some wide-awake Nevada prospectors, who knew the nature of ores. They at once liked the formation and lay of the country. Their first prospect was what is now known as the "Belmont;" the ore is chloride in all its forms. Ruth & Heath, the discoverers, have been hard at work the whole period since the discovery. They own four ledges, all of which are valuable. Ore taken from the "Belmont" the past winter would, if in Nevada, create an excitement and bring hundreds of men into the country, but here, where not one prospector or miner in a hundred know the nature of chloride, it creates no enthusiasm whatever. Other ledges in this district are being developed; in nearly every instance they show horn and native silver, carbonate and some sulphur and lead with traces of arsenic. The formation of the country is porphyry; wood and water in plenty close to the mines, and the hills are in general very steep. The ore in a ledge recently discovered favors that found in the "Richmond" mine at Eureka.

It is more than possible that the coming summer there will be some startling discoveries made that will place the owners in this promising district beyond the power of that fickle jade, Dame Fortune. CAXTON.

Butte County Mines.

EDITORS PRESS:—Forbestown still maintains considerable evidence of its former greatness when all the gulches, ravines and flats were being mined by intelligent whites, and producing large quantities of coarse gold. The many large dwellings that have not been recently painted all indicate a falling off of shipments of bullion; but yet there are large quantities of gold being taken out in this vicinity.

The Forbestown Consolidated mining company have leased their mines and 10-stamp mill to Messrs. Gurley & Co., who are endeavoring to put the claims in the best running order. Incline down about 50 feet on the ledge, which is about six feet thick. The ore is taken about 300 yards from mine to the mill by mule car and dumped above a crusher, through which it first passed before it is ready for the stamp battery.

To insure best results in the milling they have some of the best improved concentrators, and still more important, they have an experienced amalgamator from Grass Valley mills to superintend the milling. The community seems quite confident that the present company means business, and that they have taken hold of ledges that will reward their efforts with financial success.

The Union company have steam hoisting works and are down 100 feet on a ledge five feet thick. The Sagamore company, also steam hoisting, down 100 feet, ledge six feet, and all looking favorable.

Deadwood company, with steam hoisting, is going down by an incline in the ledge. Now down about 65 feet.

The incorporation books are now closed and the property leased to a San Jose company. A ten-stamp water power mill was built but not accepted; another is to be built.

About two years since, \$5,000 worth of gold was panned out from this claim in 20 minutes; one piece worth \$24, and \$2,225 from soft, porous rock.

The northern extension of Deadwood has been located, and is being prospected; and also gravel hydraulic mining near by is being prosecuted as fast as the supply of water will permit. Ohio Flat and New York Flat hydraulic claims are being worked entirely by white men, as is the prevailing custom here. Bowers & Co.'s September clean-up for the year was \$47,000. Another company on New York Flat cleaned up \$30,000.

Good Quartz

Was discovered near a year ago, about one mile from Robinson mill ranch, by some Spaniards who pulverized and panned out by hand from the soft quartz large amounts. A small mill, four-stamps, recently erected there, gives very favorable results.

Yuba and Butte Counties

Have their line near Forbestown so that a portion of the above mines are in Yuba. The whole surface of the hills from Forbestown to Oroville, and for ten miles even beyond Oroville, seems to be entirely covered with the signs of gold quartz, and probably all would be washed if water and fall could be procured.

There is a large amount of mining being done at and near Oroville, but "the heathen Chinese" is the principal operator, his main dependence

is man power; but yet he seems to be taking quite kindly to the use of steam and horse-power machinery, several steam engines being used in their gravel diggings.

Oroville, the county seat of Butte county, has a general thrift and prosperity not equaled by many of our mining towns, as it has the double patronage of farmers and miners; is abundantly supplied with stages and a railroad to Marysville.

Between Oroville and Cherokee Flat, 12 miles, there is considerable of surface mining going on; but in many places you only see the piles of washed gravel and the little mounds on which the sluices were placed; cabins and some quite good dwellings tenantless and decaying.

Oregon City,

Beautiful for situation, romantic, with abundant tree and bush shades, contains several houses, say six or ten, and a majority of them yet occupied by families, but at present it has no active mining trading or other enterprises; only claims now to have a good school, and gold in the gravel and especially in one or two valuable gold ledges that will yet pay well, when mine working takes the place of stock mining. Here also the early miners' workings are everywhere apparent and continue at short intervals all the way to

Cherokee Flat,

A mining town of the early days and a mining town of the present day, constituting of about 1,500 people, including its suburbs.

I forgot to seek out an old settler and learn why Flat was added as a surname, for the visitor to-day would have to look much to find any lever surface of earth anywhere in or near the town. The most active enterprise and chief business of the camp is hydraulic mining, which has the largest representation in the

Spring Valley Canal and Ditch Company.

They employ a mixed nationality force of 110 men, use 2,200 inches of water, and 13 chiefs, situated so as to shift the water to different parts of the diggings, and allow men to clean up bedrock. Everything is reduced to system and economy. The yearly clean-up amounts to \$400,000 to \$450,000. Their supply of water is obtained from the head-waters of Feather river and main Butte creek, and conveyed by ditch 54 miles. To cross the Feather river, about a mile above town, the water enters an iron pipe, 30 inches in diameter, and passes down the mountain side and across the river bottom and up the hill again to the height of 856 feet perpendicular pressure, where it again enters their ditch. The pipe is made of boiler iron rolled in Pennsylvania especially for this company. The company have gravel that is supposed to be enough to furnish employment for the next 100 years.

To make room for their debris in the valley below, they were obliged to purchase 16,240 acres of agricultural lands. They now have secured as tail-race outlet, the distance of 41 miles. On Dry creek they have 22 miles of levee five feet on top, and four to six feet high. I saw at the company's office eight or ten splendid white diamonds, just as they were found in the black sands; one of them, valued by J. W. Tucker at \$150. They have found quite a large number and are yet expecting to find one to eclipse Kohinoor, as California must excel in everything.

T. L. Vinton's hydraulic claim below town, near Pentz's ranch, has just started up, getting his supply of water from the Flea Valley Mill and Flume Company. This latter company, under the superintendence of Messrs. Taylor and Allen, are fluming lumber down to Pentz's ranch, where they will erect extensive shops for cutting their lumber to order, planing, etc.

Pentz's ranch, so beautifully situated at the edge of the valley, in a climate mild and agreeable, where even oranges thrive, will now become quite an active little business place. The mining, fruit, farming, lumbering, and mechanical interests seem to all be destined to meet at this point and help to make a village, where now there is only a wide opening for one to spring up.

The Great Mining Machine

Of Messrs. Hedge & Walker is the great marvel, and new departure in all the ways ever yet tried for river mining, and Oroville has the honor of its first introduction, being built there and now being used in the Feather river, just below town. Many are coming from different parts of the State to see it work, and all seem satisfied it is the right principle and a success. A description worthy of its merits would make my communication too long. The results are so great, and the agencies so simple, it leaves the beholder lost in wonder and admiration.

B. W. C.

Oroville, March, 1877.

Change in Situation of Iron.

EDITORS PRESS:—Having read a great many accounts of the Ashtabula disaster and the probable causes, I should like to make a few suggestions through your columns, the result of my observations in iron and its qualities for years.

I noticed that the report of the Civil Engineer Committee, appointed by the Ohio Legislature, was that the workmanship and material of the bridge were of superior quality with few exceptions; that the braces were insufficient and doubtless gave way first, yet it must be borne in mind that this bridge has stood the

strain for years of much heavier trains than the one that broke it, and colder weather.

About the commencement of our war I worked in an Eastern establishment where many large beam straps were forged for walking beams to marine engines; these beam straps are forged by piling up a large bundle of plate iron three or four feet long, and then welding them together, another bundle is then added to the end of this and welded and so on to the end. This process requires a long time and a great deal of hammering under the steam hammer, and on two occasions when forging a large strap when nearly completed the further end from the hammer or the end first made dropped off, breaking apparently as easy as a pipe stem; the iron when broken looked coarse and crystallized and was undoubtedly caused by the constant jar of the hammer for days.

Again, for 14 years I have been engaged in quartz milling, where I have observed the same effect of jar on iron; a set of new stamps will usually last about one year working constantly, then they begin to break, usually near the stamp head or base, where most of the strain and jar comes; after the first one, we expect more to break at any time, as they generally all do. I have known two out of sixteen stamps to break in one night; they are more apt to break in very cold weather, but it is not unusual for them to do so in summer.

The bolts of a stamp battery are affected in the same manner, but requiring a longer time and depending on the solidity of the frame-work, but usually after three years they begin breaking near the head or nut. The iron of these stamps and bolts where broken presents the same appearance as the beam straps before mentioned, coarse grained or crystallized. In conclusion, if beam straps, stamps and bolts become brittle after a certain amount of jar, why not a railroad bridge? for there is a longer strain and jar while the train is crossing, of course the jar is not constant and consequently a much longer time is required to make the same changes in the nature of the iron.

C. L. E.

Julian City, San Diego Co., Feb. 19th.

The Bonanza.

For months past the center of attraction on the Comstock lode has been the development and opening up a new level in the Consolidated Virginia and the California mines. The very air was rife with theories and speculations as to the continuity of the great ore bonanza below the 1550-foot level. It is true that two winzes had been sunk on the ore vein, a distance of 380 feet apart, both of which had penetrated ore, one to the depth of 127 and the other 143 feet. But those had afterwards partially filled with water, and the sincerest assertions of those who had visited and inspected the ore in the winzes was taken with many grains of allowance, and by some discredited altogether.

The Gold Hill News says that no mines in the world of the same vast extent and similarly situated were ever more systematically and energetically worked than these. And yet with years of experience and a management unequalled, the opening of the 1650-ft level was delayed at least six months beyond not only the expectations of the public, but that of the owners themselves. This delay was caused by a perfect lake of water encountered in sinking the C. & C. shaft. Whole months of delayed and retarded progress was lost sight of by the outside public, while the managers were carrying on the unequal contest and struggling for the mastery. So that when at last the Consolidated Virginia was obliged to suspend the payment of dividends and transfer a large portion of its ore crushing facilities to the California, the gathering storms of doubt, fanned and fed by the bear interests, culminated in bold unscrupulous assertions that the lower levels were a failure, and that the bottom of the grandest body of gold and silver ore ever discovered had been reached.

In order to see and understand for ourselves the full truth or falsity of these assertions, says the Gold Hill News, we yesterday accepted a kind invitation from acting Superintendent Mackay to visit and examine both mines. No restrictions of any kind whatever were placed upon our seeing and inspecting every drift and stope in either mine, and forming and expressing a candid and conscientious opinion as to the merits of both.

At a distance of about 700 feet west of the C. & C. shaft the 1650-foot drift cut the east clay wall of the ledge and immediately encountered ore. After passing through 28 feet of ore that gives an average assay value of \$200 per ton, a horse of barren porphyry was struck 20 feet in width. Beyond this barren streak rich ore was again encountered and penetrated for a distance of 70 feet. At that point a lower grade of ore mixed with porphyry was encountered, and the drift stopped until the connection with the deep California winze could be finished and preparations made for stoping ore. Much of the last 70 feet of ore is very rich, a portion of it being ore worth \$500 per ton.

The east clay wall has the regular dip of the Comstock, and the ledge a northeasterly and southwesterly course, and is, so far as we can judge, as regular and perfect in formation as it has ever been on any of the levels above.

The horse of porphyry encountered near the east wall is identical with that found on the 1550-foot level, the only change in any of the features being, that the ore east of the porphyry is 25 feet in width, while on the 1550-foot level it was only seven feet in width. The

drift connecting with the California deep winze, bearing nearly southeast, cut through a portion of this porphyry at a distance of 80 feet from its commencement, but again encounters the ore some 70 feet before connecting with the 1650-foot drift. A drift has just been started southward in the ore vein to connect with the deep Consolidated Virginia winze. The face of this drift starts in ore that will mill \$500 per ton. It will have 100 feet to run to reach and connect with a north drift from the winze, the separation of the two points being 180 feet.

The lateral drift on the 1600-foot level of the California, extending from the Ophir line to the north winze, a distance of 420 feet, exposes for almost its entire length as rich and handsome a body of ore as any yet uncovered in the mine. The solidity, size and richness of this vein, to within 50 feet in depth of the 1600-foot level, is confirmation almost positive that the vein, when developed further to the southward, will prove all that the most sanguine believers in worth predict.

The porphyry and low-grade ore now in the face of the 1650-foot drift, corresponds exactly with a small streak of porphyry cut through on the 1550-foot level in the same portion of the ledge, and it is believed by those familiar with the make of the vein that an advance of a very few feet more will carry the drift into rich ore which is likely to continue to the west wall, a distance of nearly 100 feet.

With the bottom of both the north and south winzes still in ore—one 28 and the other 48 feet below the 1650-foot level—the width, strength and richness of the vein in the California on the 1600-foot level, and the extent and richness of the ore already developed in the 1650-foot drift, no level of the Consolidated Virginia mine yet opened ever presented a more favorable future prospect than the 1650-foot level.

The ore extraction is confined for the present to the south stopes on the 1500-foot level. These stopes are 85 feet in length and about 25 feet in width and will furnish an ample supply of ore to keep the Consolidated mill running for three months to come, without touching the 1650-foot level, but are not of a sufficient extent to alone make dividends.

In the California mine there is yet a huge block of the richest of the ore, eighty feet or more in length, untouched between crosscut No. 4 and the south stopes on the 1500-foot level, while at several other different places on the same level there are considerable portions of the ore vein yet awaiting extraction. On the 1550-foot level the ore body is yet intact, with the exception of a small portion now known as the north stopes which are being mined and the ore taken to the surface through the Ophir shaft. On the 1600-foot level the ore extends fully in one undisturbed mass from the north to the south line of the mine, with the single exception of the horse of porphyry developed on the 1500-foot level, between east and west crosscuts Nos. 5 and 6, which appear to continue downward, with almost as much regularity in make and dip as the ore vein itself. We risk nothing in venturing the assertion that there are a year's dividends of two dollars per month in sight without the sticking of a pick below the present developments.

The Consolidated Virginia and California mills have just been given a good overhauling, and put in good repair, for a long and steady run. This was finished and both mills started up at noon yesterday, so that with the ore already in sight in the two mines, and the ore prospects on the deepest levels, the resumption of dividends in the Consolidated Virginia, the prosperity of both mines is an assured fact for a yet indefinite future period of time.

THE MANHATTAN MACHINE SHOPS.—The machine shops of the Manhattan silver mining company present a scene of life that in these dull times, is refreshing and encouraging to behold. Blacksmiths, turners, planers, carpenters, boiler-makers, and bosses, all hammering and belting away as though they were there for the express purpose of doing a good day's work. We could not help expressing our astonishment to the Chief W. A. Hall, at the wonderful amount of work being done, and inquiring of him whether, when the engines, boilers, friction gear, cars, cages, etc., then being made or repaired, were finished, the shop would shut down. Mr. Hall laughed heartily at our inquiry, and assured us that the work in hand, without additions, which are constantly being made, would occupy his entire force many months to complete, and that the extensive operations of the company was causing work to accumulate upon his hands faster than he was delivering it. We left the shop with a far deeper feeling of respect for the company than that evinced by the bears who are hammering away at the stock on California street, and the feeling awoke reflections in our mind as to whether all the activity which we had just witnessed might not have been created to fix up a dose for the said bears whose ultimate fate we do not envy.—*Reese River Revueille.*

TO LIGHT A CANDLE WITH WATER.—Get a very small piece of phosphorus, and with a little tallow, place it on the rim of a tumbler; next get a lighted candle, and after having extinguished it, hold it to the glass, and it will at once ignite.

PASTE FOR CLEANING METALS.—Take one part of oxalic acid and six of rotten stone; mix with equal parts of train oil and spirits of turpentine to a paste.

USEFUL INFORMATION.

Removing Gas from Drinking Water.

Mr. A. B. Bower, engineer, now working at Livermore, shows the Alameda County *Independent* what he is doing to purify the water for the supply of Livermore. It seems the water there, like that at Oakland, is offensive to taste and smell by the presence of sulphureted hydrogen. In order to remove this he has made little boxes full of small holes through which the water passes in entering the tank, and has a fall of several feet through the air. It thus absorbs the oxygen of the atmosphere, and gets rid of the mal-odorous compound just mentioned, which makes it so unpleasant. The experiment was first made with wooden boxes, but being found successful, sheet-iron boxes will be used and the holes made very small and numerous, so that the spray may come thoroughly in contact with the air and render the water perfectly pure before falling into the tank. That is one part of the plan, and one only, for it concerns merely the water as it enters the tank. But Mr. Bower has contrived additional means of purification for the water when it passes out of the tank also. The discharge pipes, which enter into the tank near its bottom, do not take the water from the bottom, where the weight of the pressure of the water and lack of motion in it tend to make it and keep it more or less impure, but extend upward to within an inch or two of the surface of the water, where the nearness of the air enables it to draw all the oxygen needed to purify it. From this high point the pipes are filled with water free from sulphureted hydrogen, and so send it down and out to wherever it is needed in a pure state. Thus, when going in as well as going out of the tank, this invention of Mr. Bower admirably answers the purpose of the inventor in putting the water into a good, healthy and pleasant condition fit for use. The same plan might with advantage be applied to the water drawn from the San Leandro reservoir, so as to keep Oakland supplied with good and pure water.

Composition of Fuel.

W. H. Northcott, in the course of a new work on "The Theory and Practice of the Steam Engine," gives a table of the composition of fuel which may be acceptable to some of our readers:

Carbon, free.	Hydrogen, free.	Oxygen, and Nitrogen, etc., free.	Ash, etc.	Water.
Anthracite coal.....90.0	3.0	3.0	3.3	0.7
Bituminous do.....88.0	4.0	4.0	3.0	1.0
Coke.....94.0	0.0	1.0	4.0	1.0
Wood, as cut.....40.0	2.0	6.0	2.0	50.0
do, air dried.....45.0	2.0	10.0	3.0	40.0
Peat, do.....48.0	2.0	10.0	10.0	30.0
Mineral oil.....84.0	15.0	0.5	0.5	0.0
Coal gas.....70.0	28.0	2.0	0.0	0.0

The compositions given in the above table are to be considered as characteristic only of the chief varieties of fuel. Each kind of fuel varies very considerably in composition, and an exact determination of the value of any particular fuel can only be arrived at by actual analysis or calorific testing. It must also be borne in mind that coal and coke deteriorate in thermal value during transit and storage. In the case of coal, exposure to atmospheric influences leads to the dissipation of its more volatile constituents, and in the case of both coal and coke the percentage of contained water is increased by the abstraction of moisture from the air. When so many pounds of water are said to be evaporated by a pound of coal, unless the composition or kind of coal is stated, the best quality is generally to be understood.

VARNISH FOR UMBRELLAS AND WALKING STICKS.—We annex two methods of coloring and varnishing sticks and paper which the *Mechanics' Magazine* recommends strongly. No. 1. Use Judson's simple dyes, they are so clean and moreover so economical in their application, that I believe they will take the leading part in all work of fancy or intricate workmanship. Put the stains on with a camel's hair brush, diluted with water. For dark stains use copal varnish. For light woods use the light crystallized varnish, such as is used for the tops of washstands, etc. Old damaged sticks that were varnished should have the varnish eaten off with liquor ammonia, then rinsed, scoured, stained and varnished again. 2. Make a solution of three parts of glue in 100 of warm water; to this add one part of whiting and two parts of orange chrome. Mix well. Apply with a soft brush to your sticks. When thoroughly dry rub down with a piece of dry flannel. Apply a second coat of color if deeper tints be required, or use burnt umber and brown ochre for oak tints. When dry, apply the following varnish: Coarsely powdered copal and glass, each four ounces; alcohol, 64 O. P., one pint; camphor, one-half ounce. To be heated over a watery bath, with constant stirring, until the copal is dissolved. When cold, decant the clear portion. Be careful that the alcohol does not inflame.

SALICYLIC ACID AS A SYRUP PRESERVATIVE.—M. Lagou, after a series of experiments to determine the minimum percentage of salicylic acid to be added to fruit syrups to prevent fermentation in hot weather, reports the proper quantity of acid to be equal to one-one-thousandth the weight of the sugar contained in the syrup.

DRIED POTATOES.—A German journal thus describes the manufacture of "dried potatoes," as conducted at Carsten's works at Lubeck: The potatoes are peeled with the hand and cut into disks by a machine. These are put into a basket and this into a boiler, where the potatoes are nearly but not quite boiled. The disks are next put on wire frames in a dry oven, where they are dried quite hard. It is important to preserve the color of the potatoes, and to prevent their turning gray, as they would by the above process alone. The material, after slicing, is treated with cold water, to which has been added 1 of sulphuric acid or 1 to 2 of muriatic acid. Then it is washed in pure water and the drying proceeds. The preparation obtained, which has lost none of its starch, is of a slightly citron-yellow tint and transparent like gum. Boiled with water and a little salt it is said to resume the natural color and fibrous structure of potatoes, and is not distinguishable in taste from the newly boiled vegetable.

MOROCCO MANUFACTURE.—This branch of our industries is considered to-day as one of the most prosperous in the country. It forms a most important branch of one of the greatest industrial interests of our entire country, namely, the leather trade, the annual product of which is rated at \$225,000,000. The number of goat skins in the hair received at the port of New York during the year 1875 was 3,728,930; being, as compared with the receipts of 1874, a falling off of about 97,260. The average price of these skins for the entire year was a trifle higher than in 1874. These skins are imported from Curacao, Tampico, Matamoros, Vera Cruz, Buenos Ayres, Payta, Cape and Calcutta, the largest number being sent from Curacao, Matamoros, Vera Cruz, and Calcutta. Curacao furnishes the skins which are chiefly used in the "kid finish," the Tampico being used for "pebbles." The finest quality of skins are said to be those imported from Payta.

SUBSTITUTE FOR PLASTER OF PARIS.—Best whitening, two pounds; glue, one pound; linseed oil, one pound. Heat altogether, and stir thoroughly. Let the compound cool, and then lay it on a stone covered with powdered whitening, and heat it well till it becomes of a tough and firm consistence; then put it by for use, covering with wet cloths to keep it fresh. When wanted for use, it must be cut in pieces adapted to the size of the mold, into which it is forced by a screw press. The ornament may be fixed to the wall, picture-frame, etc., with glue or white lead. It becomes in time as hard as stone itself.

NEW IRON AMALGAM.—Sideraphthite is the name of a new iron amalgam which is composed of 65 parts iron, 23 nickel, four tungsten, five aluminum, five copper. It resists sulphureted hydrogen, is not attacked by vegetable acids, and only slightly by mineral acids. It is really more useful than standard silver, while it can be produced at a cost not exceeding that of German silver. For alloys which have to be silver-plated to prevent oxidation, the inoxidizable iron, as the above is called, is stated to be a perfectly successful substitute.

GOOD HEALTH.

Notes on Chronic Disease.

A writer in the *Herald of Health* takes a hopeful view of escape from those permanent ills under which many are suffering. He says: Chronic disease, in the general acceptance of the term, is simply a condition resulting from a want of life, force or vital energy within the physical system, not organic, but functional in character; and hence curable. But how curable? I answer, by simply supplying the deficiency of life force, or vital energy. But can life force or vital energy be supplied to the physical system to meet a deficiency? If so, how? I answer, by simply supplying the physical system with proper food. I answer, that the physical system as a single organ has one general, dominant function, viz.: to develop or produce life force, or vital energy, from proper, assimilable food. I answer, that life force can have no other origin than from proper, assimilable food. And I repeat, that the paramount function of the human body, as a single organ, is to develop from proper food material this life-awakening and life-sustaining power.

From this point of view the fatal error of the past is clearly seen and understood. Nostrums, drugs, arbitrary and pernicious rules and systems are seen usurping the place that can naturally be filled only by food.

In a reform in the dietetic system of the present age is found the only true remedy for chronic disease. But this reform must be based upon natural, philosophical principles. Physiological laws must be obeyed.

Life force has its origin in food; but in food of a peculiar character. The human body has its active and passive organs. What a steam engine or water wheel is in a manufacturing establishment, the nervous tissue is among the other organs in the human body. It is the life-awakening and life-enduring agent. It is the life motor, the life engine. The other organs move and act only as they are moved upon and actuated by its power. Its function is the general, universal function of the human body, and it requires food to supply its waste in proportion to its activity and energy. Hence the natural

demand for food to supply the waste of the nervous tissue is proportionally much greater than for any other form required by the physical system. And the almost utter deficiency of nerve and brain food in the diet of the masses naturally suggests physical debility and mental incapacity; just those physical and mental conditions that are known to civilization by the term chronic disease. And to make the disaster more complete, unnecessary elements in the form of fat-forming and muscle-forming material are substituted for the natural, necessary supply requisite for the nervous tissue. What then is the true secret of physical and intellectual health? I answer, first, to supply the waste in each tissue of the physical system with a requisite amount of proper assimilable food; and second, to avoid burdening the organs of digestion with an excess. Here is the true philosophy of the dietetic science. It may all be summed up in seven words; supply the waste in the physical system.

The possibilities of dietetic science as a means of uplifting the human race are practically illimitable. A healthy physical system is to-day the exception, rather than the rule. That the divine capabilities of the human soul can only find a just expression through a perfect physical organ, is a fact that is not at present in any just degree understood. That chronic disease is almost invariably only a just punishment for a violation of natural dietetic law, rather than a natural sequence of intellectual culture and refinement, civilization fails to comprehend. Till a just understanding and appreciation of its true cause and proper remedy is entertained by the public mind, this scourge will continue to visit upon the transgressor the just penalties due to a violation of the most important fundamental law of human existence.

Lunch in the Shop.

To the workman from "twelve to one" means lunch, a newspaper and rest—perhaps a dive into a restaurant and a hurried meal. For the apprentice it is the swallowing of a sandwich and a piece of pie, with an hour's loafing. The *Iron Age* notes that to the workman the lunch time can be made both valuable and pleasant, especially when the lunch is taken in the shop. Instead of glumly getting away in a corner and bolting his tin of tea and the contents of the dinner pail, he should make more of a social affair of it. He will always find his companions ready to bear him good company, if he manifests a desire to be sociable. Something at once interesting and profitable can be found for discussion, and the thousand and one conundrums of the trade brought up for solution. At such times the apprentice should come in for his share, and if workmen are kind and boys show any aptness for learning, a great deal of good can be done with the spare time of the hour at noon. In smaller shops, in weather when play is not agreeable or when work is hard and rest is needed, reading is a resource upon which one can fall for never-ending amusement. We do not mean the dime novel, however. If pleasure and profit are to be combined, something should be taken up that has a bearing upon the trade; if it is desired to have light literature, stories, novels and the like, by all means let them be first-class. The injury done by reading really first-class works of fiction is very slight, and when a person has acquired a taste for it there is very little danger of harm from the cheap trash. At the present time good literature is as easily accessible as poor, and an employer could not do better for the young men under his care than to place within their reach a cheap, well selected library of standard works. The cost of such a library is at the present time small, and the labor of getting it together a mere nothing. Some manufacturers that we know regularly supply their workmen with books and newspapers at club rates or at the lowest wholesale prices, and in this way the men have the best of uses for their hour at noon in reading the current literature or in studying books, which, but for the discounts obtained for them, they would hardly be able to afford.

Hints for Poor Sleepers.

Poor sleepers, says the *Herald of Health*, will find it advantageous often to raise the head of the bed a foot higher than the foot, and then to sleep on a tolerably thick hair pillow, so as to bring the head a little higher than the shoulders. The object of this is to make the work of the heart in throwing blood to the brain harder, so it will not throw so much. A level bed, with the head almost as low as the feet, causes an easy flow of blood to the brain, and sometimes wakefulness, when the vessels cannot contract on it and keep the brain empty.

Then the bed itself should be good. A very hard or very soft bed is not the thing. Hair mattresses are generally best, but these might be improved. Then the bedding should be porous, so as to allow free interchange of air. Air-tight beds are bad. So, too, the room should be large and airy, and the feet kept warm, and persons with a sensitive skin should have as light clothing as possible. Heavy clothing sometimes keeps the sensory nerves of the skin so active, that they send to the brain sensory currents that keep this organ active.

Whether sleeping with the head to the north makes any difference we do not know. It seems in some cases, and in others not. It may be well to try it. Generally sensitive folks sleep better to have a bed to themselves.

MINING SCIENTIFIC PRESS

W. B. EWER.....SENIOR EDITOR.

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THE ORIGINAL ARTICLES in this paper are mostly set in solid type, giving in our columns one-third more reading than is contained in ordinary leaded matter.

Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, March 24, 1877.

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Comstock Papers.

In this number of the PRESS we conclude the series of articles entitled "Comstock Papers," which have been continued some time. The articles have attracted considerable attention, as they have contained many facts concerning the early history of the celebrated Comstock not generally known. Their compilation has been attended with more difficulty than one imagine, as there are so many conflicting opinions regarding many of the facts presented. In such cases it has, of course, been necessary to interview a good many people in order to reconcile conflicting statements. From the nature of the thing the early history of the lode has been somewhat shrouded in obscurity, as the people who were prominent at the time have scattered all over the world and many of them have passed away.

The results of deep mining on the famous ledge have been such as to draw the attention of the world to the locality, and therefore its early history has been a subject of interest. The articles which we have presented have in a great measure cleared up and made a matter of record many of the facts which were not generally known; and the way the articles have been received is very complimentary to the author—one of our best mining correspondents. He has worked on to permanent record in our journal much of value and interest to the future generations in that locality.

We hope that if any of our contemporaries or our readers have any facts bearing on the subject which we have omitted they will make them public. The future history of the lode will be recorded by a very able local press; but we desire to complete the work we have commenced of recording all of interest that may have transpired in the early days, should anything be wanting, from what we have already published. Accordingly, if any one is in possession of any further facts bearing on the subject we shall be glad to give them publicity.

Timbering the Mines.

With the opening up of the Comstock lode there was introduced not only a more cheap, simple and expeditious style of amalgamation, but also a new and improved plan for timbering the mines. As depth was attained in the Ophir ground the great expansion of the ore body rendered it apparent that the widely separated walls of the mine could not longer be sustained by recourse to the Mexican method of leaving massive pillars of ore, nor yet by the plan more common in Europe of constructing solid masonry for that purpose, the former involving the loss of too much ore and the latter being too expensive for adoption in a country where labor and material were so costly. To attain single sticks of timber sufficiently long and possessing at the same time the requisite strength was impracticable.

In this emergency Philip Deidesheimer, then the superintendent of the Ophir, devised a method of timbering, alike cheap, novel and effective. He employed strong, square pieces of timber placed at such angles and so framed into each other as to afford the greatest possible supporting power, while the structure resisted pressure from whatever direction it might be exerted. These sticks which consisted of posts, caps, side-pieces, sills and braces, composed, when put together, a system of rectangles four feet wide and six feet high in the clear, and which could be readily extended in every direction as ore excavation proceeded.

This plan was first introduced into the Ophir mine in the fall of 1860, having soon after been adopted by all the other companies on the Comstock, where it is still retained, and whence it has since spread generally over the coast. At the time this mode of timbering was first employed in the Ophir the vein was 64 feet thick, the superintendent who preceded Deidesheimer having left columns of rich ore of a corresponding length and many feet in diameter to sustain the walls, all of which were removed upon the introduction of the new plan.

In some of the Gold Hill mines they had, before this, undertaken to splice the timbers, but the gave way, though only 35 feet in length, and killed several workmen, demonstrating the need that existed for some better and safer method of doing this work; and securing the general adoption of Deidesheimer's system as soon as it was invented, that gentleman never having sought to secure it by patent, though probably a patentable invention.

Adverse Claims to Mines.

In the issue of the PRESS of February 10th, in speaking of the common custom of locating claims for friends we stated that in case of any legal proceedings it would perhaps be necessary for the owner to be in the district. In the article referred to occurred the following paragraph: "Some time in 1873 the Commissioner of the Land Office rejected an adverse claim to a patent, because it was not sworn to as required by law in the district where the land was situated. If we remember aright it was in the case of the Dardanelles company in Gold Hill, Nevada, when they applied for a patent for the Bosphorus. The California company filed a protest through its President. The protest was sworn to before a Commissioner of Deeds for Nevada, but was sworn to in this city. The Commissioner ruled that the law required an adverse claim to be sworn to before some officer authorized to administer oaths within the land district where the claims were located, and the adverse claim was accordingly rejected."

The Secretary of the Interior has just rendered a decision which reverses, or rather modifies, the former decision of the Commissioner of the Land Office. This was in the case of the Cornish mining and reduction company vs. applicants for patent for the Slide lode, Central City, Colorado. (The Denver and Central City land districts both exist in Boulder county.) In this case the Commissioner's rejection of the adverse claim, because not sworn to within the district where the mine was located was overruled. The Secretary of the Interior held that an officer authorized to administer oaths within a land district (as a County Clerk), may administer the same without the district, but within his jurisdiction. The case of the Dardanelles mining company vs. the California mining company, Copp's mining decisions 161, (where adverse claim to mine in Nevada was sworn to in San Francisco), was held inapplicable to the case.

This is the case which we referred to in our issue of February 10th, and it will be seen that although it was held inapplicable in this particular instance, the principle of the thing has been changed by the decision of the Secretary of the Interior given above.

"MECHANICAL ORE CONCENTRATION."—Mr. Cazin's continued article on this subject is deferred this week, as an engraving intended to accompany it was not finished in time.

THE will of Joseph L. Lewis, of Hoboken, leaving \$1,000,000 to the Federal Government, to help pay the National debt, is to be contested by a person who claims that his wife is a niece of Lewis.

THE sales in the San Francisco Stock Board last week aggregated \$2,400,000.

Ionite—A New Mineral.

[Written for the PRESS by SAMUEL PURNELL.]

In the plicene, argillaceous lignite of Ione valley, Amador county, California, a peculiar mineral, more or less pure, occurs in thin seams. The specimen examined by me was of what may be called the best quality. It is a firm, earthy, ochreous looking substance of a brownish-yellow color. As it comes from the mine, it contains about 50% of water, but when thoroughly air-dried it readily floats on water, its specific gravity being about .90. It rapidly re-absorbs water and sinks.

It bears a physical resemblance to the pyropisite, of Kengott, found in the lignite of Weisensfeld, and like it, melts to a pitch-like mass which burns easily, with the emission of a dense black smoke, having a resinous and aromatic odor, and with a yellow flame. But that it is not pyropisite, or indeed any mineral heretofore described, will, I think, be plain from the examination.

Ionite is not a pure hydrocarbon, as it contains 13% of impurities—principally aluminium silicate. Streak, reddish-yellow; fracture, irregular; luster, none. When pulverized, water dissolves or suspends a portion of the clay in the mineral. Partially soluble in cold alcohol; more so in boiling alcohol, giving a brown solution. Upon the addition of water no precipitate is deposited, but the solution becomes permanently of a milky color, which may be from the presence of paraffine.

Very largely soluble in ether, forming a brownish-black solution. Upon adding water a brown, tarry substance is obtained, which is very inflammable, and which, while burning, gives off the odor of burning sealing wax.

Completely soluble in chloroform, except the clay or ash, forming a brownish-black solution. Poured into water a brown oil falls to the bottom.

Partially soluble in cold, more so in boiling oil of turpentine, forming a wine-red solution. Upon concentration of the solution, crystals of paraffine are separated.

Almost entirely insoluble both in cold and boiling petroleum naphtha. Gives a pale red solution.

In boiling rectified petroleum, free from naphtha and paraffine, slightly more soluble than in naphtha. Gives a pale red solution.

Subjected to dry distillation a brown, tarry oil passes over, mixed with green colored water. This water is decidedly acid to litmus. At first the oil has a specific gravity less than that of water, but after a few days sinks in the same. This oil and water possesses a very offensive odor, altogether indescribable. The oil is completely soluble in alcohol and oil of turpentine. Tested for paraffine, the oil was proved to contain it, though only in small quantity. I am of the opinion that the amount does not exceed 5%, but this was not determined accurately.

From the examination this mineral may be pronounced an acid hydrocarbon, or fossil cerite, more or less oxidized and more or less impregnated with clay. From its varying solubilities, it is probably a mixture of different hydrocarbon compounds.

As this mineral is found in Ione valley, I would propose to name it from the locality, *Ionite*. To what industrial uses Ionite may be applied, has not yet been investigated, and it is foreign to the purpose of this paper to inquire.

San Francisco, March 16th, 1877.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: California, March 14th, \$261,073.72; first shipment for March account; Con. Virginia, March 14th, \$79,583.30; first shipment for March account; Modoc, March 12th, \$5,230—total to date, \$20,938; Northern Belle, March 11th, \$14,691.32; Tybo Con., March 9th, \$15,995.84—total to date, \$25,171.19; Arizona, March 11th, \$2,132.06; Northern Belle, March 15th, \$8,350.15; California, March 17th, \$35,719.39—total to date, \$420,596.22; Con. Virginia, March 19th, \$17,419.54—total to date, \$122,808.52; Grand Prize, March 17th, \$6,500; Tybo Con., March 13th, \$9,760.36—total to date, \$34,921.55; California, March 19th, \$210,681.05—total to date, \$631,278.27; Con. Virginia, March 19th, \$45,758.03—total to date, \$168,566.60; Modoc, March 18th, \$8,141—total to date, \$38,339; Grand Prize, March 20th, \$11,000; Leopard, March 19th, \$4,500; Manhattan, March 21st, \$10,600; Northern Belle, March 18th, \$13,414.44.

FIRE INSURANCE.—We are pleased to call the attention of our readers to the assurance agency of Cross & Co., of San Francisco. This firm represents the London Assurance corporation, which is the oldest company doing business in the United States, and the wealthiest. It was established in 1720 and has assets to the amount of \$15,000,000, exclusive of capital unpaid. It transacts fire insurance and does business all over the State through local agencies. This corporation has been represented on this coast five years. Another company represented by Cross & Co., is the Western Assurance Company. This is the strongest Canadian company. It is young, as are all Canadian companies. It has made its deposit of \$120,000 with our insurance authorities, according to law, for the security of policy holders. We have insured with Cross & Co., and thus show our confidence in them.

Dio Lewis.

We are pleased to announce that Dr. Dio Lewis and wife have transferred their residence from Boston to Oakland, and thus become citizens of California. The grand work which Dr. Lewis has done for the advancement of sound ideas and practices of hygiene is well known to our readers, from the many good lessons of his which have been presented through our "Good Health" columns. This work has also won for him a national reputation. Long and excessive mental labors prostrated the diligent friend of humanity, and one year ago Dr. Lewis and wife came to California, and with a small camping party made a tour of the southern part of our State, and visited Yosemite and other notable places. The long cruise in our bracing air and invigorating sunshine gave Dr. Lewis and wife back to Boston feeling fully restored in health. But the severe winter made doubly dear the thought of California to them, and the month of February brought them back to us for the future. When such men and women, who have earned such enduring fame for their good works in the older States, turn to California for a second youth and a permanent home, who can gainsay the merited reputation of our land? Our fair landscapes, our beautiful vernal winters, our pure air and the cordial welcome of our generous and open-hearted people are winning us friends among the best of the world. Such friends in turn aid us greatly in the development of our State. We doubt not the doctor's honest enthusiasm will call forth some of his most eloquent language concerning the advantages of a California home, and thus his efforts will prove equal to a score of immigrant societies to populate our beckoning fields and workshops with a prudent handed and brain-working people, many of whom, even with their late arrival, will outstrip some of the old '49ers in the honorable race toward a permanent prosperity.

Decisions of Interest to Miners.

We make the following abstracts from recent decisions of the Secretary of the Interior:

In the absence of fraud, an application signed by two or more joint owners of the claim is valid.

The act of an attorney in the legitimate prosecution and adjudication of cases, is the act of the claimant himself.

Commissioner's decision, that no necessity exists for his further suspension of proceedings, by reason of abandonment of surface ground concerning which, adverse claim was filed and suit commenced, overruled; held, that as surface ground may be only an incident of the suit, to issue the patent would be an evasion of the law, which directs that the case be finally adjudicated in the courts, or the adverse claim waived.

A second suit, begun after expiration of publication, cannot bar issue of the patent.

The title being contested, Commissioner's suspension of application until the applicant establishes a right of possession, approved.

An appeal from Commissioner to Secretary can be taken only by a contestant—who files an adverse claim. Such appeal can not be taken by a protestant—who did not file on adverse claim, but who objects to the grant of a patent. Case of McGarrahan vs. Boston quicksilver mine cited and approved.

Confession of judgment by defendant in the suit, (who is applicant for patent), ends the suit. The applicant then may abandon surface ground in dispute and receive patent for all that part of the mine to which he is legally entitled.

Legitimate Mining in Mexico.

We learn from private sources the following items concerning Mexican mining matters: The merchants of Mazatlan, finding that business was dull, have thrown some money together, and propose resuscitating the old mines of Panuco, about 90 miles to the southeast of the city. There are only 24 shares in the company. They have elected Don Antonio Paredes as Superintendent, formerly the right-hand man of Bradbury, at Rosario. They have sent Cornish here to buy pumping machinery, which went back on the last steamer. The mines have a brilliant record up to 1823, when the civil war caused their abandonment.

The Durango mining company, at San Dimas, are still pushing their tunnel slowly along. Have been going ahead as for the last 12 years. The tunnel is now in about 1,200 feet.

Guadalupe de los Reyes, since the death of Don Pedro Echiguer, has been carried on by his brother, Don Francisco, and is doing well, running 30 stamps.

Near Topia, Edward Worthiman, well known in San Francisco, has made a fortunate strike. Altogether, legitimate mining in that section of country never looked better.

SUIT was entered in the First District Court at Virginia City, on Friday, to recover from the California mining company the sum of \$99,897.87, due for State and county taxes upon the bullion production of the California mine for the quarter ending September 30th, 1876. A similar suit was also entered against the Consolidated Virginia mining company to recover the sum of \$16,145.74, due to the State and county on the bullion production during the same quarter.

Comstock Papers.—No. 20.

Filling Up the Geographical Vocabulary of the Country.

How rapidly a mining excitement, through a hastened influx of population, tends to multiply the names of natural objects and localities in a country before almost without any geographical vocabulary, the movement caused by the discovery of the Comstock lode aptly illustrates. Take any map of the region now constituting the State of Nevada, published prior to 1860, and we find it well nigh a blank. Scarcely more than 50 names, all told, appear upon it. The few mountain ranges, scattered at random over it, leave us to infer that the country is an almost uninterrupted plain, a supposition strengthened by the fact that it really does form a part of the Utah basin or Great American desert. The only rivers laid down are the Humboldt, Truckee, Carson and the Walker with their several forks in the northwest and the Rio Virgin and the Muddy in the southeast, these being, in truth, all the streams that exist here of sufficient size to be styled rivers. We see thereon the names of some half dozen lakes and sinks and sloughs. Dotted lines, devious and far separated, straggle across the nameless waste, indicating the trails of Fremont, Beck with, Steptoe and other early explorers, while a single wagon road, coming in from the northeast, and following down the Humboldt, marks the route pursued by the pioneer immigration. Here and there is put down on these early maps a saline or thermal spring, a mud lake or a soda lagoon, the only towns or settlements appearing thereon, being the old Mormon station, now Genoa, Franktown, in Washoe valley, Ragtown, standing near Carson river, on the southern edge of the Forty-Mile desert and Chinatown, situated at the junction of Gold canyon and Carson river, near the point where the old immigrant road crosses the latter. Upon these early and almost vacant charts, are put down neither townships, counties, nor other political divisions; all that is indicated in this direction being that the country belonged to Utah Territory, being generally denominated Western Utah.

Progress of the Work
If now we look upon the map of this region, 18 years ago so nearly a blank, we find it crowded with names. First, we have the Territory as an entirety organized into the State of Nevada with fourteen counties, some of which have been in part subdivided into townships. A multitude of mining districts appear, covering a large portion of the State, being those that still maintain their organization, such as were formed and afterwards disbanded through diminished population, or, as sometimes happened, through entire desertion, having been dropped from the more recent maps. Scores of towns and mining camps present themselves, some of the former being of very respectable dimensions, both as regards business and population; Virginia City and Gold Hill, which are really but one place, containing about 25,000 inhabitants, while Carson City has over 5,000. Such additional lakes and streams as have since been discovered, as well also as the principal mountain ranges and passes, the more noteworthy springs, the borax beds and other remarkable salines have all been looked after and duly named.

Scanty Material.

In this christening process the Washoe argonauts have had to rely mainly upon their own linguistic resources, there having been here no previously existing Spanish and but a scanty Indian nomenclature, as in California, to help them out. There were, to be sure, names of aboriginal origin attached to some of the higher peaks and ranges, and also to a few other of the more remarkable natural objects, but the adoption of these, except it a few instances, was by the whites deemed inexpedient because of their great length, their harsh and guttural sounds or their awkward pronunciation. The Rio Virgin (already half anglicised), a small stream in the southeastern part of the State, and Las Vegas, meaning the meadows, in the same vicinity, appear to have been the only terms derived from the Spanish to be found on the early maps of all this region, the christening of these having been due to their lying along the old Spanish trail leading from Santa Fe to Los Angeles, and not because there had ever been any settlements made here by that people.

Of the Indian Names that Have Been Retained,

We have, first, *Tahoe*, applied to the large lake in the Sierra Nevada mountains, about two-thirds of it being in the State of California.

The term, in the native tongue, means big or beautiful water, and adhering to the Indian rule should be divided into three syllables and pronounced Tah-hoe-ee, with the accent on the last, and not in two syllables, with the accent on the first, as we absurdly practice. The observance of the method first mentioned besides being more in consonance with the analogy of the aboriginal tongue, would impart to the word a much more poetic and euphonic sound. The newspaper press should attend to the correction of this mistake. Washoe, the name of an Indian tribe who formerly inhabited a series of valleys lying along the eastern base of the Sierra, is still retained, having been given to the principal valley in this series and also to the county which covers it, and the country adjacent. This term should have been applied to the State itself in accordance with the desire of many of the inhabitants at the time of its creation, as it had already become identified with the famous silver mines all over the world, and its adoption, apart from its eminent fitness and agreeable sound, would have prevented the many mistakes that constantly occur through the confounding of this name and that of the large and populous California county adjoining this State on the west. The Truckee river was so called after the Indian who was employed by the Donner party to guide them over the mountains into California. He appears to have been a faithful and intelligent old man, and there is little doubt but these unfortunate people would have escaped the terrible fate that overtook them, had they paid attention to his timely warnings. Shoshone, Toiyabe and Toquima, names of three high mountain ranges in Nye county, are all of Indian origin; so also is Sinkavata, a broad valley lying to the west of the Shoshone range; Winnemucca, name of a

town on the Central Pacific railroad, also of a shallow lake lying to the east of Pyramid lake, and connected with it by a slough, was the name of the principal chief of the Piutes, who lived to a great age, dying only a few years since, leaving a son who, succeeding to his name and office and who has, like his father, always maintained friendly relations with the whites. Pahranaugut is the name of a mining district situated in Lincoln county, in the extreme southeastern part of the State. It once contained quite a large population and enjoyed a good reputation for mineral wealth, but failing to sustain it by practical results the place has, for years past, been nearly abandoned.

Having but a meager vocabulary upon which to draw, the early dwellers on the "Eastern slope" being those of the pre-Comstock era, managed to make this slender stock go a good way. Thus, the name of Kit Carson, the famous Indian scout and guide, was by them applied to a river, the pass in which that stream originated, the valley through which it ran, as well as to the lake into which it disembogued and the sink where the surplus waters of the latter finally disappeared; the name having at a later date been given to a county organized in this part of Utah, and afterwards also to a city, the now flourishing capital of Nevada.



THE RUFFED GROUSE.

Among the county names of the new State only that of Washoe is of Indian origin. Esmeralda county was called after the principal mining district within its limits. The term, meaning in Spanish an emerald, was in its application here a purely fanciful and not altogether happy one. Douglas county was named after Stephen A. Douglas, then United States Senator from Illinois. Ormsby, after Major Ormsby, an early settler in Carson valley and an energetic business man, who was killed while leading the expedition against the Indians in June, 1860. Storey in like manner was named after Captain Storey, who lost his life in the same expedition. Lyon was named

in honor of General Lyon, a brave officer in the Union army, who fell at the battle of Wilson's creek, Missouri, in 1861. Churchill county was also named after a distinguished army officer, his name having before this been given to the fort, erected on Carson river in 1860. Humboldt county bears the name of Baron Von Humboldt, the great German scientist, traveler and author. Eureka and Elko were named after the principal towns they contain. Nye county was named after James W. Nye, first Governor of the Territory and afterwards U. S. Senator from Nevada, an honor that he well deserved. Lander after General Lander, of the U. S. army, who for many years was engaged in exploring the country between the Missouri river and California, and laying out wagon roads through the same. Lincoln county was named after the "martyr" President, and White Pine after the chief mining district of that region, the name having been originally suggested by a species of pine found in the neighborhood.

The Twin Rivers.

When Fremont crossed this country in his expedition of 1845, he was led to notice while passing through Big Smoky valley two large streams of the purest water, issuing each from a narrow gate-like gorge in the Toiyabe range. These gorges are but a few hundred yards apart and the two streams continuing to flow out into the valley in close proximity and parallel to each other for quite a distance, suggested the name of "Twin rivers," which was accordingly given to them by the great "Path-finder," and they were so laid down in the maps afterwards prepared by him. When the inevitable prospector arrived in that region, recognizing in these two creeks the Twin rivers of Fremont, he adopted the name for a mining district, whence it came to be applied to a considerable section of the mountains and valley adjacent; the singular form of the phrase, "Twin River," having meantime come into general use.

Reese River

Was named after Captain Reese, a Mormon, who having a home establishment at both Carson valley and Salt Lake, necessitating frequent journeys between these two points, was led to seek a shorter path than the circuitous route via the valley of the Humboldt. In carrying out this purpose he left the old immigrant road near Carson lake, and pursuing an easterly course came upon the small stream that now bears his name. Walker river and lake bear the name of one of the employees of the Northwestern Fur Co., who trapped on these waters many years ago. Pyramid lake is so called because of a high, conical rock rising from the deep water near its eastern shore. In looking over the modern map of Nevada, many streams will be seen there laid down as rivers, but they are with the exceptions already noticed, nothing but creeks, and the most of these very small

creeks at that. Reese, Twin, White and many other so-called rivers, including the Virgin and the Muddy, are everywhere easily forlorn, nor would it greatly trouble an active man to jump across almost any of them, except during their highest stages.

Ruffed Grouse.

The bird of which we give an engraving on this page will be recognized by our Oregon and Northern California readers as a denizen of their thickets. Many others will also remember it the object of their gunning in the Eastern States. The grouse, although one of the most widely distributed birds in the United States, seldom, if ever, so far as we know, appears in our Southern counties. It is known as the "partridge" in the Middle States and the "pheasant" in the Southern States.

There is a close resemblance between this bird and the domestic fowl in their natural habits, especially with respect to the rearing of their young.

Although a permanent resident in the region it inhabits, the ruffed grouse performs partial sorties at the approach of autumn, but not so extensive as the peregrinations of the wild turkey, the little partridge or the primed grouse, yet sufficiently so to be noticeable at periods when the food in some mountainous localities becomes scarce.

Although the ruffed grouse is partial to the craggy sides of mountains and hills and the rocky borders of rivers and small streams,

thickly mantled with evergreen, small trees and shrubs, they at times remove to low lands, and even enter the thickest cane-brakes, where they sometimes breed. In the spring and autumn the male often betrays himself to the gunner by a drumming noise produced by his wings, which they have been known to continue for several hours at a time, and may sometimes be heard at a distance of half a mile. Their human persecutors imitate this noise, by tapping on dry and inflated bladders, when the bird comes forth to combat a supposed rival, and is shot; and they are also caught in traps set upon their drumming ground, or logs. Different species of hawks also destroy them, particularly the red-tailed and Cooper's hawks. Skunks, weasels, raccoons, opossums, and foxes are also their foes, some of them sucking their eggs, and others feeding on their flesh.

Seeds and berries of all kinds chiefly comprise their food, but they are particularly fond of fox-grapes, winter-grapes, strawberries and dew-berries. In winter or early spring, they eat the tender buds of various

trees, and thus sometimes prove injurious to the apple and other fruit crops located near dense woods. They are then easily approached, but are too lean to be desired. About the first of September, when the mountains are covered with whortleberries and blackberries, is the proper time for shooting and catching them. Trap-boxes are then used, as well as the "figure-of-four." When the snow is deep, they often conceal themselves by diving beneath it and emerging at a distant place, but are often caught in the attempt.

The whirring noise produced by these birds when rising in alarm from the ground is not made at any other time. Its usual flight is low, straight forward, and seldom more than a few hundred yards at a time, being also stiff, and accompanied with a beating of the wings for more than half the distance, after which, it sails like a ship before the wind. It moves gracefully and proudly upon the ground, until alarmed, when it lowers its head, expands its tail, first runs a little distance, and then flies away with a whirring noise.

AIR COMPRESSORS.—We are asked by a correspondent what air compressor received the highest award at the Centennial. The awards for air compressors have not yet been received from the judges by the competitors, although the Burleigh Drill Company received notice that they had obtained an award on the air compressor as they did on the drilling machinery. As soon as the report of the judges is received we will publish it for the information of our mining readers.

RUMORS of a compromise between the Richmond and Eureka Con. companies are in circulation at Eureka. The *Sentinel* has not been able to find any foundation for them.

We can recommend the New York watch, of Springfield, Mass., as A. 1.

Rights of Stockholders.

In the case of G. S. Bowdoin vs. James T. Sanford, the Brentwood coal company et al., Judge Morrison has rendered an opinion on motion of defendants, to strike out the complaint of intervention filed by one Williams. The suit is to foreclose a mortgage for \$90,000, executed by the Brentwood coal company to Sanford, and by him assigned to the plaintiff. Williams the intervenor, avers that he is the owner of a large amount of the capital stock of the Brentwood coal company; that the defendant, Sanford, is the principal stockholder in the same and has absolute control of the company; that its trustees are subservient to all of his wishes; and that he dictates their action as such in all particulars, and has always done so; that the company is not faithfully defending its interests and rights or those of its stockholders in this action, but is purposely betraying and abandoning the same for the benefit of Sanford, with the fraudulent design of enabling him to become the owner of its property or its capital stock, and to the sacrifice and ruin of the interests and rights of the intervenor therein, and with intent to cheat and defraud the intervenor out of his rights and interests in said company. The complaint of intervention also charges that the mortgage was *ultra vires*, and was given by the corporation fraudulently, with intent to defraud and cheat the intervenor. The coal company admits the indebtedness, and interposes no defense to the foreclosure of the mortgage. The company has gone into bankruptcy since the filing of its answer, and the assignee in bankruptcy has been substituted as defendant. The question presented in this case involves the right of a stockholder to come into a court of equity and ask the interposition of the Chancellor for the protection of his rights where the trustees are derelict in duty and are about to permit the property of the corporation to be sacrificed. It has been said that the duties of trustees or directors of corporations are due primarily to the corporation; that the stockholder has no direct interest; and if permitted to be heard at all, he must appear in a representative capacity for the corporation. Judge Morrison decided that the trustees owe a duty directly to the stockholder, and quoted various authorities in support of his opinion. He said: "In the case now under consideration, the intervenor shows that the trustees of the corporation are about to commit a flagrant breach of their trust, by permitting an unjust claim to go into judgment by means of which the corporation will be deprived of the greater part, and perhaps nearly all, of its corporate property. The intervenor asks that he may be permitted to come into this court and prevent the perpetration of that great wrong by interposing an equitable defense, which will defeat the attempted foreclosure. Every sense of duty and obligation of law requires that these trustees should avail themselves of any meritorious defense they may have to this foreclosure suit. But, instead of setting up the alleged defense, they have manifested a willingness to permit the foreclosure, and thus strip the corporation of its property, and the stockholders of their interest therein. The ground of complaint here is, that the trustees have fraudulently refused to perform a duty which they owe, not only to the corporation, but to the stockholders. It is very clear to my mind, and is fully supported by authority, that the stockholders may, in such a case, appeal to a Court of Equity for the protection of their rights. The mere fact that the Brentwood coal company has gone into bankruptcy does not, in my opinion, affect the rights of the intervenor in this case. The assignee has come into this Court and has evinced the same readiness and willingness to allow this alleged fraudulent foreclosure proceeding to go forward. He has subjected himself to the jurisdiction of this Court, and whether the corporation is to be represented by dishonest trustees or by a faithless assignee makes no difference. Neither the consent of such trustees, nor that of such an assignee will justify this Court in withholding its aid for the protection of the rights of the stockholders of the company.

The motion to strike out the complaint of intervention of Williams was therefore denied.

Mining Prospects about Dutch Flat.

In an article on "Our Prospects" the Dutch Flat *Forum* says: We will lead off by giving a synopsis of Dutch Flat, its enterprises and surroundings. When we speak of its being at the present time one of the richest mining towns on the coast, considering its population, many of our readers will be surprised to learn that less than six years ago the trade of this place became so slack that nearly, if not quite, one-half of the business houses were closed up, and offered for sale for less than what it cost to furnish the lumber used in their construction. This was owing to an opinion, at that time prevalent among miners, that as the rich pay in the gulches had failed, and as the top strata of loose gravel was removed by hydraulicing the vast body of hard gravel remaining protected by high rim rock, was only rich enough, in places, to pay for drifting, and the enormous expense that would be incurred in opening them up for hydraulicing was beyond their means; and even if it were not, the lower strata, several hundred feet in depth, was of such a hard and rocky nature that it was considered impossible to remove it fast enough by water power to make it pay. But then, as time is ever kept busy in

solving mysteries, it was discovered that through the aid of powder, the gravel in those hard banks could be pulverized, and removed as readily by hydraulicing as that of the top. Then the hardy and energetic miner was not loth to comprehend that he still owned a valuable mine. Rich and enterprising capitalists, through the aid of mining experts, investigated these facts, and found therein an encouraging field for the outlay of a large amount of capital, with the chances insured for encouraging results.

The consequences are that within the last few years the industries of Dutch Flat and vicinity have undergone a sudden change, with extraordinary encouraging results. Nearly all of the vast, extensive and rich mining property which lies in the vicinity of Dutch Flat, Gold Run, Little York, Liberty Hill and You Bet have been purchased by capitalists, together with several mining ditches, at an outlay of several millions of dollars, and through the aid of Burleigh drills they have run and completed bed-rock tunnels in months, in place of years as heretofore; and to-day can be witnessed the working of nearly all of said mines through long tunnels. A great many of them are so far advanced in being opened that monster derricks are arranged on the bedrock, capable of stacking boulders, weighing as high as eight and ten tons each, out of the way. We also have in our midst numerous other rich hydraulic and drifting mines, located at Lowell Hill, Remington Hill, Alta, Green Valley, Eucher Bar, Sandy Run, Bear River, etc., nearly all of which are so owned and situated that the town of Dutch Flat derives a great benefit from their continual liberal patronage. These mines, together with the important lumbering interests, make our town a lively and prosperous place.

TRIUMPH FOR AMERICAN PLOWS.—The *American Manufacturer* says: The recent victory of American implements in Russia has some picturesque features. When Mr. Kolyzsko returned from the Philadelphia exhibition and told what he had seen, the English dealers in Russia became alarmed, and began a newspaper campaign against American implements. They especially attacked our plows, and said that English plows would be used throughout the whole continent of America were it not for our tariff. Mr. Kolyzsko challenged them to a trial, and the day and place were appointed. The English went to the spot a day ahead of time and plowed a piece of soft ground. Mr. Kolyzsko arrived next day with American plows and experts. He found that what was left to him was land of the worst nature, covered with shrubs and very uneven. Knowing what American plows were, however, he went to work at once and showed the Russians and English what they had not seen before. With these plows he cut the earth and matted roots with the greatest ease, very much to the surprise of all spectators, who decided the victory for the American plows complete.

HOTEL CARS.

Another Grand Improvement to be made by the "Pioneer" Line.

Description of the Superb Cars now being Constructed.

For some time we have heard hints of a line of hotel cars for the Omaha and California line of the Chicago & Northwestern Railway. When asked about their cars, the officers have uniformly evaded a direct reply. Our "reportorial instincts" taught us to investigate for ourselves. We have done so, and are now enabled to state positively that such a line will be started in the early spring, and that the cars are now being built. The fact will no longer be a secret after this day's paper gets before the public.

Four of the most magnificent hotel cars that have been built anywhere are now being constructed by the Pullman Palace Car Company expressly for this line. These cars will be 66 feet long, 10 feet wide and 10 feet high, with 12 sections, one drawing-room (with table room for six persons), and one state-room, besides the kitchen, china closet, dressing-room, etc. The interior will be finished with black and white walnut, mahogany, French ash and curled maple, the place of the usual head-lining being filled in with foreign polished woods; the panels between the windows will be of California laurel and other California woods; the lamp fixtures, window fastenings, door hardware, etc., will be of triple-plated silver. The upholstery of the seats is to be of rich but plain reps, corresponding and harmonizing with the wood finish of the sides and roof of the cars. Between each set of seats is space for a table that will accommodate four persons comfortably, but as a rule are not expected to seat more than two persons. The glass and chinaware for the tables are now being made at Dresden, Germany, from patterns selected from the Royal Dresden exhibit that was at the Centennial exposition and so greatly admired. Each piece of silverware, glassware and chinaware will have the monogram of the Chicago & Northwestern road marked thereon. The kitchens of the cars will be so arranged that no fumes from the cooking viands can reach the occupants of the berths. On each car will be a steward, two cooks, three waiters and a chambermaid to wait upon lady patrons. It is the intention of the company to furnish the best meals that money can buy, and choice wines and cigars will be attainable by those desiring those luxuries.

These hotel cars will leave Chicago on the California Express, and run through to the Mis-

souri river. On the west-bound train, dinner, supper and breakfast will be served. The east-bound hotel cars will leave Omaha on the Atlantic Express each day, in the afternoon. On this train supper, breakfast and dinner will be served. Thus passengers bound in either direction will be enabled to have all their meals en route and yet not leave their palatial traveling parlor.

The only objection that has been raised against the use of hotel cars has been connected with the odors of the kitchen. As we said before, this, in these cars, will be entirely obviated; no person, no matter how particular he or she may be, will have cause to make any objections on this score. In the dining car you merely get your meals, and as soon as you are through eating you are shovelled out and started for the coach or sleeper, so as to make room for some other traveler who desires your place. While in these hotel cars your berth will be secured through, you will own it absolutely for the length of your trip, and it will be your own for lounging, sitting, sleeping and eating purposes, as much as your own seat in your own house. As it is not generally known, dining cars are never run over the entire length of any route; they are taken on and set off of the train at stated meal times, while these hotel cars will be made a part of the train and run through in the same way as the regular sleeping car.

On the admirable steel rail that is now laid on the Chicago and Northwestern Railway, these elegant, 16-wheeled hotel cars will ride as easy and with as little noise or oscillation as a balloon that floats serenely through the air; and we believe that it will be found to be a result that thousands will flock to this "Pioneer Line," who have hitherto gone by some other route.

With these and other improvements the people of Cedar Rapids are very largely interested and we believe will join with us in congratulating the progressive management of this great line in this its most advanced step; and unite with us in saying, the Chicago & Northwestern Railway has become the foremost road in all the West.

These hotel cars will be placed in service about March 1st, 1877.—*Republican*, Dec. 22d, 1876.

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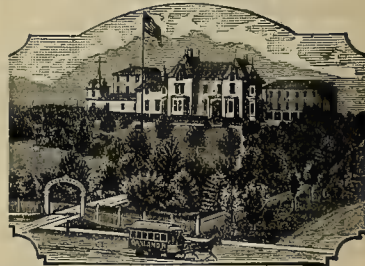
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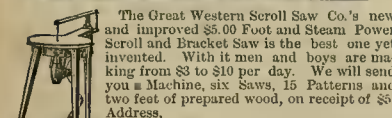
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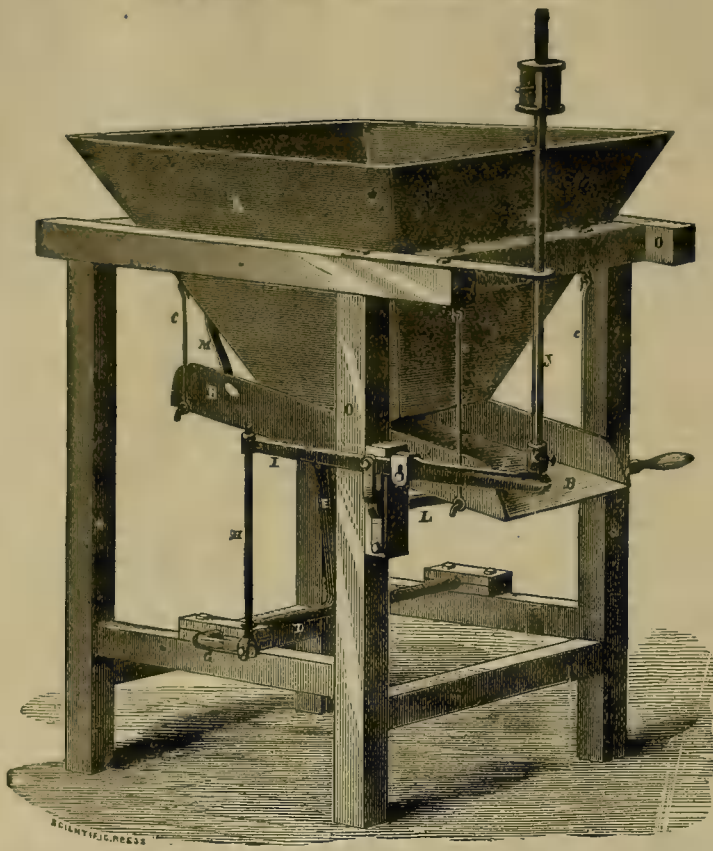
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at reduced prices. Abundant testimony furnished of
the great economy and successful working of numerous
machines in operation in the quartz and gravel mines
on this coast. Circulars forwarded, and full infor-
mation given upon application.

A. J. SEVERANCE & CO.

Office, No. 320 Sansome street, Room 10.

Continued from page 181.

That part of the work was finished day before yesterday. Justice.—Daily yield, 400 tons of ore. The ore stops are looking well in every portion of the mine, and are yielding the usual good quality of ore. The waste sinking below the 800-ft level is still rich ore.

Succor.—Sinking the shaft is making excellent progress. The work is being pushed with great energy in order to get below the broken portion, and reach a concentration of the ledge.

Leviathan.—The face of the main north drift at the 600-ft level continues in promising vein material. The face of the drift north at the 650-ft level from the incline is in fair grade ore, which shows continued improvement.

New York.—Work on the pump compartment of the shaft is going steadily forward. The upraise has yet about 160 feet to make to reach the surface. In the meantime the tanks and the stations for the lift pumps are being put in.

Savage.—During the first part of the week a delay of the pumping operations allowed the water to rise in the main incline some 60 feet. The defect to the machinery has, however, been again remedied, and the pumping resumed.

Phil Sheridan.—The east drift on the 400-ft level is in 55 feet, the face in softer and more favorable ground. The progress is excellent, and the approach to the ore vein steady.

Imperial Con.—The main incline is cleared out and repaired to the bottom and the sinking resumed. The main north and south drift on the 2135-ft level is being enlarged and timbered.

Chollar-Potosi.—Daily yield, 100 tons of ore, the average assay value of which is \$26 per ton. Sinking the combination shaft is making the usual progress.

Phoenix.—Work suspended and mine closed at present, owing to the injunction procured by the Overman mining company, who claim the ground.

Buckeye.—Just enough ore is being extracted to keep the Hope mill steadily running. The character of the ore is not materially changed.

Alta.—Sinking the shaft is being pushed forward with steady vigor. The bottom of the shaft is in good working ground.

Utah.—The west drift at the 1150-ft level is steadily advancing toward the ledge, the face in very hard blasting rock.

Baltimore and American Flat.—The main east and northeast drifts on the 1400-ft level are steadily advancing. The face of the northeast drift shows indications of a near approach to the main ore vein.

Central.—The amount of quartz appears to be gradually increasing, some of which gives good assays in both gold and silver.

South Constock.—Shaft down 100 feet below the 300-ft level to-day. Some very fine stringers of quartz are being met with.

North Con. Virginia.—Sinking the shaft is making the best progress possible. The bottom in very favorable ground.

BULLION DISTRICT.

Active.—Eureka Sentinel, March 16: There is considerable activity in Bullion district and quite a number of men are engaged in prospecting. The Lee mine is the principal mine in the district, and employs a considerable number of men in the mine and at the mill. There has been a change in the company's affairs, and the new superintendent is renovating the mill, giving out wood and timber contracts, and getting things in order for the summer's work. The ores are worked by the roasting process, and carry a very small percentage of lead. The deposit is quite extensive.

ELY DISTRICT.

Alps Company.—Pioche Record, March 10: The Alps company's mills are running regularly—the Pioche mill on custom ore and the Condon on concentrations. The Superintendent has been notified of a large shipment of Leads ore. Considerable ore is being extracted from the Alps mill on second level, and prospecting is being vigorously prosecuted.

Raymond & Ely.—The news this week in regard to the Raymond & Ely mine is very encouraging. On the 1100-ft level there are very good indications and in all probability the ledge will be struck in about a week. On the 8th level, also, there are good ore indications—a new development in the places worked. The 9th and 10th levels are being pushed ahead as usual.

EUREKA DISTRICT.

Shut Down.—Eureka Sentinel, March 16: Furnace No. 4, at the Eureka Consolidated works, was closed down yesterday, after a long and successful run.

Successor Mounier's Claims.—The following is a short description of a couple of mines on Prospect mountain, owned by Captain Foley. The Tyndall location shows very extensive surface indications, perhaps more than any other mine on that slope. The work done consists of sinking two shafts, one an incline 80 feet deep, the other a perpendicular shaft 60 feet deep, and 20 feet of tunnel running on the line of the ledge. Developments thus far have been sufficient to demonstrate the fact that this is a mine of some magnitude, the vein being about 90 feet in width, and contains chlorides of silver, sulphates of silver and some native silver. A considerable quantity of ore has been taken out, select samples of which assayed \$2,500 to the ton. The Cosmos, another location of 1,500 feet, is about 100 yards distant and parallel to the foregoing ledge, and shows much the same formation and arrangement as the Tyndall mine, selected samples from which assayed \$300 in gold and \$250 in silver.

CHERRY CREEK DISTRICT.

Encouraging.—White Pine News, March 17: From District Attorney Davis, just from Cherry Creek we get the following items: Dunn & Co. have purchased the judgment of Paul Mitchell and others against the Star mine, subject, of course, to release within the six months allowed by law to the former owners. The same parties have also purchased the Tehama mill at that place, and are interested in the mines of Hunter district—the latter, we understand, being about the very highest grade. But the indications in Hunter district are so promising as to warrant the purchasers in giving the high price demanded. The impression at Cherry Creek seems to be that the old owners of the Star will make such arrangements with Messrs. Dunn & Co. as will harmonize all interests, and that before long the mine will commence active operations. The Teasup and Pacific mines are being worked to good advantage, and the Tehama mill is being run to its full capacity. Another mill will be constructed in the spring, should the conflicting interests of the Star property be adjusted. The prospects of the camp are more encouraging than they have been for a long time.

WARD DISTRICT.

The Mines.—Eureka Sentinel, March 17: We have been permitted to extract the following from a letter received by a gentleman in this place. The writer says: The Step-toe Con. Co.'s mines are looking among the best of this district, and the company stands well in San Francisco. There are seven mines in the consolidation, of which the Ready Cash is the most developed, showing a vein of 25 feet of rich carbonate ore, paying well in silver, and promising to be one of the largest and best mines of the district. The Light, Cow, and the Emily produce high-grade milling ore, and are regular veins of good size. The company thinks its mines will constitute one of the great properties of Eastern Nevada. The Martin White Co. is taking out large quantities of rich ore, chiefly from their Paymaster and Defiance mines, and is producing about ten tons of bullion a day from two smelting furnaces. The mill has undertaken the experiment of the leaching process, instead of amalgamation, but the imperfect roasting of the ore, as effected in the White furnace, has prevented the success hoped for. With proper treatment, the mill running upon the rich ore of the Paymaster or other free milling ores of this district, would produce from \$3,000 to \$5,000 a day. Experiments are dangerous in a new country.

Arizona.

MINING MATTERS.—Arizona Citizen, March 10: The Drew-Symond's claim, on the Green lode, southwest of Tucson, is said to be opening up finely and even surpassing the expectations of the late purchasers. One blast this week blew down at least \$1,000 worth of ore. One of the claimants is reported as saying he wouldn't trade his mine now for the Silver King. It is undoubtedly a good mine. The Messrs. Hughes & Pacileo have a force at work on their discovery, 13 miles southwest of town, and the ore body opens finely as they go down. It will be remembered that the first assay from this claim went from \$408 to \$1,636 to the ton. The ore seems to maintain an even grade all the way, and the mine is, no doubt, valuable. Wm. Zeckendorf informs us that about 30 men are at work in and about the Yellow Jacket mine, that the ledge looks well and that richer ore than ever is coming out. The mill will be ready for crushing in a few weeks.

Colorado.

CASCADE DISTRICT.—Colorado Miner, March 17: Mr. Lincoln informs us that the Cascade mining company are pushing work rapidly on the Cascade mine. The tunnel is now in 433 feet, and the lode is improving with every foot gained. Parties are at work on adjacent lodes and with fair prospects.

RED ELEPHANT MOUNTAIN.—Since the great strike on the Free America, which has made a rich man of a poor prospector, attention has been attracted to this mountain and there are now engaged in prospecting upon it over 100 men. The boys are making dirt fly numerously, and although no big strikes have as yet rewarded their search, a number of lodes have been discovered and located.

SHERMAN MOUNTAIN.—The Cashier, owned by Messrs. Kalbaugh, McQuillan and Weisley, is now being worked by four parties of lessees, and is in good pay, in some parts of the mine the ore vein being quite large, and the mineral everywhere of good grade. The first-class ore runs from 600 to 700 ounces.

TERRELL MINE.—This mine is again to take its place among the leading mines of Clear Creek county as an ore producer, and we hope, with greater success than before. Mr. Henry has inaugurated active preparations to resume work, getting a new hoisting rig into the Terrell, and making every preparation for getting the water out of the mine on the double quick. A contract has been let to Messrs. Crawford and Storms to place a Burleigh engine in the tunnel, with much greater capacity than the one now doing duty there. A Knowles's special mining pump is to be applied to the water in the mine, and by Tuesday next the mine will be drained at the rate of 5,000 gallons per hour. As soon as it is drained, work will be actively commenced in the various levels. We understand, also, that the company's concentration works are to be placed in thorough working order, and all the company's works prepared for extensive operations.

Montana.

NEW MINES.—Helena Independent, March 8: The town of Pony, or Pony City, as it is sometimes called, is situated on the right hand fork of Willow creek, Madison county, two miles south of Hon. H. H. Mood's ranch. Buildings for various purposes are going up daily. It is the live town of the mountains. Forty or 50 dwellings have been completed, and more are going up. The lodes are being developed with a vigor seldom witnessed in a new camp. The Strawberry lode has been opened with the 60-ft shaft. The ore body is seven feet thick and pays from \$40 to \$50 per ton. It is owned by G. G. Marlon. Mr. Merks is now erecting a 15-stamp mill upon it, which he expects to have in good running order by the 1st of April. The Keystone lode, the property of J. W. Robinson, has an eight foot vein of ore that yields \$600 per ton. The Boss Tweed, owned and worked by Dr. Getchell & Co., is 24 feet in width, and pays from \$12 to \$15 per ton. Dr. has a five-stamp mill in operation, and is adding to it five stamps more. The Ned lode, owned by Mallory & Co., has a three foot vein of ore that pays from \$70 to \$140 per ton. The same company own the Willow Creek, a very promising lode that mills from \$25 to \$30 per ton, and contains five feet of pay ore. They also have in operation a 10-stamp mill. The White Pine lode shows a vein of solid ore two feet wide, that pays from \$30 to \$100 per ton. It is owned by H. H. Merks. A depth of 40 feet has been attained upon it. It is considered the best lode in the camp.

A RICH STRIKE.—Mr. R. McNeil informed us yesterday that Mr. Tatem had made a rich and important strike on the Park lode. For some time past work has been prosecuted in cutting through a fault in the vein some 20 feet in extent. When the lode was finally reached it was found fully four feet thick, and the whole body will mill \$50 per ton on an average. This strike will encourage others to persevere, and we confidently expect to see Park and Unionville thriving camps ere the close of the coming summer. What renders the above strike of more than ordinary significance is the fact that it was found at a much greater depth than has heretofore been attained on the lode, proving that it is a true vein.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

- FOR WEEK ENDING MARCH 13TH, 1877.
- 188,255. EXTENSIBLE WAGON BODIES.—F. Oppenheim, S. F.
- 188,341. MILK COOLER.—H. Clifford, S. F.
- 188,345. GRAIN SEPARATOR.—W. Edris, Eugene City, Oregon.
- 188,348. DAM FOR STORING AND UTILIZING TIDE POWER.—W. E. Kelsey, S. F.
- 188,369. DREDGER.—W. B. Hyde, Oakland, Cal.
- 188,374. DEVICE FOR UNLOADING AND STACKING HAY, ETC.—G. F. Kelly, Susanville, Cal.
- 188,375. WINDOW-SASH HOLDER.—J. Kelly, S. F.
- 188,376. METAL WEDGE.—J. Kelly, S. F.
- 188,379. COMBINED HARROW AND CLOD-CRUSHER.—W. H. Kuhn and S. Miller, Albany, Oregon.
- 188,397. TOBACCO CUTTER.—Moon, S. F.

TRADE-MARK.

4,439. WATCHES.—J. Gordon, S. F.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

SILVER CROWN M. Co.—March 17th. Location: Arizona. Capital stock, \$10,000,000. Trustees—Isaac Weightman, A. W. Robinson, Thomas E. Hughes, Wm. S. Bell and Chas. W. Arnold.

ANADOR M. Co.—March 17th. Location: Arizona. Capital stock, \$10,000,000. Trustees—J. W. Gashwiler, B. B. Minor, J. W. Young, H. W. Burling and E. de Prati.

CARLEO BAY COAL M. Co.—March 17th. Location: California. Capital stock, \$10,000,000. Trustees—Joshua Gray, Wm. Steider, Horace Jameson, Andrew Kohler and Lorenzo B. Lyman.

CROOSE a good companion only—one of Dewey & Jordan's "New York watches."

Hydraulic Mining.

The San Francisco *Alta* has been and is still a staunch friend of the hydraulic miners of the State, and has ably defended the interest against the efforts of the agricultural portions of the State to destroy or cripple it. But in a late issue it makes some assertions that are not borne out by facts. It affirms that most of the hydraulic camps are exhausted, and in tracing the line of exhausted claims, it mentions several places in this county that it thinks are played out. San Juan and Moore's Flat are among the number. It says further that "the assertion that hydraulic mining is in its infancy, indicates ignorance of the history and condition of the business. Of course," it says, "the owners of hydraulic claims, anxious to sell them, will say that they own miles upon miles of deep and rich gravel, but let the buyer beware how he believes." Now, if the mining expert of the *Alta* will take the trouble to visit what he calls the exhausted hydraulic mining section of Nevada county, it will find that it has shown in its assertions an entire ignorance of the condition of the business. It is true that some mining camps in this county have decayed, but the cause is not due to the exhaustion of all their mining claims. Some of them had rich surface mines, which have been worked out, but the surface gravel was only the outwash from old channels which still lie hidden away under the hills adjoining, and which contain millions of treasure where only dollars were found on the outshoots or surface claims sent out by them. These deep claims require time and capital to open and work them, but that they exist and can be traced for miles is beyond dispute. Wherever they have been systematically opened, they never fail to reward the operators. That they have for long years been allowed to remain undisturbed is true. Men of means have been pleased to invest their capital in the mining stock market, where the fluctuations gave them a hope of reaping sudden accumulations to their hoards, rather than to engage in legitimate mining enterprises. But this is not the fault of the gravel belts. Instead of Moore's Flat being an exhausted camp, it is to-day in the immediate vicinity of the richest and most extensive mining region of the coast. And the same may be said of all the towns on the ridge, including San Juan.

That "miles upon miles of deep and rich gravel" exist in that section of our county is past dispute, and is admitted by every mining expert in San Francisco who has ever visited that section, as the *Alta* will discover if it will refer to their reports upon the subject. It will also learn, by visiting the county that these "miles of gravel" are being opened all along the line. Moore's Flat was once famous for its mineral wealth, when less than a mile on a side channel was worked; what will it be when several miles of the main channel is in full operation, as it soon will be. It is probable that the amount of debris sent from the mines will not be increased as the *Alta* in its article seems to want to convey the impression, for it is now generally conceded that hydraulic mining will, in the near future, be abandoned for the more profitable method of drift mining. Men have learned that it is cheaper to take out the richest portion at the bottom of the channel than to wash it away by hydraulic power, when two or three hundred feet of banks containing but little pay dirt have to be sent away with it. Instead of our gold bearing gravel being exhausted, it has barely been touched, and mining writers at the Bay will convince themselves of the fact by visiting this county and witnessing the new enterprises being inaugurated and in operation to open up the country.—*Nevada Transcript*.

LANGLEY'S DIRECTORY.—Langley's San Francisco Directory for 1877 has been issued from the press. This is the 20th year of publication and it is really a standard work. It contains a great mass of information aside from the Directory proper, all of which has been compiled with intelligent care and conveniently arranged. A thorough publication of this character is of importance to the city. In our journeying in Eastern cities we saw none equal it. The publisher is experienced and careful, and his work circulates more in proportion to those of other cities, showing the work is appreciated. The go-aheadiveness of our city makes frequent changes necessary and also makes a Directory almost indispensable. The Directory for 1877 contains a lithographic map of the city, with colors indicating the different sub-divisions of the city and county, with streets, wharves, reservations, etc.

THE big ship, *Three Brothers*, departed last Saturday on her fourth voyage around "the Horn." She carries the largest and costliest cargo ever taken by any sailing ship from California, its value amounting to \$240,000. Captain Cummings, her commander, confidently expects to make this trip to Liverpool within 100 days. It took the two powerful tugs, *Monarch* and *Neptune*, to tow her out of the harbor.

DON'T trifle with a poor watch when you can buy a good one of Dewey & Jordan, 433 Montgomery street, San Francisco, at prices according to the times.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

FITZGERALD'S *Home Newspaper and Educational Journal* is the title of a new San Francisco weekly issued by Rev. O. P. Fitzgerald.

General News Items.

THE spring meeting of the California Rifle Association will take place at San Bruno, San Mateo county, on Wednesday April 11th.

REAR-ADMIRAL SIR EDWARD BELCHER, the explorer who commanded the expedition in search of Sir John Franklin in 1852, died in London last week, aged 78.

FOUR clerks of the U. S. Treasury left for Europe on the 18th, carrying with them \$10,000,000, of the 4½ per cent. United States bonds for the Syndicate.

THE English steamship, *Spartan*, left New York on the 18th for Java, freighted with 394,000 gallons of refined petroleum. She goes via the Suez canal. The object is to head off the arrival in Java of 250,000 gallons of oil, shipped in sailing vessels in last January and February. This is the first ocean steamer carrying petroleum.

SECRETARY SCHURZ appointed as the Committee to investigate the grasshopper plague, under the act of Congress, Professor Riley, State Entomologist of Missouri; Professor Thomas, of Illinois, and Doctor Packard, of Salem. These gentlemen will leave Washington soon for the scene of their labors.

A PRIVATE Toronto dispatch announces a decision of the Court of Appeals in that city, of interest in the business community. In the case of McLean vs. Dun & Co.'s Mercantile Agency, the judge decided that the defendants could not be held liable for losses incurred through their reports. The amount involved was small, but the principle involved made it a test case.

IMPORTANT orders will be issued by the Interior Department shortly for the protection of timber on the public domain from depredation. The present system of entrusting its care and the detection of depredators to the local officers will be abolished, and the Department will send out specially qualified agents to detect and report to the Department of Justice, for prompt punishment, all persons cutting timber on public land without the authority of the Government.

GENERAL SHERIDAN has the arrangements completed for the erection of two new military posts in the Indian country as soon as the materials can be transported up the Yellowstone. One is to be located at the mouth of the Tongue river, the other near the mouth of the Little Big Horn river. Each post will contain quarters for 12 companies, and these will be garrisoned by six companies of cavalry and the same number of infantry. General Sheridan is of the opinion that if there had been posts in that country a year ago the Custer massacre would not have occurred.

THE BLACK HILLS MINERS.—A correspondent of the Omaha *Herald*, writing from Deadwood says the people inhabiting the Black hills, realizing the fact that the Government is not, at least for the present time going to afford protection to their lives and property, and they being fully aware of the danger that threatens them on the opening of spring from hostile Indians, have determined to act on their own responsibility in the matter. Meetings were held at Spearfish and Crook City, at which the subject of self-protection was fully discussed, and delegates were appointed from both of these localities to meet the citizens of Deadwood in mass meeting, to discuss the best mode of accomplishing the desired result. The mass meeting was very largely attended and proved to be a success. Several gentlemen of prominence expressed their views on the subject, all agreeing that some immediate action should be taken by the people. It is proposed to arm and equip a band of 20 scouts under the leadership of Tom Hardwick, an experienced Indian fighter, to take the field immediately and discover the whereabouts of the camp of Indians who have already commenced their work of murdering and stealing. It is further proposed to organize and equip a home-guard company of 75 men who are to be held in readiness to march against the hostiles, if the scouts succeed in finding them.

Look out for a man calling himself J. Livingston. Last whereabouts in Yuba county.

DEWEY & JORDAN have been at 433 Montgomery street, S. F., for 13 years. They are reliable—like the "New York watches" they sell.

THE GRAND PACIFIC HOTEL, Chicago, with its central position and railroads branching off in every direction, is naturally a point to which travellers from all parts of the country are apt to come more or less frequently. Being there, a hotel is a necessity. A first-class one in every respect will be found in the "Grand Pacific," which is the temporary home for our off-hand Western folks who want to go to the best place the first time. The hotel is a handsome one and is fitted up in fine style with all the modern conveniences. It is centrally located, keeps a first-class table with the best market affords at all times and seasons, and the proprietors know how to make their guests feel at home.

"TESTING ORES."—A. B. Roberts, of Boise City, says: am very much pleased with Chas. H. Aaron's work on "Testing and Working of Silver Ores." It will be the cause of new life and great advancement in silver ore prospecting if miners and prospectors would procure a copy and put in their pockets when they start for the mountains.

"SPEAKS WELL," ETC.—We would return thanks for an exchange and back numbers of the MINING AND SCIENTIFIC PRESS, published by Dewey & Co., of San Francisco, Cal. It is a well edited, interesting, and valuable journal and speaks well for our Pacific neighbors.—U. S. Mining and Manufacturing Journal.

METALS.

WHOLESALE.)

THURSDAY, M., March 22, 1877.

IRON—			
American Pig. ton.	29 00	@	32 00
Scotch Pig. ton.	31 00	@	32 50
White Pig. ton.	30 00	@	—
Oregon Pig. ton.	—	@	—
Refined Bar.	4 00	@	4 1/2
Boiler, 1.	7 1/2	@	8 1/2
Plate, 13 to 20.	—	@	—
Sheet, 10 to 14.	—	@	—
Sheet, 16 to 20.	5 1/2	@	—
Sheet, 22 to 24.	6 1/2	@	—
Sheet, 26 to 28.	6 1/2	@	—
Horse Shoes, keg.	6 00	@	—
Nail Rod.	8 1/2	@	9
Norway, Oval.	8 1/2	@	8
Boiler.	7 1/2	@	9
COPPER—			
Copper Tinned.	37 1/2	@	40
Sheathing, lb.	37 1/2	@	40
Sheathing, Yellow.	21 1/2	@	22 1/2
Sheathing, Old Yellow.	21 1/2	@	—
Composition Nails.	21 1/2	@	—
Composition Bolts.	24 1/2	@	—
STEEL—			
English Cast, lb.	14 1/2	@	25
Anderson & Woods, ordinary sizes.	16 1/2	@	—
Drill.	16 1/2	@	—
Flat Bar.	15 1/2	@	20
Flow Steel.	8 1/2	@	12 1/2
TIN PLATES—			
Orl 14 C Charcoal.	9 00	@	9 50
Banca Tin.	24 1/2	@	—
Australian.	18 1/2	@	18 1/2
ZINC—			
By the Cask.	11 1/2	@	—
Zinc Sheet 7 1/2 to 10, lb.	11 1/2	@	—
7 1/2 to 11, lb.	11 1/2	@	—
8 1/2 to 10, lb.	12 1/2	@	—
8 1/2 to 11, lb.	12 1/2	@	—
NAILS—			
Assorted sizes.	3 3/4	@	—
QUICKSILVER—			
By the lb.	42 1/2	@	45

LEATHER.

WHOLESALE.)

WEDNESDAY M., March 21, 1877.

Sole Leather, heavy, lb.	26 1/2	@	29
Light.	22 1/2	@	24
Jodot, 8 Kil, doz.	48 00	@	50 00
11 to 13 Kil.	68 00	@	79 00
14 to 19 Kil.	82 00	@	94 00
Second Choice, 11 to 16 Kil.	57 00	@	67 00
Cornellian, 12 to 18 Kil.	57 00	@	67 00
Females, 12 to 13 Kil.	63 00	@	67 00
14 to 18 Kil.	71 00	@	76 50
Simon Ullimo, Females, 12 to 13 Kil.	58 00	@	65 00
14 to 15 Kil.	68 00	@	70 00
16 to 17 Kil.	72 00	@	74 00
Simon, 18 Kil.	61 00	@	63 00
20 Kil.	65 00	@	67 00
24 Kil.	72 00	@	74 00
Robert Calf, 7 and 8 Kil.	35 00	@	40 00
Kips, French, lb.	1 00	@	1 35
Cal. doz.	40 00	@	45 00
French Sheep, all colors.	8 00	@	15 00
Eastern Calf for Backs, lb.	1 00	@	1 25
Sheep Roans for Topping, all colors, doz.	9 00	@	13 00
For Linings.	5 50	@	10 50
Cal. Russel Sheep Linings.	1 75	@	4 50
Boot Legs, French Calf, pair.	4 00	@	—
Good French Calf.	4 00	@	4 75
Best Jodot Calf.	5 00	@	5 25
Leather, Harness, lb.	35 1/2	@	38
Pair Brille, doz.	48 00	@	72 00
Skirting, lb.	33 1/2	@	37
Welt, doz.	30 00	@	50 00
Buff, ft.	11 1/2	@	20
Wax Side.	17 1/2	@	18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, March 21, 3 P. M.
LEGAL TENDERS in S. F., 11 A. M., 96@96 1/2. SILVER, 6@6 1/2.
Gold in New York, 104 1/2.
Gold Bars, 88@89. SILVER BARS, 10@15 1/2 cent. discount.
EXCHANGE on New York, 50@55-100 cent. premium for gold; on London bankers, 49; Commercial, 49 1/2; Paris, five francs 3 dollars, Mexican dollars, 85@86.
LONDON Consols, 96 1/2; Bonds, 102 1/2.
QUICKSILVER in S. F., by the flask, 3 lb, 42@42 1/2.

Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the heading of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the heading of "Leases" are the titles, Smelting, Mexican process, Chilean process, Krochne's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

He describes an improved retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome Street, San Francisco.

Thanks for Prompt Attention.

STOCKTON, June 26th, 1876.

Messrs Dewey & Co., S. F.:—
I have received the patent for my invention in wagon brakes, which you prosecuted for me; patented May 11th, 1875—No. 163,046. Thanks to you for your prompt attention to the case; you will remember be my attorneys in such cases. I recommend all inventors on the Pacific coast to give you a call, which I think they will never have any cause to regret. Very truly yours,
GEO. G. BUCKLAND,
Stockton, Cal.

Call and See them or Send for Description and Prices. Sent by Express to any part of the Pacific Coast.
DEWEY & JORDAN,
No. 433 Montgomery Street, San Francisco.

NEW YORK WATCH CO'S FIRST CLASS AMERICAN WATCHES, FROM SPRINGFIELD, MASS.

Mining and Scientific Press.

Is the leading mining journal in America, and enjoys a large circulation among the more intelligent operators and workers in the gold fields of the world.
As a scientific and mechanical representative of the Pacific Coast, it is decidedly popular and a standard journal with the most thrifty industrial people of the Pacific States and Territories. Its authority is of the highest order, and its usefulness in its special sphere unrivalled.
Every public library, mining engineer, metallurgist, mining operator and intelligent mechanic and manufacturer will find profit by its reading.
Subscription, \$4 a year in advance. Sample copies, post paid, 10 cents. As an

ADVERTISING

Medium for the Pacific Coast, it is superior to any other journal for all kinds of mining and hydraulic machinery and other mechanical work, building materials, new manufactures and inventions. Our rates are very reasonable compared with those of other first-class journals.

DEWEY & CO., Publishers.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THOMP—San Francisco.
B. W. CROWELL—Colusa, Butte and Sutter counties.
G. W. McGREW—Santa Clara county.
A. C. KNOX—Nevada, Montana and Utah Territories.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMBERLAIN—Tulare, Kern and Fresno counties.
A. U. STRONG—Lake, Napa and Solano counties.
G. KITTSOW—Contra Costa county.
W. D. WHITE—San Bernardino and Los Angeles counties.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Dolores Consolidated Mining Company

Location of principal place of business, San Francisco, Cal. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of February, A. D. 1877, an assessment, No. 1, of 10 cents per share, was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 418 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 26th day of March, A. D. 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 16th day of April, A. D. 1877, to pay the delinquent assessment, together with cost of advertising and expenses of sale. By order of the Board of Directors.

J. W. CLARK, Secretary.

Office, Room No. 2, 418 California street, San Francisco, California.

Excelsior Silver Mining Company, Nye

County, Nevada. A meeting of the stockholders of the above company will be held on the 28th day of March, 1877, at the office of the company, 306 Post street, San Francisco, California, to elect Trustees.

W. A. KOLLMYER, Secretary.

Klamath Quartz Mining Company—

Notice is hereby given that the principal place of business of this company will be removed to Klamath Mill, Siskiyou County, California, from the City and County of San Francisco, California, in thirty days from the date of the first publication of this notice.

GEORGE H. FOREE, Secretary.

San Francisco, March 21, 1877.

Mariposa Land and Mining Company

of California. Location of principal place of business San Francisco, California. Location of works, Mariposa county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 9), levied on the 16th day of January, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

COMMON STOCK.				
Names.	No. Certificate.	No. Shares.	Amount.	
Brumagim, J. H.	unissued	550	\$550 00	
Brumagim, J. H.	1342	100	100 00	
Brumagim, J. H.	1381	100	100 00	
Birmingham, D. Walton.	1478	100	100 00	
Collins, C. A.	1200	100	100 00	
Collins, C. A.	1203	100	100 00	
Curles, W. B.	272	100	100 00	
Colbron, W. T.	473	100	100 00	
Colbron, W. T.	474	100	100 00	
Durbrow, Lamont.	unissued	100	100 00	
Hallgarten & Co.	unissued	50	50 00	
Hoyt, E. P.	1223	100	100 00	
Hoyt, E. P.	1224	100	100 00	
Hoyt, E. P.	1225	100	100 00	
Kennedy, Hutchinson & Co.	476	100	100 00	
Loth, M.	411	50	50 00	
Loth, M.	412	50	50 00	
Moore, Silas H.	1215	100	100 00	
Oppenheimer, Ed L.	1339	100	100 00	
Paulody, A. S.	unissued	100	100 00	
Rathborne, R. Wm.	121	100	100 00	
Rathborne, R. Wm.	163	100	100 00	
Rathborne, R. Wm.	314	100	100 00	
Rathborne, R. Wm.	315	100	100 00	

Names.	No. Certificate.	No. shares.	Amount.
Rathborne, R. Wm.	319	100	100 00
Ryce, A. Thorndyke.	1230	100	100 00
Stern, Chas.	unissued	100	100 00
Taylor, W. & J.	unissued	100	100 00
Thorpe, Louise E.	A 7	1	1 00
Thorpe, Louis W.	A 8	1	1 00
Thorpe, Caroline A. M.	A 12	1	1 00
Smith, Morris H.	unissued	100	100 00
Van Schaick & Co.	unissued	1000	1000 00
Van Schaick & Co.	69	100	100 00
Van Schaick & Co.	70	100	100 00
Van Schaick & Co.	71	100	100 00
Van Schaick & Co.	1333	100	100 00
Wollberg & Co.	unissued	100	100 00
Weeks, W. A.	unissued	100	100 00
Warner, Geo.	1413	100	100 00
Stern, Joseph.	1506	100	100 00
Stern, Joseph.	1507	100	100 00
Stern, Joseph.	1508	100	100 00
Vanderhoof, H. B.	1509	100	100 00
Vanderhoof, H. B.	1600	100	100 00
Cowles, Jos N.	22	25	25 00
Cowles, Jos N.	A 23	25	25 00
Bernheimer, I and S.	1601	100	100 00

PREFERRED STOCK.

Ackerman, T. J.	A 17	54	54 00
Ambelman, Edgar M.	unissued	135	135 00
Brumagim, J. H.	1315	100	100 00
Brumagim, J. H.	unissued	305	305 00
Brumagim, Mark.	1238	100	100 00
Brumagim, Mark.	1239	100	100 00
Block, Henry.	A 31	67	67 00
Block, Henry.	A 32	67	67 00
Block, Henry.	A 33	5	5 00
Block, Henry.	A 34	1	1 00
Block, Henry.	1243	100	100 00
Block, Henry.	1244	100	100 00
Block, Henry.	1245	100	100 00
Block, Henry.	1246	100	100 00
Block, Henry.	1247	100	100 00
Block, Henry.	1248	100	100 00
Block, Henry.	1249	100	100 00
Block, Henry.	1250	100	100 00
Block, Henry.	1251	100	100 00
Block, Henry.	1252	100	100 00
Block, Henry.	1253	100	100 00
Block, Henry.	1254	100	100 00
Block, Henry.	1255	100	100 00
Block, Henry.	1256	100	100 00
Block, Henry.	1257	100	100 00
Block, Henry.	1258	100	100 00
Brumagim, Fred P.	A 52	70	70 00
Brumagim, Fred P.	1296	100	100 00
Brumagim, Fred P.	1297	100	100 00
Browne, George.	A 62	25	25 00
Birmingham, D. Walton.	1330	100	100 00
Birmingham, D. Walton.	1333	100	100 00
Connett, W. H.	133	100	100 00
Connett, W. H.	434	35	35 00
Connett, W. H.	unissued	214	214 00
Copp, B. A.	A 50	50	50 00
Davis, Geo F. M.	1283	100	100 00
Harriott & Noyes.	A 37	25	25 00
Harriott & Noyes.	A 38	25	25 00
Hoyt, E. P.	A 18	20	20 00
Hoyt, E. P.	A 19	20	20 00
Hoyt, E. P.	A 20	20	20 00
Jaques, Washington L.	A 63	1	1 00
Monroe, E. S.	A 5	20	20 00
Monroe, Sarah S.	1101	100	100 00
Olcott, Horatio L.	211	100	100 00
Patton, Wm L.	unissued	67	67 00
Rathborne, R. Wm.	441	2	2 00
Scott, Wm B.	1109	100	100 00
Scott, Wm B.	1110	100	100 00
Scott, Wm B.	1111	100	100 00
Scott, Wm B.	1112	100	100 00
Scott, Wm B.	1113	100	100 00
Scott, Wm B.	1114	100	100 00
Scott, Wm B.	1115	100	100 00
Scott, Wm B.	1116	100	100 00
Scott, Wm B.	1117	100	100 00
Scott, Wm B. & Co.	1104	100	100 00
Scott, Wm B. & Co.	1105	100	100 00
Scott, Wm B. & Co.	1106	100	100 00
Scott, Wm B. & Co.	1107	100	100 00
Scott, Wm B. & Co.	1341	100	100 00
Stryker, Wm S.	unissued	31	31 00
Woodman, Cyrus.	unissued	3	6 00
Watson, Augustus E.	unissued	300	300 00
Cowles, Joseph N.	1347	100	100 00
Cowles, Joseph N.	1348	100	100 00
Bernheimer, I & S.	1350	100	100 00
Bernheimer, I & S.	1351	100	100 00
Bernheimer, I & S.	1352	100	100 00
Bernheimer, I & S.	1353	100	100 00
Bernheimer, I & S.	A 74	37	37 00
Bernheimer, I & S.	A 75	50	50 00
Bernheimer, I & S.	A 76	50	50 00
Bernheimer, I & S.	A 78	13	13 00

And in accordance with law, and an order of the Board of Directors, made on the 16th day of January, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California, on Monday, the 19th day of March, 1877, at the hour of one o'clock P. M. of said day, to pay said delinquent assessment, together with costs of advertising and expenses of sale.

LEANDER LEAVITT, Secretary.
Office, Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.

POSTPONEMENT.—At a meeting of the Board of Directors of the Mariposa Land and Mining Company of California, held on March 6th, 1877

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,
SAN FRANCISCO, CAL.

Established for the Manufacture of
RAILROAD AND OTHER IRON

Every Variety of Shafting,

Embracing ALL SIZES of
Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

Hammered Iron of Every Description and Size.

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. Box 2032, San Francisco, Cal., will receive prompt attention. Office: 16 First Street.
The highest price paid for Scrap Iron.

THE RISDON Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,
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Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

Directors:

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Wm. Norris, Wm. H. Taylor, J. B. Haggins,
James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

THOS. PENDERGAST. HENRY S. SMITH

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and **MACHINERY**

OF ALL KINDS.

Fremont Street, Bet. Howard and Folsom

SAN FRANCISCO.

FULTON FOUNDRY AND IRON WORKS.

HINCKLEY & CO.,

Manufacturers of

STEAM ENGINES, Quartz, Flour and Saw Mills,

Hayes' Improved Steam Pump, Brodie's Improved Crusher, Mining Pumps, Amalgamators, and all kinds of Machinery.

N. E. corner of Tehama and Fremont streets, above Howard, San Francisco.

AMERICAN MACHINE

AND

Model Works

Experimental and fine Special Machinery, Dies, Taps, Punches, Reamers and other tools made to order. Planning, Gear Cutting, Machine Repairing, etc. Models and Patterns for Inventors promptly executed, in wood or metals.

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Between Sansome and Leidesdorff Sts., San Francisco.

SHEET IRON PIPE.

Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

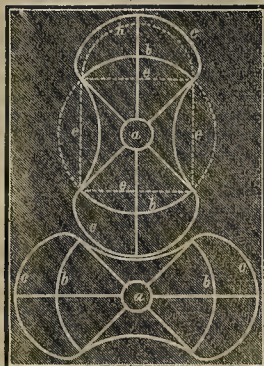
Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

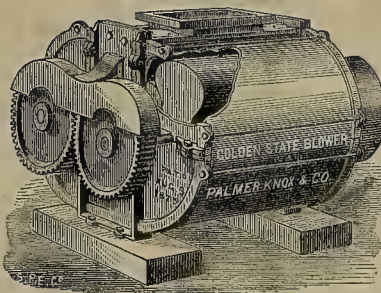
All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

GOLDEN STATE IRON WORKS, CO-OPERATIVE, FOUNDRY and MACHINE WORKS.



MINING
—AND—
MILLING MACHINERY
OUR SPECIALTY.



GOLDEN STATE SUCTION AND PRESSURE BLOWER FOR VENTILATION OF MINES. BLAST OR EXHAUST FOR FURNACES OR REDUCTION WORKS.

They have no superior. The casing is made in sections, so as to be easily accessible. They run easily, not rapidly, and the perfect contact of wings gives a uniform and powerful blast.

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Nos. 19 to 25 FIRST STREET, San Francisco, Cal.

THE ASBESTOS PATENT FIBER COMPANY,



TWO MEDALS OF HONOR.

TWO CERTIFICATES OF THE HIGHEST MERIT.

Of Philadelphia, offer for sale through their agent in San Francisco,

Asbestos Steam Packing, Asbestos Boards and Asbestos Steam Joints,

All manufactured from the pure utilized Asbestos Patent Fiber, and under patents granted to J. S. Rosenthal. The packing is in all sizes from one-quarter to three inches in diameter, round, and free from all grit or mineral matter. The non-utilized or crude Asbestos, manufactured by some parties into packing, is impure and gritty, liable to injure the piston rod and should not be used. The packing made under the Rosenthal patent heretofore offered for sale. It is compact in form, will not fuzz or disintegrate, and will wear much longer than any other kind of packing. The indestructible, expanding, contracting and lubricating qualities of Asbestos are now universally recognized, and packing made from it is peculiarly adapted for steam engines and pumps.

ASBESTOS PATENT FIBER BOARD.

This is the champion non-conductor, to prevent radiation of heat and condensation of steam, as covering for marine, stationary, or locomotive boilers and pipes, and for lining wood-work, where exposed to great heat. It is light, flexible, is not disturbed by vibration, and will not char or crumble. The sheets are 30 by 44 inches, of any desired thickness, and are easily applied.

ASBESTOS PATENT FIBER STEAM JOINTS.

Indestructible by fire or water, expands and contracts in a desirable manner, adjusts itself to any rough point, is cheaper than rubber, and in all respects a superior article. PURE ASBESTOS FIBER for packing steam governors and other purposes. All these goods are extensively used in the Atlantic States and give general satisfaction.

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107 & 111 Front Street.

PHILIP HINKLE,

SOLE AGENT FOR THE PACIFIC COAST,

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At the Hydraulic Elevator Works.

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First and Fremont Streets, between Mission and Howard, San Francisco, Cal.,
RANKIN, BRAYTON & CO.,

MANUFACTURERS OF

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING AND MINING MACHINERY, INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS, CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES, FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES, RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES, SUGAR MILL MACHINERY, WATER WHEELS, Etc., ALL OF THE LATEST AND MOST IMPROVED CONSTRUCTION.

Agents for the Allen Engine Governor, Cook's Boiler Feeder and Heater, Buckminster Rock Drills and Air Compressors, Wheeler's Ore Breaker, Etc.

GEO. W. FOGG, Supt.

HAWKINS & CANTRELL, MACHINE WORKS,

210 and 212 Beale Street, bet. Howard and Folsom Sts., - - San Francisco.

Manufacturers of

IMPROVED PORTABLE Hoisting Engines,
For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

PHELPS MANUFACTURING COMPANY,

Manufacturers of all kinds of
Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS.
HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,
SAN FRANCISCO, CAL.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

California Machine Works,
119 BEALE STREET, SAN FRANCISCO.

BIRCH, ARGALL & CO.,

Builders of QUARTZ, SAW AND FLOUR MILLS,

Keating's Sack Printing Presses,

THE ECONOMY HYDRAULIC HOIST FOR STORES,
And General Machinists.

CALIFORNIA BRASS FOUNDRY,
No. 125 First Street, Opposite Minna,
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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch.
J. H. WEED, V. KINGWELL.

SACRAMENTO BOILER WORKS,
37 Fremont St., cor. Mission, S. F.

HALL & KELSHAW,
PRACTICAL BOILER MAKERS,
Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.
Repairing promptly attended to at the lowest possible terms.

THOMPSON BROTHERS, EUREKA FOUNDRY,
Light and Heavy Castings of Every Description Manufactured.

Sole Proprietors and Manufacturers of
Lynch's Ventilating and Illuminating Tile,

The Only Illuminating Tile Manufactured for Lighting Cellars, Basements and Dark Rooms which provides proper ventilation for such places.

129 and 131 Beale Street,
BET. MISSION & HOWARD, SAN FRANCISCO

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BOILER MAKERS AND GENERAL MACHINISTS,
Howard between Fremont and Beale Sts., San Francisco

Miners' Foundry and Machine Works,
CO-OPERATIVE,

First Street, bet. Howard and Folsom, San Francisco

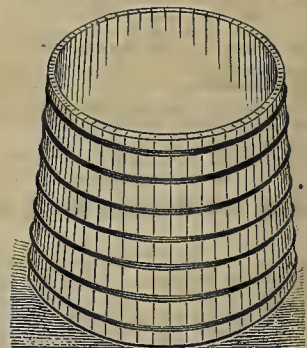
Machinery and Castings of all kinds.

SANBORN & BYRNES,



Mechanics' Mills, Mission Street,

bet. First and Fremont, San Francisco. Orders from the country promptly attended to. All kinds of Stair Material furnished to order. Wood and Ivory Turners. Billiard Balls and Ten Pins, Fancy Newels and Balusters.



WATER TANKS of any capacity made entirely by machinery. Materials the best in use; construction not excelled. **Pan Staves, Tubs and Oak Guides** for mining purposes a specialty.

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A CARD.

Pacific Iron Works, First and Fremont Sts., bet. Mission and Howard, San Francisco,
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Manufacturers of Engines, Boilers, Marine and Stationary. Pumping, Hoisting and Mining Machinery, including Batteries, Amalgamating Pans and Settlers, Concentrators, Ore Feeders, Crushing Rolls and Rock Breakers. Also, Water Jacket Smelting Furnaces for reducing Lead, Silver and Copper Ores, Quicksilver Furnaces, Retorts and Condensers, Roasting and Chloridizing Furnaces, Sugar Mill Machinery, Water Wheels, etc., all of the latest and most improved construction. Agents for the Allen Engine Governor, Cook's Boiler Feeder and Heater, Buckminster Rock Drills and Air Compressors, Wheeler's Ore Breaker, etc., etc.

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All classes of mining properties reported on, consultations had on reduction of ores of all descriptions, plans for furnaces and reduction works furnished, and the construction of them superintended. Ore tests made at the office.

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SEND FOR CIRCULAR. Address

MENZO SPRING,

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MINING MACHINERY DEPOT,

PARKE & LACY, 417 Market Street, S. F.

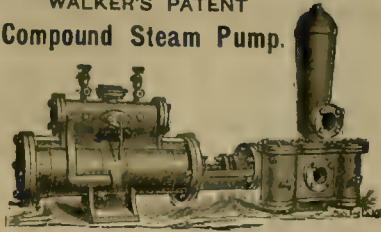
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Compound Steam Pump.

ECONOMY IN COST.
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POSITIVELY UNEQUALED FOR
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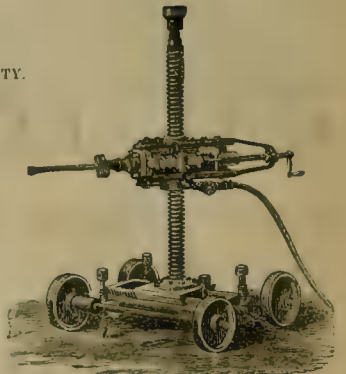
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Plunger Steam Pumps—Cope & Maxwell's.

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BUCKET PLUNGER PUMPS—WRIGHT'S.

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BATTERY FOR BLASTING—FARMER'S
EXPLODERS—HILL'S.

Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

VILLAGE HOOK AND LADDER TRUCKS,

Chemical Engines Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.

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H. P. GREGORY & Co., Cor. Market and California Sts.,
P. O. Box 168. San Francisco, Cal.

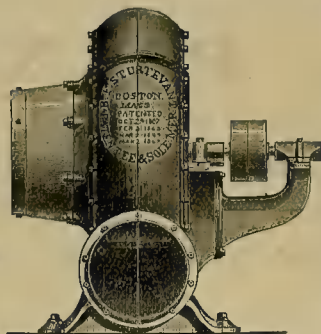
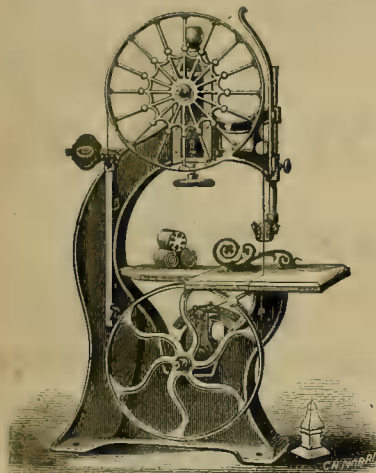
SOLE AGENTS FOR THE PA-
CIFIC COAST FOR

J. A. Fay & Co's Wood-
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Blake's Patent Steam
Pumps,

Tanite Co's Emery Wheels
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Fitchburg Machine Co's
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Sturtevant's Blowers and
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J.A. Roebbling's Sons Wire
Rope,

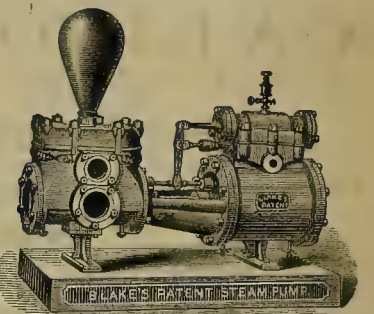
Pure Oak Tanned Leather
Belting,

Perin's French Band Saw
Blades,

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Nathan & Dreyfus' Glass
Oilers, and Mill and
Mining Supplies
of all Kinds.

BLAKE'S PATENT STEAM PUMP.



Over 8,500 in Successful Use in the United
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PATENTED

CAST STEEL SHOES
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Guaranteed Cheaper than the Best Iron.

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Reduction in Price from 16 Cents
to 12 Cents Per Pound.

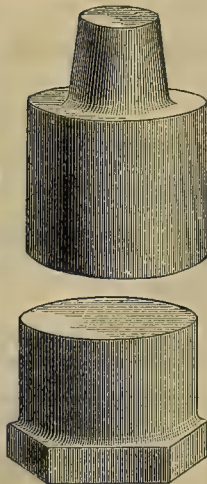
Owing to our largely increased business, the present
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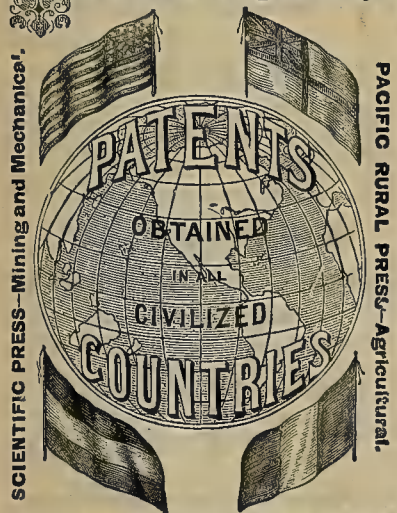
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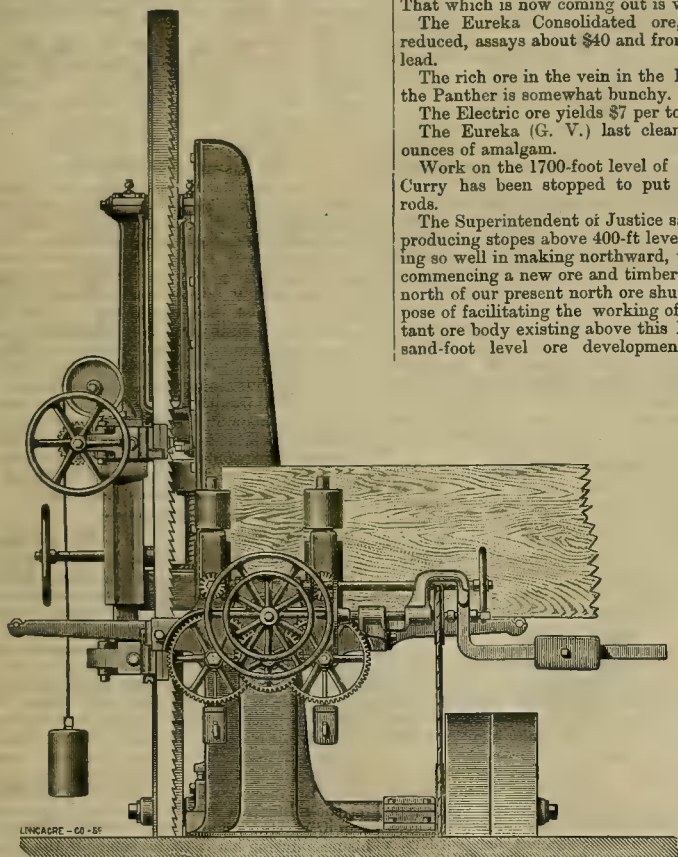
SAN FRANCISCO, SATURDAY, MARCH 31, 1877.

VOLUME XXXIV.
Number 13.

Band Saw Re-Sawing Machines.

The illustrations shown on this page represent a new band saw re-sawing machine, built by Richards, London & Kelley, the well-known band saw machine manufacturers. The cuts show two views (two elevations) of the machine and give a pretty good idea of its mechanism.

The frame is cast in one piece, with a rectangular cored section. The wheels are 60 inches in diameter, of wrought iron, covered with wood, and faced with leather or gum, warranted to stand the tension of blades to three inches wide, and safe from centrifugal strain. The top wheel has a vertical adjustment of 16 inches, and is carried on a steel shaft 2½ inches diameter, with bearings on both sides of the wheels. The supports rest on



Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city.

The ore breasts in the California are looking well and yielding the usual quantity of good ore.

The ledge matter of the Coso Consolidated averages two feet in width. The vein in the Gila mine shows marked improvement in the past few days, both in ore and the quality of the vein matter. It is not carrying any more ore, but in every other way looks more encouraging than it has for some time past.

At the Cosmopolitan they are sinking a winze on the ore body discovered in the main tunnel. The rich rock in the Mansfield still holds out. That which is now coming out is very rich.

The Eureka Consolidated ore, now being reduced, assays about \$40 and from 18% to 20% lead.

The rich ore in the vein in the lower level of the Panther is somewhat bunchy.

The Electric ore yields \$7 per ton.

The Eureka (G. V.) last clean-up was 285 ounces of amalgam.

Work on the 1700-foot level of the Gould & Curry has been stopped to put in new pump rods.

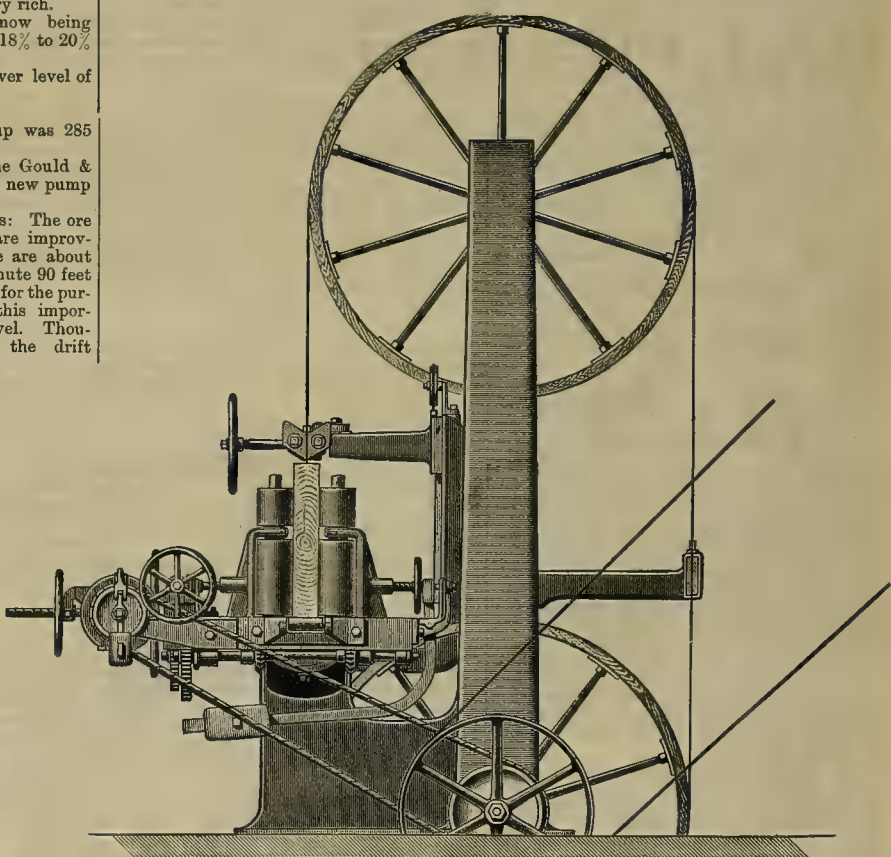
The Superintendent of Justice says: The ore producing stopes above 400-ft level are improving so well in making northward, we are about commencing a new ore and timber shute 90 feet north of our present north ore shute for the purpose of facilitating the working of this important ore body existing above this level. Thousand-foot level ore development, the drift

The Mining Interests of Idaho.

The quartz mining interests of Idaho have for a long time been under a cloud, and the difficulty of overcoming the popular prejudice against Idaho mines has worked great hardships to the miners. It is but just to remember, however, that this feeling has been caused more by the action of the managers of the mines than by reason of any lack of confidence in the mines themselves. The stocks of those mines which have been listed in the boards in this city, have been made shuttlecocks of and thrown about to suit the whims and schemes of the managers. The practice became so outrageously bad that the public here came at last to look upon Idaho stocks as so many assessment

thought more of stock operations than of legitimate mining.

The placer mining interests of the Territory, which are much larger than most people suppose, although not so important as in former years, are looking up. The winter has been so dry that the miners have been despondent and the outlook has not been very flattering. Of late, however, prospects are much better for a good season. A correspondent of ours, writing from Boise City under date of the 19th inst., says that the heavy rains of the two weeks from the 3d of March have resulted in furnishing a good supply of water on the ground and will secure a good crop in the valleys; while in the mountains there has been a heavy fall of snow, and now the miners think they will have an average if not a long mining season. Mining has been progressing in the Boise basin for for some ten days with a full force, thus getting



RICHARDS, LONDON & KELLEY'S BAND SAW RE-SAWING MACHINE.

springs that equalize the tension on the blades, and allow them to expand or contract. The machine receives saws to 32 feet in length and three inches in width, and is calculated to cut lumber ten inches thick and 24 inches wide. Messrs. Burnham, Standeford & Co., of Oakland, recently put one of these machines into their mill. This machine has re-sawed 10,000 feet of lumber in a day of ten hours run. Berry & Place of this city are the manufacturers, agents, and will give any further information to those desiring it.

WHAT water the miners on the divide have this season, says the Placer Herald, is being used to good advantage. The drift claims in that region were never looking better than at present, and the discount in the yield of the hydraulic mines, in consequence of the limited supply of water, will be largely made up by the increased yield of the drift mines.

A MEETING of oilmen was held at Lyons station, Los Angeles county, on Saturday, in reference to the taking up of mineral lands by squatters. Notification was sent to the latter to vacate the same immediately or summary steps would be taken to eject them.

following the same south continues to expose a very promising vein, plainly indicating a bright future.

The water in the C. & C. shaft is coming in very strong.

Average assay of Chollar ore is \$25 to the ton.

Work at the various prospecting points of the Raymond & Ely mine is progressing satisfactorily without any marked change. The 30-stamp mill will start up on tailings in a few days.

The Barcelona tunnel is now in 813 feet.

In the Manhattan the 500-foot west drift continues in very hard rock, with no ore. The stope above still carries very good ore near the 434-foot level. The upper stopes on the 370 and 300-foot levels are producing a limited quantity of ore. The 560-foot east drift carries a small ledge of fine ore.

THERE is quite an excitement in Salt Lake City over the discovery of a silver-bearing mining ledge in Red Butte canyon, about three miles from the city. It is claimed to assay over 300 ounces of silver to the ton, and there is quite a stampede from that town to the vicinity of the discovery.

machines, and nobody would have anything to do with them. When these stocks became comparatively worthless from the effects of these actions of the managers, and the people refused to pay any more assessments, the trustees shut down the mines and let them lie idle; they found it less expensive to make money out of assessments than working the mines legitimately.

This action was of course very detrimental to the mining interests of the Territory at large but more particularly so to the towns and the miners at the mines. When several prominent mines in a camp shut down or fail to pay wages owed, and are temporarily abandoned, it must naturally depress all kinds of business in the vicinity. This state of thing lasted some time, and there was some difficulty with the miners on account of non-payment of wages; but now several of the mines have been started up again and under changes of management better things are hoped for this year. There is little doubt that if the Owyhee mines were situated somewhere else they would command much better figures and would be worked more vigorously; and this simply on account of the reputation they have unfortunately acquired through the machinations of persons who

about six weeks' earlier start than usual. Now the outlook for Idaho is good for the coming season. This shows how a few days' rain will change the prospects of an entire country and shows also that it is not California alone that is affected by dry seasons.

MINE PATENTS.—The patents for the Cerro Bonito quicksilver mine has been sent from Washington. Their issuance has been delayed several years by McGarrah's patent, claiming that these mines were within the inferior boundaries of the Panoche Grande ranch. Ex-Senator Stewart and William Neely Thompson are daily working at the Interior Department to secure the issuance of a patent to the New Idria company for the quicksilver mines now in their possession. Their efforts are combated by McGarrah and his attorneys, who insist that no patent should be issued for this property until the question of rightful ownership shall be again submitted to the courts and finally adjudicated, by means of a Government suit against the present occupants, with the right for McGarrah to interplead, as proposed by a resolution which some years ago passed the House of Representatives by nearly a unanimous vote.

CORRESPONDENCE.

Mining in Beaver County, Utah.

EDITORS PRESS:—After leaving the terminus of the Utah S. R. R. at York, a ride of 140 miles by stage (the Gilmer & Salisbury line) brought us to Beaver City, which is from 20 to 50 miles of Bradshaw, Star and San Francisco districts, the principal fields of the most active mining operations.

Good ore and promising veins have been found also in Lincoln, Rocky, Beaver Lake, Preuss and Granite mining districts, many of which will be favorably heard from when better facilities are provided for reduction and shipment of ores.

Limestone may be set down as the characteristic country rock, but not unfrequently found in near contact with porphyry, syenite, granite, hornblende or some kindred formation, which in some instances are known to form one or both walls of the lodes. The general character of the ore is plumbiferous and ferruginous, carrying fair values in silver, so that furnaces are more in demand than mills, although instances are not wanting where a comparatively free milling fluor spar, or some similar gangue, running high in silver, has been found lying side by side in the same mine, with the ever present carbonate of lead.

The Cave Mine.

Situated seven miles from Minersville, in Bradshaw district, has been opened by a tunnel 320 feet in length, attaining a depth from surface of 200 feet. The ore body for 80 feet in depth below the cave entrance is averaged at 100 feet in length by 80 feet in width, varying at other points from two and a half to six feet, the full width of the lode from wall to wall not yet ascertained, although good ore has been found thus far in all the levels opened.

The matrix in this case is a decomposed quartz, easily mined and milled, averaging \$50 in gold and silver. Some of it is of very high grade, giving assays of \$3,000 per ton; one lot of 10 tons working up to \$402 per ton. Prospecting is now going on at the 200-foot level, where a streak of carbonate ore has been struck, estimated to run \$160 in gold and silver and 30% in lead. This is one of the leading mines of the district and looked upon generally as a very valuable property. In the same vicinity, the Promontory may be mentioned among the promising claims, having furnished some ore running as high as 60 ounces in silver and upwards of 60% in lead. Good accounts were had of the Chancy, the Emeline, the Mountain Maid, and others, some ore from the last named represented to have run as high as \$200.

Mines of Star District.

The Burning Moscow, owned by Messrs. Taylor, Golden & Co., one mile east of Shauntie, appears to be a contact vein, lying between the white and black limestone. The lode has a beautiful, smooth foot-wall, and is about four and one-half feet in width, with average ore vein of 15 inches of carbonate and oxide of lead, which is paying a profit of about \$25 per ton. There are also in connection with the mine five side veins putting into the main lode from the west, where they are cut off by the hard magnesian limestone on the east wall. All these feeders, which are from 18 inches to two feet thick, are producing ore of a similar but richer character than that of the mother lode, some first-class working up to 150 ounces in silver and to 60% in lead.

The Boston, a few hundred yards from the above, shows at the foot of shaft and in two drifts from same a fair body of smelting ore, running from 40 to 50 ounces silver and 50% lead. The tunnel already advanced over 300 feet, is expected soon to tap the vein. It is straight as an arrow, and for neatness and finish could not be better.

The Sarsfield, just above the Boston, yields some high grade ore, the lead running 60% and first-class as high as 80 ounces in silver.

The Wasco

(Elderman, Kimple & Co.), two miles from Shauntie, near the Picacho peak, was first opened by incline on vein of 270 feet, and afterwards tapped by tunnel 170 feet. The ore is from three to six feet in thickness. The whole is extracted and smelted, giving a general average of 60% lead and 72 oz. silver. It has paid \$20 per day to the man from surface down, most of the ore coming from the incline. In addition to considerable bodies in sight the lower works were giving indications of a near approach to some rich chimneys, previously cut by the incline.

Immediately below the Wasco the Mountaineer exhibits a large body of iron, ochre and carbonate ore, some of which has been shipped, bringing from 20 oz. to 60 oz. silver, and from 30% to 40% lead. The Harrisburg belonging to Messrs. Sloan & Kimple, has an incline 200 feet, on a vein of carbonate ore, represented to look well at the bottom. One hundred and fifty tons have been shipped, first-class, \$180 silver and 60% lead.

The St. Marys, south of the Wasco, owned

by Messrs. Barrett, Taylor & Shumer, has had a considerable amount of good ore extracted and is looked upon as a promising prospect.

The Mammoth

(Walker & Co.), is admirably located for convenient working by tunnel levels, on the crest of the mountain near the center of the district, north and south. The greatest depth attained by shaft is 342 feet, where the ore vein is eight feet; character, argentiferous galena, averaging 52 oz. silver and 55% lead; first-class going as high as 111 oz. silver and 72% lead.

Owing to the difficulty of hoisting the ore by windlass, a tunnel is about being run to tap the lode at the foot of the shaft. Any desired number of levels can be extended along the vein in the same direction, beginning at different points on the side of the mountain where the lode can be seen boldly cropping out.

This may well be viewed as one of the leading mines of the district, surface indications in connection with present developments, giving promise of leading to much larger and better defined bodies of ore, than any yet encountered. It has paid from its opening in 1875; and while the owners have been far from realizing the full amount, the gross value of ore yielded during that time has been put down in the neighborhood of \$100,000. The Elephant, lying north of the Mammoth, has two shafts, the deepest 150 feet; ore often found in large bodies in pockets and chambers. Over \$10,000 worth was purchased at one time by Shumer & Co., the product of a single month. For reasons not learned but little was done last year, but arrangements are now being made for a vigorous prosecution of the work.

The Croesus.

In North Star, the property of Mr. H. M. Donaldson, has a shaft down 70 feet, and a 40-foot drift. It is understood to be a late discovery of very great promise, the ore consisting mostly of chloride and black sulphurets of silver, giving assays as high as 6,000 oz. and upwards, and 64% lead. A small lot worked 1,500 oz. in silver, and the owner is sanguine enough to think the ore will average something near this amount, besides running from 50% to 60% in lead. If so he may consider himself already "as rich as Croesus," and prepare at once "to retire to private life."

The Vicksburg.

Owned by Shumer, Donaldson & Cook, is a true fissure vein in the granite, some eight feet wide, with ore from two to five feet; the ores, galena, carbonate and iron intermingled with some bunches of pure sulphur, running from 60 oz. to 70 oz. silver, for first-class, and 70% lead, and second-class 40% to 50% lead. The mine has more than paid its way, leaving at present a good body of ore in sight, extent not known, that is growing larger and richer as depth is attained.

The Hoosier Boy.

Owned and worked by Shumer & Co., and by Mr. John Andrew, who holds a fourth interest. One shaft 240 feet, besides three others, all connected by levels on the vein. In addition to the carbonate ore, a sufficient amount of iron is found to render it valuable for smelting.

About 2,000 tons have been extracted within the past three years, mostly from the surface to the depth of 100 feet and slope of 300 feet in length. Since June last, the ore has averaged 50 ounces silver, and something upwards of 45% lead.

Not including some dead work in the way of developments, \$12,000 worth of ore was taken out from August 1st to December 1st, 1876, at a cost not exceeding \$1,500. So that this also may be classed among the good paying mines of the district. Before passing to a new field, it may be well to mention in this connection, that Shumer & Co. have a neat furnace at Shauntie, of one stack, large size, with a superior condensing chamber for saving the dust. Its capacity is 20 tons per day, is doing a fine business and a necessity to the camp not to be dispensed with.

Copper Mines, Beaver Lake District.

It is understood that six claims are at present being worked, the ore running from 20% to 30% copper, 20 ounces silver and one ounce in gold. Forty tons, selected and sold, went 30% copper, 40 ounces silver and one and a half ounces in gold. One claim is represented to have 100 tons on dump, and considerable activity was being displayed, in consequence a contemplated erection of concentrating works.

Some of the Mines of San Francisco District.

Two very promising claims, the property of Messrs. Adams & Stokes, are located in what appears to be a species of horn-blende, and have both paid a profit. The Cerro Gordo has shipped \$5,000 worth of ore, which usually runs from 55 to 100 ounces in silver, first-class going from 265 to 300 ounces—a chloride and milling ore. It has been laid open at several points on the side of the mountain by cuts, showing ledge matter 30 feet in width, but as yet no well defined lode. The Minnesota is in all respects similar. Favorable results may be looked for when the vein is reached at a depth of 100 feet from surface by a tunnel which they are now driving.

The Mountain Maid, (Mulcoy & Ritchie), was opened two years ago by a shaft 50 feet, some ore shipped at that time, brought 130 ounces silver and 68% lead, 12 sacks selected ore as much as 500 ounces. An incline is now being run on vein, which shows two feet of fine looking ore.

These mines, together with the Portage,

Monahan, Snort, Gray Eagle, the Drum & Mahoney, and others of more or less promise are situated on the opposite side a high ridge and two miles from

The Great Bonanza

Of the county, which towers so far above every other mine in this and surrounding districts, as to cast a shadow over what might otherwise have been stars of no small magnitude. The Mono, the Ira, the Crismon, Mammoth and other mines of Utah have richer ores, the Comstock and Richmond of Nevada may have larger chambers, but in some respects, more particularly in the great uninterrupted, evenly paying, compact character of its immense, and as yet unknown ore body, it will, unhesitatingly, bear favorable comparison with the best mines of the continent, for so far as developed, neither break, nor fault, nor horse of country rock, with scarce a vestige of waste gangue has made its appearance to mar the beauty, symmetry and uniformity of the great ore deposit.

It is situated at Grampion and is known as

The Horn Silver.

The property of Messrs. Campbell, Byrom, Ryan and Cullen, the first mentioned having the management of the furnace, while the last has charge of the mine.

It has been opened by shafts to the depth of 150 feet. A level of 300 feet in length has been run at the depth of 100 feet from the surface, and another of 100 feet and upwards at the depth of 150 feet. A cross drift from the upper level, running easterly 40 feet, struck the porphyry, the first and only indication of a wall yet found, the shafts, levels and drifts having all passed through a solid and continuous mass of ore. A cross drift from the lower level has been extended 70 feet on the east side without reaching the wall. It is positively ascertained from the developments, that the ore body is 300 feet in length, over 40 feet in width and 150 feet in depth, with a solid mass of ore at the bottom, throughout, at each end and everywhere except at the single point in the 100-foot level where the porphyry was found. So that it is impossible to form, as yet, anything but a very imperfect conception of its length, breadth and depth. The ore so far extracted and worked (no waste), has averaged 33 ounces silver and 50% lead, the last 500 tons going as high as 35 ounces silver and from 45% to 50% lead. In addition to the smelting ore there is a considerable body of milling ore in portions of the mine with quartz and spar as the matrix, frequently rich in horn silver, and rated at \$250 per ton. Work was commenced about a year ago, since which 2,600 tons have been extracted, worth at Salt Lake City, \$48 per ton, giving a yield of nearly \$125,000. Taking the figures and the measurements as above given, as a basis of calculation, it leaves us with \$10,000,000 in sight, with not less than \$4,000,000 thrown in which can be set to account of mining, smelting and incidentals. The ores are reduced principally at the furnace of Ryan & Co., at Frisco, one mile from the mine and some of them probably at the furnaces at Shauntie and Milford. The extensions, as a matter of course, are all taken up, but as they had not been developed to any great extent, none of them were visited.

The Young America.

About 1,000 feet south of the Horn Silver, owned by Messrs. Jones, Ritchie and Enaberry, has a shaft 60 feet deep, following the ore all the way. This vein is small, but said to be widening. Ore assays, 26 ounces silver and 79% lead. A tunnel has been run with the view of tapping the lode. It has been extended 130 feet and has about 80 more to run.

The Grampion.

Belonging to Messrs. Ryan & Hawkes, and, I believe, the original owners and discoverers of the bonanza, lies several hundred feet southwest of the same. They have a shaft 140 feet and four feet of carbonate ore, running 50% in lead and 30 ounces in silver.

From this brief and imperfect sketch of the mining operations of the county, it must be evident that she contains within her boundaries vast resources in the way of mineral wealth. As soon as the railroad reaches her borders, a new impulse will be given, capital will flow in, mills, furnaces and all the necessary facilities for extracting and reducing the ores will be supplied, and her bullion product (it is safe to say), increased a hundred-fold. Yours, A. C. K.

Globe District, Arizona.

EDITORS PRESS:—The furnace of Messrs. Bebee & Kenedy started up March 6th. The furnace is modeled after the English copper furnace. The works cover about a quarter of an acre of ground and are very substantially built. The Superintendent is Mr. E. O. Kenedy. Mr. Jennings is running his Mexican smelter on ore from the Richmond basin; from all accounts he is working very successfully. Tidwell's mill from Silver City, Nevada, arrived in McMillan's camp about two weeks ago. It is a five-stamp mill. Mr. Tidwell, the Superintendent, is busily engaged erecting the mill. He expects to blow the whistle and start the stamps in about three weeks. Messrs. Stockman & Currier are erecting amalgamating works at the Wheatfields. They intend to grind in arastras and amalgamate in barrels. Their works will have a capacity of one ton per day.

They have got over 150 miner's inches of water to run their wheel.

McMillan's Camp.

McMillan's camp is situated in Globe district, about 20 miles from Globe City. There is plenty of wood and water there. The mines are situated in low, undulating hills, which are of a granite formation. The principal veins run northeast by southwest intersected by many counters and cross courses which are very small, but yield very rich ore.

The Evening Star mine, shaft 25 feet deep, three feet of vein matter, width of vein unknown. Average assays of ore body in sight 150 ounces per ton, owned by James Aikens. The Hannibal mine on same ledge. Open cut on ledge. Vein 60 feet wide. Pay streak six feet. Average assays 100 ounces per ton. Owned by Yager & Co.

The Stonewall Jackson mine on the same ledge has a tunnel on vein 30 feet in. Expects to cut ledge at 40 feet. Small stringers of rich ore to be seen in face of tunnel. Shaft down on ledge 34 feet. Width of shaft in ore. Width of body unknown. Average assays run from 40 to 60 ounces per ton. Owned by McMillan, Harris & Co.

The Little Mac mine ledge is a counter from main ledge. Open cut on vein 20 feet deep. Vein 18 inches wide. Assays \$2,000 per ton. Owned by McMillan, Harris & Co. The Democrat mine is an extension of the Little Mac. Shaft 12 feet deep. Vein 18 inches wide. Assays 200 ounces per ton. Owned by McMillan, Harris & Co. The Florence vein is a counter from the main ledge. Shaft 35 feet deep. Vein 18 inches wide. Assays 100 ounces per ton. Owned by Charles Williamson. The "440" mine is on the same ledge. Tunnel cuts the ledge 60 feet deep. Vein 13 inches wide. Assays 50 ounces per ton. Owned by Palmer & Williamson.

The Awalden mine has a shaft on ledge 25 feet deep. Vein four feet wide. Average assays 160 ounces per ton. Owned by Yager, Richard & Co.

Pride of the West has a shaft on ledge 13 feet deep. Vein two feet wide. Average assays 120 ounces per ton. Owned by Yager, Richard & Co.

Two small feeders which are stringers or feeders to the American ledge on the Stonewall Jackson mine, contain very rich ore. Width of Feeder No. 1 eight inches. Average assays, \$2,500 per ton. Width of Feeder No. 2, six inches. Average assays, \$4,000 per ton.

The Ores of Globe District.

The ores of Globe district may be divided into four classes. First, free milling ores—ores containing chloride, bromide, and iodide of silver, and surface or desulphurized ores, which yield their silver by raw amalgamation very well; second, from ores containing silver which do not work well by raw amalgamation; third, cupiferous ores—ores containing sulphur, carbonic acid, silicium, arsenic, consisting of gray copper ore; tennantite and bournonite which require to be roasted to be treated successfully; fourth, ores containing lead—as a carbonate, as a sulphide, oxide, silicide, silicate, which, owing to the small amount of lead they contain, would be better beneficiating by roasting. No smelting ore is to be found in the district.

THOMAS P. GILMORE.

Globe City, Arizona, March 10th, 1877.

MAKING RUSSIA LEATHER.—The following story of how our late Minister to Russia discovered the method of manufacturing the celebrated Russia leather is a good one, if true, as told in the New York Tribune: When General Jewell was Minister in Russia he visited the tanneries of that country and found out the secret in the use of birch bark tar, with which the skins are dressed, in place of tallow and grease, the latter substances being so largely used for food by the lower classes. This tar, which is carefully saved as it exudes from the wood when burned, was first used as a substitute for wheel grease in Russia, as it is to this day, and then for the filling and dressing of skins. By a system of careful inquiry and literally following his nose during his visits to some of the great Russian tanneries and curriers' shops, Mr. Jewell found this compound in a great kettle ready for use, and thus the mystery was solved. It is not expensive, costing but about \$10 a barrel, and he immediately ordered 10 barrels and sent them, with instructions, to various leather manufacturers in this country. The result is that genuine Russia leather goods are now made in America, and doubtless will soon be sold at nearly 50% below former rates.

BRASS BEARINGS.—Brass for journal boxes, according to an exchange, should be made as follows: Take 10 pounds of copper, one and a half pounds tin, and one half pound spelter. Cut the copper into thin slips, and plunge into the other metals while in a state of fusion. Another process is to melt the copper first, and plunge beneath its surface lumps of zinc held in iron tongs. If it were attempted to melt the metals together, the zinc would be in a great part consumed before the mixture reached the high temperature required to melt the copper; and yet these metals combine so readily that copper is sometimes converted into brass upon its surface, merely by the fumes of the burning zinc. A layer of fine charcoal placed upon the melted zinc protects it from the atmosphere, and reduces this loss to the least amount. The usual composition of brass is in the proportion of two parts by weight of copper to one of zinc.

SCIENTIFIC PROGRESS.

Assaying for Coinage.

An address was delivered at a recent meeting of the Franklin Institute at Philadelphia, by Outbridge, on "Metallurgy and Assaying of the Precious Metals for Coinage." An abstract is given by the *Polytechnic Review*, from which we quote a few points:

Silver is received at the mint in the form of bars, pigs, dore bullion, coin, old plate, photographer's waste, etc. It often contains a variety of base metals, which destroy its ductility and color, and render it unfit for coin. The usual way of eliminating these impurities is by means of oxidizing fluxes with borax to dissolve the oxides of the base metals. The precious metal is then ready for the process of refining by nitric acid, to separate the gold, as practiced in the mint at Philadelphia. In most of the foreign mints, and at the assay office in New York, this "parting" is effected by means of concentrated boiling sulphuric acid in cast-iron kettles. In the former case the nitrate of silver is precipitated in a large tank holding 1,200 gallons, by salt water, the nitrate of soda formed is drawn off, the chloride of lead is reduced, by granulated zinc, to the metallic size; it is then pressed into large "cheeses," dried, melted in sand pots and cast into bars, or the requisite proportion of silver added for coin.

The most modern discovery in the refining of gold and silver is by the direct application of a stream of chlorine gas through the metal while in the molten state. The chlorine unites with the base metals, forming volatile chlorides which pass up the chimney. The chlorides of silver and copper are prevented from volatilizing by a protective covering of melted borax, and having a lighter specific gravity than the molten gold, they rise to the surface. The pot is then removed from the fire, the gold is allowed to "set," and the chlorides of silver and copper poured into molds. The "king" of gold is then turned out nearly pure, and the silver is reduced in the ordinary way. This method was devised by Prof. Miller, of the Sydney mint, Australia, to recover the silver contained in the native gold of that country (often amounting to as much as 14%).

The delicate processes of assaying the precious metals were described in detail and illustrated by actual analyses. The sample of gold or silver cut from the bar is carefully weighed upon a balance sensitive to the twentieth of a milligramme. The normal weight used for gold assay is the half gramme; this weight is decimally divided down to the ten-thousandth degree. A weight of pure silver is added, to make the proportion approximately two parts silver to one part gold. The alloy is enclosed in an envelope of pure lead, melted in small bone-ash cups in the muffle of a furnace. The base metals are converted into oxides, which, being much more fluid than the melted precious metals, sink into the pores of the cupel. When the button has "flashed" it is removed from the cupel and weighed; this gives the proportion of base metal. The button is then laminated, rolled into a "cornet" and boiled in nitric acid. The silver entirely dissolves, leaving a roll of pure gold. The difference between the weight of the gold cornet and that of the base metal, less the amount of fine silver added, is the proportion of silver originally present in the sample. The object of adding fine silver is because the atoms of gold would otherwise cover up and protect the silver were it not in excess.

The fire or "dry" assay is not well adapted for silver, owing to its volatility; hence the humid process invented by Gay Lussac, is employed. This is at once the most delicate and accurate process of analysis known to chemical science. In order to obtain a true sample of the metal to be assayed, a small "dip" is taken from the melted mass and poured into cold water, forming granulations. This is important, as alloyed silver segregates, on cooling, into richer and poorer alloys within certain limits. The weighed sample is dissolved in nitric acid, and a charge of salt water is added. The solution is prepared of such a strength that the pipette (holding 100 grammes) shall precipitate one gramme of pure silver. This solution is called the "normal salt solution." The bottle is agitated for a few moments to settle the precipitate. A decimal salt solution, one-tenth of the strength, and one-hundredth the volume of the normal solution, is added. If any silver remains, a cloud will form on the surface of the liquid, and the precipitate will be equivalent to one-thousandth of a gramme. In this manner the proportion of pure silver in a given weight of alloy is rapidly determined without weighing the precipitate. So accurate are these methods that the value of thousands of dollars is calculated from the assay.

A TRANSIT VISIBLE IN CALIFORNIA.—*Nature* says: The next transit of Mercury across the sun is to take place on May 5th, and is to be visible in California. MM. Andre and Sugot, already celebrated by their work on the last transit of Venus, ask of the Academy that they be placed in charge of future observations. Up to this moment they have continued their studies of the physical conditions of the phenomena which they have so well re-commenced at the observatory.

The Distribution of Animals.

The distribution of animal life, says the *Journal of Chemistry*, is one of the most interesting subjects within the domain of the naturalist. At first thought, the law of distribution seems to be a simple one. "It was long thought," as Mr. Wallace remarks in his recent work on the subject, "and is still a popular notion, that the manner in which the various kinds of animals are dispersed over the globe is almost wholly due to diversities of climate and of vegetation." But it does not require a minute knowledge of the productions of the earth to show us that this is not the case, for countries very similar in climate and physical features are found to have very different fauna. To quote a few of Mr. Wallace's illustrations:

"In the equatorial parts of Africa and America, for example, where very similar conditions of climate exist and the soil in both regions bears luxuriant forests, elephants, apes, leopards and guinea-fowls are found in the former, while in the latter their places are occupied by tapirs, prehensile-tailed monkeys, jaguars and toucans. Again, while in reference to climate and soil, a striking similarity exists between parts of South Africa and Australia, the one has lions, antelopes, zebras and giraffes; the other kangaroos, wombats, phalangers and mice. Certain districts of North America closely resemble many parts of Europe in soil, climate and vegetation, yet the former have raccoons, opossums and humming-birds; the latter their moles, hedgehogs and true fly-catchers."

The problem is not then so simple as it appears on the surface. Other factors than those of climate and vegetation must be involved, prominent among which is the relation of the existing life of the globe to its past life as illustrated by fossil remains. The geologist must here come to the aid of the zoologist, and the field of study must be widened to take in not merely the earth as it now is but the successive stages through which it has passed in the vast periods whose history is written in the "great stone book" of nature. The present distribution of animals according to Mr. Wallace, is the final product of all the revolutions in organic and inorganic nature which have taken place on the earth from the earliest geological ages.

Filtering Metals.

Professor Lampadius, Frieberg, concluded that at a certain low temperature of fusion the metallic impurities present in the more easily fusible of metals would separate, partially as such and partially as definite crystalline compounds, and float in the fused mass, from which they could be removed by filtration. Experiments by him in this direction were so far successful that the expected definite compounds were found upon the filter, but the metallic filtrate was still very impure. The filter was made of quartz, sand, slag, etc., which was not wet by molten metal. Curter, however, according to a communication by him, in trying to adapt this principle to the purification of Bohemian tin, of a commercial scale, sought for material for a filter which would be wet by the metal to be purified without being dissolved in it. Iron, with its comparatively high temperature of fusion, and its affinity for tin, as manifested in the tinning of iron, was employed for a filter; 500 strips of tinned iron, as thin as paper, about 6-10 inches long, and one-fourth inch broad, were packed tightly in a square iron frame by the aid of wedges, and the frame was then luted into a suitable opening in the bottom of a graphite crucible. The tin, melted in a second crucible, was allowed to cool until the separation of fine crystals on the surface was noticed, and thickening metallic mass was then poured into the filtering crucible, when the still pure metal passed through, and a pasty magna was left, in which iron, arsenic, and copper, concentrated to a great degree, were found combined with the tin, while the filtered tin proved to be almost chemically pure. Fifty hundred weight were purified in the crucible described. Other forms and other materials for filters are suggested, and other possible applications of the method, and in the separation of silver from lead containing the former metal.—*The Engineer*.

ALCOHOL FROM BEET LEAVES.—Pierre, assuming that the sugar found in the beet root must be elaborated by the leaves, has examined these leaves for sugar. Owing, however, to the difficulty of preparing the sugar as such, he subjected the juice expressed from these leaves to fermentation, and from the alcohol obtained, estimated the quantity of sugar. The leaves employed were collected in November, and weighed 158 kilograms. They yielded 34 to 35 liters of juice, which after fermentation, gave 275 cubic centimeters of alcohol of 68 per cent. Calculating from these data, each hectare of land would furnish about 173 liters of absolute alcohol, as a minimum.

A NEW IDEA IN PAPER.—The *Papier Zeitung* remarks that it would be an advantage if wall papers could be had which would adapt themselves to the degree of illumination, becoming darker with a greater brightness, and brighter as the darkness increased. The proposal has been made to coat the walls of rooms with oxalate of copper, which becomes dark in light, and bright again in darkness. By combination with other colors wall papers might be obtained which would present an agreeable variation in colors.

MECHANICAL PROGRESS.

Hanging Shafting.

Jesse Lord, in the *Polytechnic*, gives the following hints on putting up the shafting in a machine shop: When a proper building is provided, the hanging of the shafting should be intrusted only to a competent man, one who can previously plan the location of every machine on the floor, and the position of every pulley on the main line, if not also on the counters. Then he can know just where his hangers or brackets should be, to best sustain the weight of the heavy pulleys, and the proper intervals between them, to prevent sagging of the shaft when at rest, and its springing when in motion. If the shaft is supported by brackets on posts, an approximation to a level may be made by stretching a chalk-line along the posts and designating the top or bottom of the brackets, or the center line of the shaft on the posts. Although the line, if stretched a considerable distance, will sag some, it will be a sufficient guide for the boring of the bolt-holes. The rectification of this line can be effected, after the boxes are placed, by means of a water level—a sighting level, or some similar device—the eye being entirely reliable in testing a right line, although not trustworthy as to level. To ascertain the level, a straight edge, of good seasoned pine, planed accurately on both edges, strictly parallel, and wide enough to prevent sagging, and long enough to reach from one box to the next, should be provided. In use, one edge should be rested in the boxes, and on the other should be placed a spirit level. This is a simple, but effective device. Of course it is equally applicable to hangers and brackets.

Shims for leveling down hangers should be of wood, not leather; a yielding material, not iron wedges, generally made too narrow to give a good bearing. Probably nothing is better than seasoned, rived, cedar shingles, which are almost as hard as horn. Bolts to hangers are perhaps necessary for very heavy shafting, but they have been largely superseded by lag screws, or, as some call them, coach screws. If bolts are used the heads should be slightly convex, strengthened by washers under the head, and both washer and head partially sunk into the floor. When lag screws are used the holes for their reception should be bored only as large as the core of the screw, leaving the thread to make its own way through the wood.

Shafting is continually getting out of line or of level, from one cause or another; the walls of the building may settle, or the floor may be depressed in one spot by an unusual weight; a heavy strain by a belt may cause a cutting of a box and consequent derangement of the line. Frequent, periodical inspections should be made to re-adjust hangers and brackets, if necessary, and to ascertain if there is undue strain on any particular portion. Neglect of these duties will surely cause waste and expense.

SUGGESTION TO CAR BUILDERS.—A communication to the New York *Tribune* complains as follows: I have noticed in the cars of the New Haven, Hartford and Springfield road three massive sets of lamp holders of elaborate design, with each of their four lower corners tipped with sharp, metallic spurs, pointing down on you like so many inverted lightning rods ready to impale some poor victim should the car be overturned; or, perhaps, to hold him like a trap until the car took fire and roasted him; or, in case of a collision or possibly the sudden action of the air brakes, to be wrenched off and fall with crushing weight among the passengers. Every railway disaster, in the long list of those cut and bruised about the head and upper part of the body, tells of the horrid work of such destructive agents. Our cars should be finished inside with a view to the greatest safety in the not improbable event of their being overturned. Any sharp spur or hook is as much out of place in a passenger coach as would be a bayonet or a pitchfork. We have had too much already of these angular productions of blacksmiths and brass founders. They should be banished at once, and for a substitute a strong shelf running the whole length of the car, of such form as to give greater strength to the corners of the car, which are most liable to be crushed in by outside obstructions, and upholstered on the edge and under side, affording an elastic surface to lessen the distance and break the force of the fall in case of an overturn when the living freight is hurled into the top of the car.

A NEW ANCHOR.—A new anchor, the invention of Vice-Admiral Inglefield, C. B., has been received at Portsmouth for trial on board the *Dreadnought*. It weighs 102 cwt., and is a modification of Martin's well known self-casting anchor, with which the whole of the turret ships are now fitted. Like it, the shank and the crown are formed of one piece, but it has no stock nor "steading arms," the weight thus saved being added to that of the arms, to give them more holding power. The new anchor also resembles the Martin anchor in the special feature that the arms are on parallel lines, and so grip the ground simultaneously. It differs from it, however, in the very important characteristic that instead of the arms being made of one forging, and working through the crown, they are formed of separate forgings, and are attached to the shank by a swivel pin. The advantages gained for the anchor are greater holding power and less liability to foul.

French Steam Street Cars.

French seem to be gaining success with their application of steam to street railways. We find in foreign papers the following interesting facts: Some interesting particulars as to the success of steam over horse-power, on tramways, were given by Mr. Henry Merryweather, whose firm had sent 30 of their engines to Paris, in which city they had been adopted by the principal companies. The route over which these engines run is from the Bastille to the Arc de Triomphe, a length of about seven miles. On this road there are various inclines, that at avenue Josephine being from one in twenty-eight to one in thirty, extending over half a mile. The engines have been working for more than a year, during which time there has been no accident of any kind, neither has the ordinary street traffic been in the least obstructed or inconvenienced, and this may also be said in regard to the runnings on other lines at home and abroad.

Messrs. Merryweather's engine is much less than half the length of an ordinary tram-car, which it resembles in appearance; and therefore, in contrasting the steam power with horse power, it occupies less space than the horses of a tram-car would occupy. At each terminus it is disconnected and brought to the front of the car. This operation does not occupy more, if so much, time as is required with horses. The boiler is multitubular, so that dangerous explosions cannot occur. Each engine weighs about three tons, with sufficient water and fuel to run for four hours. The consumption of fuel is about 20 pounds weight per hour; steam pressure 100 pounds. The engines are noiseless, and emit neither smoke nor steam. The exhaust steam is disposed of by a condensing apparatus, thus the whole weight of the engine is kept to a minimum, thereby reducing, very considerably, the working expenses, and the wear and tear on the permanent way. The engines have all four wheels coupled; they can ascend heavy inclines, and from their short wheel base they can pass round the sharpest curves, and they are sufficiently powerful to draw two loaded cars. They can be propelled at any required speed at the will of the driver; the brake power can be immediately applied, pulling up the car far quicker than can be done at present with the ordinary horse cars. The engine is fitted with the necessary self-acting appliances for shutting off steam and applying brakes, if the driver should exceed the prescribed rate of speed. The starting and other levers, as well as the fire hole door, are ready to the hand of the driver, who has an unobstructed view of the roadway on all sides.

TESTING STEEL-IRON WELDS.—In a late issue of the *Railroad Gazette*, J. K. Sax gives the method which he employs to detect a perfect weld between the iron and steel in his car wheels: "We know in every instance before the wheel is sent out whether we have a perfect weld or not, simply by turning the edge of the thread of the wheel, which is now done in all cases. Therefore, if the weld is perfect, when the tool reaches the junction or union of iron or steel, the turnings even on the extreme edge of the wheel, as they leave the tool, being part steel and part cast iron, in a perfect weld will stick firmly together and be inseparable, even though they may be not more than a 64th part of an inch in thickness. On the other hand, if there is not a perfect weld, the iron will invariably be separated from the steel in the turnings as they leave the turning tool, thus making a sure means of detecting any imperfections in the weld. So finding a perfect weld on the outer edge of the thread is a sure indication of a perfect weld in the center of the thread of the wheel."

THE PARIS EXPOSITION.—A London letter says: Two thousand laborers, busy as ants, were employed in giving shape and beauty to the latest marvel of architecture. The general disposition of the new building will more or less resemble that of 1867, the principal difference consisting in altering the elliptic form of it. The galleries will thus present a more striking aspect and the decorations of each division, which will be either square or oblong, will be more easy to exhibitors. The galleries on the right, forming the foreign section of the building, will be divided by spaces of different breadth, according to the importance of each nation. In walking from the Pont d'Iena to the military school a visitor will thus be enabled to see the productions of all the people of the world, and may compare the relative value and perfection of the same goods in different countries. To compare a French article, however, with a foreign article of the same sort the visitor will have to cross the fine art galleries or return to the grand vestibule.

NEW AERIAL MACHINE.—Experiments were made recently at Chatham, England, with a new aerial machine, to be used for discovering the position, etc., of an enemy's camp at night. The machine consists of a light frame work covered with loose canvas, which becomes filled with air, and thus the machine is kept aloft. When at a proper height a parachute provided with fire balls is sent up the line holding the machine; and, on reaching the machine, the parachute explodes, and the fire balls are discharged, and thus the surrounding country is lighted up for a considerable distance, and the position of an army would be shown. The trials proved very satisfactory, in spite of bad weather, and further experiments will be made.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Table with 5 columns: Name of Company, Week Ending Mar. 8, Week Ending Mar. 15, Week Ending Mar. 22, Week Ending Mar. 29. Rows include Alpha, Andes, Baltimore Con., Belcher, Belmont, Best & Belcher, Bullion, Caledonia, California, Challenge, Chollar, Confidence, Con Imperial, Con Virginia, Crown Point, Cose Con, Dayton, Eureka Con, Exchequer, Gaden & Bertrand, Seg Belcher, Grand Prize, Gila, Globe Con, Gould & Curry, Hale & Norcross, Hussey, Julia, Justice, Jackson, Kenuck, Knickerbocker, Kossuth, Lady Bryan, Lady Wash, Leopold, Leviathan, Leeds, Modoc, Manhattan, Mansfield, Meadow Valley, Mexican, North Con Virginia, North Con, Northern Belle, Norcross, Occidental, Ophir, Overman, Pacific, Phil Sheridan, Panther, Poorman, Prospect, Raymond & Ely, Rock Island, Savage, Seg Belcher, Sierra Nevada, Silver Hill, South Chollar, Succor, Union, Union Con, Utah, Wells-Fargo, Woodville, Yellow Jacket.

Sales at S. F. Stock Exchange.

Table with 2 columns: Name of Company, Sales. Rows include Friday, A. M., Mar. 23, 220 Alpha, 200 Andes, 350 Baltimore Con., 230 Best & Belcher, 200 Belcher, 300 Bullion, 230 California, 1500 Con Virginia, 100 Challenge, 400 Chollar, 820 Caledonia, 25 Dayton, 645 Exchequer, 1000 Gould & Curry, 400 Hale & Norcross, 310 Justice, 500 Julia, 300 Knickerbocker, 100 Kossuth, 100 Lady Wash, 345 Mexican, 150 New York, 50 Occidental, 425 Ophir, 370 Overman, 190 Phil Sheridan, 190 Savage, 400 Sierra Nevada, 40 Silver Hill, 500 Union, 300 Woodville, 500 Yellow Jacket. Afternoon session includes 120 Alpha, 140 Andes, 140 California, 140 Chollar, 350 Caledonia, 25 Dayton, 645 Exchequer, 1000 Gould & Curry, 400 Hale & Norcross, 310 Justice, 500 Julia, 300 Knickerbocker, 100 Kossuth, 100 Lady Wash, 345 Mexican, 150 New York, 50 Occidental, 425 Ophir, 370 Overman, 190 Phil Sheridan, 190 Savage, 400 Sierra Nevada, 40 Silver Hill, 500 Union, 300 Woodville, 500 Yellow Jacket.

Table with 2 columns: Name of Company, Sales. Rows include Wednesday, A. M., Mar. 28, 100 Alpha, 330 Andes, 270 Best & Belcher, 195 Belcher, 175 Best & Belcher, 210 Crown Point, 1200 Con Imperial, 285 California, 40 Chollar, 425 Confidence, 710 Crown Point, 50 Challenge, 800 Dayton, 225 Exchequer, 1795 Gould & Curry, 200 Hale & Norcross, 495 Julia, 325 Justice, 340 Lady Washington, 140 Knickerbocker, 300 Leviathan, 35 Mexican, 450 New York, 600 North Con Vir., 50 Occidental, 530 Ophir, 145 Overman, 150 Phil Sheridan, 100 Rock Island, 400 Savage, 150 Sierra Nevada, 130 Silver Hill, 30 Solid Silver, 200 Trojan, 40 Utah, 210 Union Con, 200 Woodville, 160 Yellow Jacket. Afternoon session includes 400 Alps, 205 Bullion, 150 Chollar, 615 Best & Belcher, 400 Caledonia, 30 Chollar, 210 California, 250 Con Imperial, 130 Crown Point, 400 Con Virginia, 400 Eureka Con, 100 General Thomas, 750 Grand Prize, 80 Gila, 305 Gould & Curry, 230 Golden Chariot, 110 Justice, 60 Manhattan, 200 Mansfield, 300 Modoc, 200 Northern Belle, 500 New Cose, 80 Ophir, 90 Overman, 1000 Panther, 15 Raymond & Ely, 450 Rye Patch. Thursday, A. M., Mar. 29, 100 Alpha, 330 Andes, 270 Best & Belcher, 195 Belcher, 175 Best & Belcher, 210 Crown Point, 1200 Con Imperial, 285 California, 40 Chollar, 425 Confidence, 710 Crown Point, 50 Challenge, 800 Dayton, 225 Exchequer, 1795 Gould & Curry, 200 Hale & Norcross, 495 Julia, 325 Justice, 340 Lady Washington, 140 Knickerbocker, 300 Leviathan, 35 Mexican, 450 New York, 600 North Con Vir., 50 Occidental, 530 Ophir, 145 Overman, 150 Phil Sheridan, 100 Rock Island, 400 Savage, 150 Sierra Nevada, 130 Silver Hill, 30 Solid Silver, 200 Trojan, 40 Utah, 210 Union Con, 200 Woodville, 160 Yellow Jacket. Afternoon session includes 400 Alps, 205 Bullion, 150 Chollar, 615 Best & Belcher, 400 Caledonia, 30 Chollar, 210 California, 250 Con Imperial, 130 Crown Point, 400 Con Virginia, 400 Eureka Con, 100 General Thomas, 750 Grand Prize, 80 Gila, 305 Gould & Curry, 230 Golden Chariot, 110 Justice, 60 Manhattan, 200 Mansfield, 300 Modoc, 200 Northern Belle, 500 New Cose, 80 Ophir, 90 Overman, 1000 Panther, 15 Raymond & Ely, 450 Rye Patch.

Sales of Last Week and This Compared

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MINING SHAREHOLDERS' DIRECTORY.

(Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.)

ASSESSMENT'S-STOCKS ON THE LISTS OF THE BOARDS.

Table with 10 columns: COMPANY, LOCATION, No., AMT. LEVIED, DELINQ'T. SALE, SECRETARY, PLACE OF BUSINESS. Rows include Arizona M Co, Andes S M Co, Alta S M Co, Adams Hill Con M Co, Baltimore Con M Co, Belmont M Co, Best & Belcher M Co, Belcher S M Co, Caledonia S M Co, Con Imperial M Co, DeFiance M Co, Sierra Nevada M Co, Crater M Co, Geo Thomas M & M Co, Northern Belle M Co, Jackson M Co, K & K Con M Co, Knickerbocker M Co, Lady Washington M Co, Lady Bryan M Co, Leviathan M Co, Metallic M Co, Niagara M Co, North Con Virginia M Co, Occidental M Co, Picton M Co, Sierra Nevada M Co, Silver Hill M Co, South Con Virginia M Co, Wells-Fargo M Co, Yellow Jacket M Co.

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Table with 10 columns: COMPANY, LOCATION, No., AMT. LEVIED, DELINQ'T. SALE, SECRETARY, PLACE OF BUSINESS. Rows include Aureole M Co, Cherokee Flat Blue Gravel Co, W G Cousins, Curvo M Co, Dolores Con M Co, East Branch M Co, El Dorado W & D G M Co, Elmer M Co, Florida M Co, Gold Bar Gravel M Co, Golden Crown M Co, Holden & S M Co, Kennedy M Co, Linden Gravel M Co, Mitchell M Co, Moore's Flat Blue Gravel M Co, Cornucopia M Co, Orange Con M Co, Ocean View Quicksilver M Co, Remington Gravel M Co, Silver Sprout M Co, South Hill Hill M Co, Starr King M Co, South Con Virginia M Co, Tuolumne Hydraulic M Co, Victor M & M Co.

MEETINGS TO BE HELD.

Table with 5 columns: NAME OF COMPANY, LOCATION, SECRETARY, OFFICE IN S. F., MEETING. Rows include California Con M Co, Chlamion M Co, Cornucopia M Co, Comanche M & M Co, Cabinet M Co, Enterprise Con M Co, Northern Belle M Co, Washoe Cullied by Trustees, Southern Belle M Co, Black Bear Quartz M Co, California M Co, Consolidated Amador M Co, Con Virginia M Co, Comanche M & M Co, Empire G M Co, Hite G M Co, Leonard M Co, Manhattan S M Co, Modoc M Co, Northern Belle M & M Co, P & M M Co, West Comstock G & S M Co.

LATEST DIVIDENDS-WITHIN THREE MONTHS.

Table with 5 columns: NAME OF COMPANY, LOCATION, SECRETARY, OFFICE IN S. F., PAYABLE. Rows include Black Bear Quartz M Co, California M Co, Consolidated Amador M Co, Con Virginia M Co, Comanche M & M Co, Empire G M Co, Hite G M Co, Leonard M Co, Manhattan S M Co, Modoc M Co, Northern Belle M & M Co, P & M M Co, West Comstock G & S M Co.

California Board-Latest Sales.

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ment of his stock had been paid, at which Dr. Sigismund stated that he could not really come under the head of the dissatisfied ones, as he had acquiesced in the decree of the levying of the assessment; but Mr. Fox, of the combination that had been foremost at previous times, wished the dissatisfied of the present time to join in with those who for several months have been contending against the legality of a former assessment. Wm. Reynolds was elected Secretary. A committee of five, consisting of Messrs. Dr. Sigismund, Fox, McIntosh, Kiby and Tarpy, the committee of the old dissatisfied stockholders, was appointed to carry out the affairs of the present dissatisfied persons. A committee of three was also appointed to confer with the committee of five and to act in concert with it. There were represented 2,500 shares.

In the Third District Court, Joshua Hendy brings suit against the Martin & Walling mill and mining company to recover \$1,025, alleged to be due for services rendered.

Concerning the Comstock's Gold Hill News of this week says: Crossman's report of the discovery of another good bonanza lying east and south from the present wonderfully rich bonanza of the Consolidated Virginia and California has created quite a stir among the sanguine, and that bonanza would certainly be a good thing to have. But its existence never has been practically or satisfactorily demonstrated yet, the report of any over-sanguine expert or mining man to the contrary notwithstanding. The Sutor tunnel, however, will satisfactorily demonstrate this and kindred points, for it is now in 16,400 feet, and fast penetrating the regular Comstock ore belt at a considerable depth. All outlying ore bodies east of the main Comstock are likely to be met with and their merits developed by the tunnel. The Consolidated Virginia folks are getting their work in well, and producing large amounts of good ore again, keeping their mills well running, and the bullion results have to follow. They will have a bountiful surplus over expenses next month, and be fully able to resume the payment of dividends in May. The newly-developed 1650-foot level is being opened out in good style, and the ore breasted and stoped after the usual way, both in that and the California ground. Justice continues her excellent ore yield, the mills are running and work goes ahead lively all along the great lode, regardless of the price of stocks.

The Mining Share Market.

The depression in the stock market continues and there is little new to chronicle in connection with it. It is now positively asserted that Consolidated Virginia will resume the payment of dividends on the 1st of May, which, if it prove true, will undoubtedly have a beneficial effect on the market. At present, transactions in the Boards are on a very small scale, and are principally confined to the brokers themselves, working on the ups and downs of an eighth in the price of a stock. The general public is undecided as to which way the market intends to go, but seems at the same time decided not to invest very much any how. Brokers are having a hard time of it and will soon have to reduce expenses materially should the present depression continue very much longer. A meeting of the Lady Bryan stockholders who paid the last assessment (No. 14), and who are unwilling to pay the present assessment (No. 15), was held on Tuesday evening last. The Chairman of the meeting stated that the assess-

Pacific Board-Latest Sales.

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MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

TALLMAN.—Amador Ledger, March 24: The mine was located in early days, and worked to a considerable depth under the name of the Hubbardville mine. Three shafts were sunk. The south or main shaft is down 500 feet. It is not yet drained, but a body of quartz four or five feet wide is said to exist at the bottom. A few months back John Troglan was led to turn his attention to the old Hubbardville, which he rechristened the Tallman. Organizing a company he started work, putting up some of the finest pumping and hoisting machinery to be seen in the State. Only a short time elapsed before the prospects became sufficient to justify a ten stamp mill, which was commenced by Messrs. Knight & Co., of Sutter. At the outset the ledge at the bottom of the south shaft was the objective point. It did not enter into the calculation that ore of any consequence existed above that. In this, however, they have been greatly deceived. Finding a drift from the middle to the south shaft for ventilation, a splendid body of rock was struck at a distance of 100 feet from the starting point. The ledge varies from two to three feet in width, with a boulder ledge two feet in width, the two separated by a foot gouge. The rock is of that dark streaked kind so much prized by miners. It is full of rich looking sulphurates, with specks of gold for good measure. The mine is kept running on ore from this drift. As to the paying quality of the rock, scarcely a doubt need be entertained; good judges estimate it to yield all the way from \$15 to \$25. In addition to the main lead upon which the three above mentioned shafts are sunk, two other distinct veins have been lately discovered, one 40 feet east and the other 75 west. Both contain gold in paying quantities. Supplied with every labor-saving appliance, it is safe to say there is not a more economically worked mine in the State. No steam is used on the works. Everything is run by water power. With a fall of 320 feet, 40 inches of water is all that is required to run the whole machinery. Seventeen men are employed, the whole under the direction of John Troglan, the lessee.

THE CORNER.—Located a quarter of a mile south of the Tallman. It has lately been bonded by H. Ross and others. Many years ago a shaft was sunk 70 feet. Last week we visited the claim, and found half a dozen men engaged in sinking a new shaft, a few yards south of the old works.

OLIVE.—We last week mentioned that the clean-up of the Olive rock realized the handsome sum of \$18 per ton. The owners are very gleeful over the result. It is now the intention to get the whim and hoisting gear from the Bonanza mine, and sink the shaft to 320 feet from the surface. Should the ore chimney hold out at this depth, the erection of a mill will be next in order. The finances of the company are in excellent shape.

BONANZA.—On this mine preparations are being made to sink. Everything is to be fitted up to run by water power. The works will enable the mine to be explored to a depth of 500 feet.

CALAVERAS.

THE THOR.—Calaveras Chronicle, March 24: We have intelligence of a cheering nature from the Thor mine at Rich Gulch flat. The tunnel being run in the mine is now 280 feet, and has cut the ledge at a depth of 100 feet. The vein shows fully three feet thick, all fair milling ore. Running the rock in 300 feet further will reach a point where the ledge over 200 feet beneath the surface, putting the mine in splendid condition for working. The battery is kept in constant operation and work is being urged forward with great energy.

GWIN.—The sinking for the 1300-ft level at the Gwin mine is completed. It is expected to commence running the levels about the first of April. There is still an abundance of rock in the 1300-ft level, from which the ore is supplied. An average of 110 tons per day are put under the stamps, the yield not varying from what it has been for several months past. Indications are favorable that the 1300-ft level will develop better rock than is now being mined.

HUGHES.—Over 100 tons of ore is on the dumps of the Hughes mine in Chile gulch. The shaft is sunk to the depth of 100 feet, 1 vein run and stope opened. The mill is not running at present, but the work of hauling rock is to be commenced soon and the stamps set at work. The ledge is a wide one, and we get it from good authority that the unassorted ore will yield an average of \$10 per ton.

BLAST.—A blast was exploded in the Veith hydraulic last Tuesday, doing good execution. The amount of powder burned was 100 lbs. being ten kegs of dynamite. Preparations are being made for another and larger blast, one of the objects being to test a new kind of powder.

UPPER COUNTRY ITEMS.—A new vein of quartz has been struck in the Champion mine at West Point. The ledge is about two feet wide. Rock rich. There is something like 80 tons of ore now in the mill and crushing has been commenced. It is expected that 100 tons will be worked before crushing is completed. Fields & Co. continue to mine good ore. The machinery has been removed from the Mina Rica and placed upon the Austrian mine, owned by the same company. Prospects good. Ninety tons of rock from the Chapman mine at Railroad brought \$30 per ton. Operations are to be pushed with increased vigor in the future. At Mosquito, Potter & Rogers continue to extract rich rock from the "Blue Jay." Crushing will be commenced next Monday. Work is progressing favorably at the old Holmes mine.

FRESNO.

MORE GOLD.—Fresno Examiner, March 22: We noticed three weeks ago the circumstance of a \$30 and a few smaller nuggets of gold having been recently found on the Fresno River, not far from Deadwood, which had induced several parties to prospect in that neighborhood. One of the parties, a Mr. Conoly, was rewarded on Thursday last by the discovery of a well defined vein of rich gold quartz; from present indications it bids fair, we understand, to create quite a sensation.

INYO.

GOLD MINE.—Coso Mining News, March 24: Two of our prominent citizens, F. J. Trapp and H. J. Lent, are erecting a three-stamp gold mill over in old Coso. They expect to have the mill in operation in two weeks. We should like very much to see a five or ten-stamp mill being run in the Coso. There is a large quantity of gold rock which works over \$100 by the assay process.

GOOD ORE.—W. T. Grant, the indefatigable prospector, is working his new discovery, the Pacific, in Lookout district, and taking out quite a lot of fine milling ore, that averages \$300 per ton. Grant will endeavor to have some of his ore worked at the Minnetta mill to test it.

COSO.—We are glad to report that, so far as we can ascertain from the parties who have recently been in the Coso, that the company is now meeting with good success in smelting since Messrs. Robinson and Arents have taken charge of things. The mine is looking extremely well in all its workings, and when the hoisting works are completed, will furnish ore enough to keep both furnaces in constant operation.

MODOC.—We are informed that the Modoc is developing to an unprecedented extent, large ore bodies having been developed in nearly every one of the numerous drifts, tunnels and shafts. Both furnaces are running finely and turning out the usual quantity of high grade bullion. The DeLancey furnace, since starting, has been running very successfully with the exception of about 10 hours. The stick work on top of furnace No. 1 was seen to be cracking, and it was shut down for repairs, and No. 2 was started instead. No. 1 may have to be built over; it is found that it cannot be drawn together with clamps, but Mr. Gorman thinks that in another week he will have to employ both furnaces in order to dispose of the ore now

being taken from the mine. Not quite so many bars of bullion are now being made as upon the last run, because of the ore carrying a greater percentage of silver and less of gold, but the amount of which was not so great. The starting amount of ore at the furnace dumps has increased instead of being diminished, although the furnace casts the ore up at the rate of about 25 tons per day.

NAPA.

QUICKSILVER.—Cor. Napa Register, March 24: The Manhattan mine, three miles beyond and to the left of Knoxville, is working 60 men and is taking out 100 flasks of quicksilver per month. They have but one furnace. The Reed mine, which is still further up and to the right of the Manhattan, employs 74 white men and 33 Chinamen. They have two furnaces and intend putting up the third soon. The furnaces are undergoing repairs. The future prospects of this mine are very flattering, there being an abundance of ore already in sight.

NEVADA.

RICH DIRT.—Nevada Transcript, March 23: The Cold Spring gravel mining company are making some very encouraging developments of late in their mine. Last week a tunnel, which they have been running for some time, struck with a body of gravel about six feet in depth, which prospects very rich. The gold is in regular nugget shape, and each pan is worth all the way from 50 cents to \$1.50. From the character and shape of the gold, all old hydraulic miners say \$10 chunks are just as liable to be found as smaller ones. The gravel also contains large quantities of flint, which will yield \$20 to the ton by mill process. In the other parts of the mine the prospects are equally flattering. The owners are in high spirits, and all who know anything of the character of the Live Oak channel, think they have got the thing corralled sure this time. Adjoining claimants on the same lead, of course, are not very down-hearted just now.

SHIVERS MINE.—We have not as yet had an opportunity to visit this mine, as the shaft gravel mine, situated beyond Banner hill, but we learn from the Superintendent, Mr. Duncan, that the prospects of opening up a good claim there are first-rate. The prospect incline is now down 210 feet, and a body of gravel, six feet in thickness, is above the incline, and it prospects very well. The locality is not one where it has heretofore been supposed that a channel existed, but from the reports we hear it appears that the mine is a very rich one. The same Superintendent is running a prospect shaft for gravel on Little Deer creek, near the Union mine, near the old Banner.

OLD DUMP PILES.—Grass Valley Union, March 20: There are several hundred old dump piles around about this place. Most of these would pay to work, provided water for washing them could be procured. We understand that the Bar has refitted and again turned on water, and a thin, the dump pile at the old Forest Springs mine. They got \$1.50 a day to the hand in free gold, and they have saved the quartz separate from the actual waste. The quartz, of which there is a goodly quantity, as there is in all the old dumps, has milled about \$65 to the ton. Three men, who are at work, are making a good bit over wages, with ground enough to last them for three years. The Forest Springs mine is not the only one where such things can be done.

PLACER.

ITEMS.—Dutch Flat Forum, March 22: Our ditches are still running full to their utmost capacity. The Star & Union, Elmore Hill and Summersett continue washing. The Bar has refitted and again turned on water, and is fast approaching the shaft. A powder blast will be put off in this claim in the latter part of the week, when washing will be again pushed. The Franklin fired a blast of 250 kegs of powder on last Saturday, doing good execution. Water was turned on on Tuesday, and the mass of clay, gravel and cement was so disintegrated that the moment the water touches it it dissolves and passes off like so much ash. The Southern Cross and Polar Star continue washing. The Pacific has refitted and turned on water last Friday. The Central cleaned up on Saturday and is now refitting. At Gold Run, the Cedar, Gold Run, North Star and Illinois claims continue washing. The Hoskin claim is clearing away and passing through the immense clay streak in order to reach their pay gravel. The cement mill continues to hammer away. The Indian Hill is washing on the gravel loosened by the powder blast of a few months since. The miners are pushing their claims forward with their usual energy.

REMINOTON HILL.—The Rhode Island company continues to ground sluice with good results. The Wide West company are working a good many men at present, and are laying a supply of timbers, lagging, etc., and advancing both tunnels. The gravel in tunnel No. 2 is of usual richness, but it will take some time to reach the pay gravel. The Pacific has refitted and turned on water last Friday. The Central cleaned up on Saturday and is now refitting. At Gold Run, the Cedar, Gold Run, North Star and Illinois claims continue washing. The Hoskin claim is clearing away and passing through the immense clay streak in order to reach their pay gravel. The cement mill continues to hammer away. The Indian Hill is washing on the gravel loosened by the powder blast of a few months since. The miners are pushing their claims forward with their usual energy.

LOWELL HILL.—The air tunnel connected with the Swamp Angel mine caved last week, preventing any more work being done until remedied, which will be done by forcing four-inch iron pipe, through which the air will be forced by a water blast. The East New York company have the running on the bedrock tunnel to the ledge mine by contract. The Wild Cat and Leavitt companies are making good progress in their tunnels. The Connet company will commence the construction of a new tunnel in a short time.

BEAR RIVER MINES.—The Centennial, Crissman and Whipple companies have been working in gravel for several days that is very rich, some of it paying as high as \$80 per ton. The work on the bedrock tunnel to the ledge mine by contract. The Wild Cat and Leavitt companies are making good progress in their tunnels. The Connet company will commence the construction of a new tunnel in a short time.

LIBERTY HILL.—The Liberty Hill company continue to wash steadily; having plenty of water, the progress being made is good.

LITTLE YORK.—The Empire and Christmas Hill companies are making unusual good progress, the ditches are running full and the water is being utilized to good advantage.

PLUMAS.

MORE QUARTZ.—Plumas National, March 24: Quite an excitement has been on the boards for a few days over the discovery of a quartz ledge in the head of Soda creek, by J. Ellis. The work on the bedrock tunnel to the ledge mine by contract. The Wild Cat and Leavitt companies are making good progress in their tunnels. The Connet company will commence the construction of a new tunnel in a short time.

ITEMS.—We saw some regular old-fashioned lead gold, some of the pieces weighing \$20 and over, the other day. It was from a claim owned by a man named Wilson, at Oak Flat, a short distance below Shoo Fly. Several caves are reported on the Maxwell company's new ditch. Mr. C. Gurnee, of San Francisco, one of the principal owners of the Hungarian mine, has been at that place for several days and started home on Friday. The chances for a good run of water this season are decidedly slim at Hungarian, but it will come all right by and by. Steve Libby has bought C. Galpin's claim on Massac, and Galpin is opening some new diggings on Squirrel creek.

SAN BENITO.

ANTIMONY.—San Benito Advance, March 24: About 60,000 pounds of crude antimony ore from the mines near us is now at the depot ready for shipment to San Francisco. The average value of this ore is \$50 per ton. Several shipments have already been made with profitable results. Probably the Salinas mine under Shrewser's management is better developed than any other of the number now being worked. The croppings of this ore can be traced for miles, and we have every confidence in the existence of inexhaustible deposits of antimony in the McLeod mining district. Among the principal mines in the district are the Stayton, the Consolidated Wonder, the Comstock and the Ralston, all owned by incorporated stock companies. Prospects are good, and the mining claims and other companies will doubtless be organized. The quicksilver and antimony prospects of the county are equal to any in the State.

SONOMA.

COAL.—Sonoma Democrat, March 24: Since our last report the Santa Rosa coal mining company have developed a well defined coal vein of three and one-half feet. It is

pronounced by experts to be the best coal yet found in California. On Wednesday arrangements were made to work the mine on a scale commensurate with its merits. The company are composed of the leading capitalists of the county, and propose to start at once a double track working tunnel. The parties who have taken the matter in hand is a guarantee of the merits of the mine and its speedy development. The S. F. & N. P. R. R. Co. have agreed to put in a branch track from their road to terminate at or near White Sulphur Springs.

Mining Activity.—Russian River Flag, March 22: Mining notices are being posted daily in this section, designating new and renewed locations, and claiming privileges to mine for gold, silver, copper, quicksilver or sulphur. Prospecting parties are constantly met, fling out for the hills in search of hidden treasures. The Great Eastern, with one Eames furnace, and the Mt. Jackson, with three, are steadily running. One week ago last Monday, several parties located claims a few miles northwest of Healdsburg, with the object in view of mining for silver. The Oakland, northwest of Pine Flat, in charge of Superintendent Dennis, still proves itself to be a mine. W. C. Graves is negotiating with parties for the development of his claim, Eureka. Life is very brisk at the Bacon, four miles easterly from Pine Flat. The improved Eames furnace, drawing to completion under the supervision of Messrs. Bacon and Eames, keeps a large force of teamsters and men employed, transporting and putting in place the machinery and bricks for the furnace, and lumber for the buildings. The machinery of Sylvester Charles's improved quicksilver furnace came up from San Francisco last week. It was fitted up by Mr. Charles and S. T. Harrison, in North Healdsburg, and has since been shipped to the Mt. Jackson mine, near Guerneville. Its practical working is looked forward to with much interest by operators of quicksilver mines. Mr. Easton, a professional mining engineer, informs us that he has just discovered the origin of the rich "float" that attracted much attention from the miners at Pine Flat, in the palmy days of that mining town. The ledge he has found is not more than 1,000 feet from the flat, and from it he has taken one piece which he calls 50% cinnabar, fully as rich as the best of the float that has been found. The ledge crops out on the old "Norris" claim and consists of a strata of clay between two well defined walls, and contains the deposits of this wonderfully rich cinnabar. It has long been acknowledged that when this ledge was found, it would prove the richest in the whole region, and hundreds have prospected for it in vain. On the strength of the find, Mr. Easton informs us that he has purchased, in company with parties in San Francisco, the bankrupt property of Thompson Brothers, at Pine Flat, consisting of hotels, stables, stores, etc. There is some litigation going on, but a small force of hands was sent up Monday, to open the ledge still more thoroughly.

A NUGGET.—Tuloume Democrat, March 24: Francis Roleri, while mining on his claim between Columbia and Yankee Hill, found a chipmunk worth about \$700 last Wednesday. When the find was first reported in Columbia, the chipmunk was a nugget worth between \$20,000 and \$30,000, and the news of the find spread like wildfire. Every old resident began to hunt around for pans, sluices and shovels, preparatory to "stalking out" as they did in the good old days, but when the piece dwindled to a \$700 chipmunk, the excitement rapidly dropped below par. Roleri considers himself fortunate nevertheless.

Nevada.

WASHOE DISTRICT.

COSO VIRGINIA.—Gold Hill News, March 23: Daily yield, 400 tons of ore, keeping the mills steadily running. The yield of ore from the stope on the 1550-ft level continues good and the ore of an excellent quality. On the 1400-ft level 30 men to the shift have been regularly employed since the air connection was completed in cutting out and clearing the tunnel west of the drift. The payment is, however, fast approaching completion, and by the 4th or 5th of April next the tracks will have been laid, the sill timbers all in, and the openings completed to a sufficient extent to admit of the extraction of 400 to 500 tons of ore per day, if the management so desire. The south drift running through the ore vein to connect with the deep vein is in a distance of 62 feet, the face still in ore of a very rich character. The management is making the payment of a sufficient quantity of ore for the resumption of the payment of regular dividends, beginning with the first of May next, is an assured fact.

CALIFORNIA.—Daily yield, 550 tons of ore, keeping the mills all crushing. The ore stope are showing splendidly on the 1550, 1550 and 1600-ft levels. The yield of bullion for the month of March will not exceed by \$100,000 or more the yield of the month of February. The payment of the regular monthly dividend of \$1,080,000. On the 1650-ft level the ore vein is opening up richly wherever it has been prospected. The north drift has been enlarged, and is now being pushed forward to connect with vein No. 3 for ventilation purposes and to establish a base of operations for breasting the ore whenever it may be desirable to do so. The hoisting machinery, mine, mills, in fact everything for the whole company is in the best working condition, and there appears to be nothing to interrupt bullion production and the payment of the regular dividends.

CICILLAR-POTSOL.—Daily yield, 100 tons of ore. This ore is from the old upper works and has an assay of \$27 per ton. The east drift from the main incline on the 1785-ft level is steadily advancing toward the ledge, the face in very favorable position, and sinking the Combustion shaft is making the best progress. This shaft is without exception the best designed working shaft for a deep mine on the Comstock ledge, if not on the entire Pacific coast. It has four splendid working compartments, timbered from top to bottom with red spruce, 14x14 inch timbers, and in places where the ground is somewhat heavy, these timbers are placed only four feet apart, the usual distance being five and one-half feet. The excavating machinery is in the best working condition, and there appears to be nothing to interrupt bullion production and the payment of the regular dividends.

BULLION.—A serious accident to the hoisting engine on Saturday last has temporarily stopped all work on the 1500-ft level. The hoisting engine suddenly gave way, making it necessary to remove the old engine and replace it with a new one. In the meantime the work on the 1600, 1700 and 2000-ft levels is progressing as usual, the hoisting from those levels being done through the Imperial Com.

CALIFORNIA.—On the 1200-ft level the east cross-cut near the north line has cut the ledge, which at that point shows a fine quartz formation, with encouraging ore prospects. Sinking the main shaft is going ahead at the rate of 15 feet per week.

JOSKE.—Daily yield, 400 tons of ore, keeping the mills crushing to fine capacities. The bottom of the south winze, sinking on the ore-vein below the 800-ft level, is still in fine ore, with every prospect of the ore vein widening as greater depth is attained. The water is being drained from the bottom of the main incline below the 1000-ft level, preparatory to sinking for the purpose of opening the mine at still greater depth.

JULIA.—The main south drift in the 1000-ft level is being pushed forward, the face in quartz and ore of a very hopeful character. On the 1800-ft level west cross-cut No. 3, recently started, has been pushed a distance of 50 feet to the westward, without yet finding the west wall. For that distance the entire size of the drift is in quartz and low-grade ore. The main south drift on the 1800-ft level, at a point 40 feet south of the west wall, No. 3, has advanced some 10 feet, running along through the vein. Passing through this clay slip, a much softer and better character of quartz and ore has been found, strongly confirming the opinion of the experts that the chances of finding a paying body of ore to the south and east is steadily growing better.

OVERMAN.—The main east drift on the 1400-ft level is steadily though slowly advancing toward the vein. The flow of water from the face of this drift is very strong and intensely hot, so that the utmost care has to be observed in every attempt made at advancement.

LADY WASHINGTON.—A considerable portion of the past week has been occupied in casing a portion of the timber in the main shaft and timbering the winze below the 850-ft level. This has been about completed.

NORTH COV. VIRGINIA.—Sinking the shaft is being pushed forward with vigor. Streaks of quartz of a favorable character are frequently met with.

DAYTON.—The east cross-cut on the 220-ft level is being steadily advanced, the face in more favorable ground. The cross-cuts on the 500 and 700-ft level are showing some very favorable ore prospects.

UTAH.—The west drift on the 1150-ft level is now in a distance of 75 feet.

SOLID SLIVER.—Face of main north tunnel showing well in good looking vein matter. East cross-cut pushed ahead through the vein, which is thus far rather low grade ore, with occasional streaks, which give good assays.

LEVATHAN.—Considerable improvement is shown in the main north drift at the 600-ft level, the whole face being in quartz and low-grade ore.

SITRO TEXAS.—Total length of tunnel from mouth to header, 10,400 feet. Face of header in porphyry, with clay seams and occasional streaks of quartz. Good regular progress is constantly being made.

FLORIDA.—The west drift on the 815-ft level is being pushed rapidly forward, the face in porphyry mixed with quartz of a fine character.

ALTA.—The shaft is now rapidly approaching the point at which it is expected the ledge will strike.

KNICKERBOCKER.—The reduction of the water in the shaft has gone forward very successfully, and the bottom of the shaft will be reached some time to-morrow. The shaft is in good condition. To-morrow work will be actively resumed in the 600-ft level, where good ore developments were already made before work was suspended and the mine allowed to fill with water.

REVERIE.—The north and south drifts on the 650-ft level are each steadily advancing, running nearly parallel with the ore vein. On the 444-ft level the main south drift on the east side of the ore vein is being rapidly driven forward, the face in soft ledge matter.

BECKER.—The water has again been drained to the bottom of the main incline. Sinking the drain shaft is making the best progress. The pumps are being put in as fast as the shaft can be sunk, and are to be put in a new set. The preparations for opening up a new level at the 1800-ft station are rapidly approaching completion.

YELLOW JACKET.—The north winze on the 2040-ft level is down 160 feet with the incline of the ledge. The bottom of this winze is in perfectly dry ground, very favorable for sinking. Both of the east cross-cuts from the north and south drift on the 2040-ft level are steadily advancing, without any change of value. At the bottom of the new shaft there is a considerable flow of water.

MEXICAN.—The main north drift on the 1700-ft level is being pushed rapidly forward, the face in very favorable quartz and low-grade ore.

GOULD & CURRY.—All work in the main south drift and the east cross-cut on the 1700-ft level has been temporarily suspended, in order to give the full use of the hoisting machinery with which to lower the pumps and pump-rods into place.

BEST & BELCHER.—All three of the east cross-cuts on the 1700-ft level have been stopped since last Friday, in order to have the full use of the Gould & Curry hoisting machinery with which to lower the pumps and pump-rods into place ready for use.

CROOKS CORNER.—The east cross-cut on the 2000-ft level is rapidly advancing, the face still in hard porphyry. The Burleigh drills operate splendidly in that character of rock and are sending the drifts forward at a very rapid rate. Every preparation is being rapidly perfected for the opening up of the new level and the prospecting of the 300 feet of virgin ground lying between it and the level above.

VALLEY AND AMERICAN FLAT.—The northeast drift on the 1400-ft level is being pushed rapidly forward, the face in quartz and ledge matter which is steadily improving in character as the drift advances.

NEW YORK.—Work on the pump shaft is making excellent progress. The enlargement is steadily nearing completion.

IMPERIAL CON.—The bottom of the main incline has been cleaned out and sinking resumed. The east cross-cut near the center of the mine, on the 2000-ft level, is showing a decided improvement in the face.

SOUTH COMSTOCK.—The shaft is progressing well, having passed the 400-ft level and sinking deeper in good working ground. Stringers of quartz, carrying metal, are constantly coming in.

UNION CON.—The face of the north drift on the 1300-ft level is in soft, favorable ground, showing a lively looking quartz. The quartz in the bottom of the north winze, below the 1300-ft level, is showing a decided improvement in both looks and quality.

SAVAGE.—Another break-down of one of the pump bobs during the first part of the week greatly impeded draining operations and permitted the water to rise in the shaft to within a few feet of the 1900-ft level.

MINN.—The drift at the 1400-ft station is in 70 feet, the face in porphyry which, though somewhat hard, admits of excellent progress.

PHIL SHERIDAN.—The east drift on the 400-ft level is rapidly advancing toward the ore vein, the face in soft vein matter of a very favorable description.

GALENA DISTRICT.

LOOKING UP.—Cor. Reese River Revue: Galena is looking up, and now I have more faith in the camp than I have had for years. The white mine is to be thoroughly prospected and worked systematically, and if it has any merit it will be made to pay. The company at present are employing between 50 and 60 men, which will probably be increased to 100 by the time the roasting furnaces are in operation. The Copper concentrating mill, on Willow creek, is running steadily and producing a fine shipping ore per day, and there appears to be ore enough in the mine to keep the mill running for some time.

WHITE PINE DISTRICT.

EBERHARDT AND AURORA TUNNEL.—Eureka Sentinel, March 24: Capt. Frank Drake, who arrived in town last evening, informs us that the tunnel being run by the Eberhardt and Aurora company is now in a distance of a little over 1,000 feet, and that work on it is being pushed to its fullest capacity. The Captain does not expect to strike a ledge until about 1,000 feet more have been completed, when he feels confident of striking something pretty good. While running the first 1,000 feet they ran across two seams of good looking quartz, but they were only a few inches in thickness. He reports the town of Hamilton as being extraordinarily dull, and does not have much hope for improvement during the coming summer.

FOUL AIR.—White Pine News, March 24: Much annoyance is being experienced in the Eberhardt and Aurora company's tunnel from bad ventilation. A furnace is being constructed which will be completed in a day or two, to supply the workmen with pure air from outside and carry off the vitiated atmosphere caused by blasting.

HENRY TUNNEL.—We are informed that Major Henry is expected back from the East about the first of April, when additional force will be put on the tunnel. Mechanic James Montgomery is now engaged in putting the machinery in proper working order, and the work on the tunnel that the company have determined to push this enterprise forward with all possible speed.

CORNUCOPIA DISTRICT.

WORK.—Cor. Oakland Transcript, March 24: Our winter here has been one of the mildest known for the last number of years; most of all kinds of business during that season continued steadily along without interruption; true, times were and now are called dull, but they can be attributed only to the general depression which pervades all communities on the Pacific coast. The depression has not been charged to the non-productiveness of our mineral resources as far as they have been developed, because it is a notorious fact that of all the mining districts

THE ENGINEER.

The Detroit Tunnel.

The project for a tunnel under the Detroit river seems to be calling out the inventive genius of the engineers and many novel propositions are made. We read in the *Engineering News* that Mr. William Scott and Mr. Henry Collins both propose tunnels in different locations, the former putting the cost at \$2,500,000, and the time two years, and the latter making his figures \$2,268,000, at which sum he offers to contract to excavate it. Mr. Hall, of Mt. Clemens, proposes to sink a boiler-plate tube, coated with tar and gravel to make it impervious to water. Mr. H. M. Cargill, of Grand Rapids, proposes to bore a tunnel with an earth auger, with appliances for removing boulders and other obstructions, working his machinery by compressed air. He estimates the cost at \$2,500,000. Mr. McWilliams, whose scheme we alluded to on February 10th, reckons the expense at \$150 per lineal foot, the tunnel to be 22 feet in diameter. Oliver Drouillard desires to sink iron tubes weighted with masonry on either side, at an estimated cost of about \$200,000. Then there is a plan for an underground hydraulic tunnel, though what that is we fail to guess. Still another ingenious inventor proposes to solve the difficulty by quite another method, that is to bridge to and from Belle Isle, and to build a canal through the island for the benefit of vessels. Mr. Luther Beecher thinks that he can tunnel underground for \$100 per foot.

Mr. John Burt, the chairman of the committee, proposes to start directly from the Michigan Central railroad depot, thence to curve to the foot of Woodward avenue, and thence to cross the river directly, making a length of 5,280 feet. This plan contemplates the construction of a double track tunnel, in caissons from 100 to 200 feet in length, across the entire bed of the river, the tunnel to be made of brick in a timber caisson, with temporary bulkheads, floated out, maneuvered by tugs and sunk in line by means of guide timbers attached to the caissons already down. When bottom is reached, access is to be had to the caissons by iron shafts, the water is to be forced out by compressed air, or to be pumped out in case the caisson has taken the bottom sufficiently to exclude the water and then the excavation is to be carried on beneath until the caisson with its included tunnel is lowered to the required depth in the trench. He proposes to run hydraulic cement into a cavity left in the brick work at the joint in order to make this portion tight. Then, finally, Mr. Coats, of Kalamazoo, has come forward with a scheme of which we have learned no particulars.

The Great Bridge Cables.

The manufacture of the wire for the great cables of the East River bridge is undertaken in the factory of J. Lloyd Hahn, the contractor, at William and Inlay streets, Brooklyn. A Pittsburg firm is under contract to furnish the steel of which the wire is made. Already the contractor has delivered ten tons of wire, but this was under an order received before the contract was executed. It will take about 22 months to draw the 6,800,000 pounds required for the cables. The steel from which the wire is made reaches the factory in the form of rods a quarter of an inch in diameter, made into coils. The coil is at once put into the hands of a smith who heats and points one end, and turns it over to the cleaners. They remove any oxide or foreign matter by dipping the coil into vats containing diluted sulphuric acid. The coil is kept in the vat until the surface of the wire is sufficiently attacked. Then, to assist the further action of the acid, a mixture of lime and water is dashed over the coils as they lie on the floor. The coils next are put into an oven to dry, preparatory to the drawing process. The draw plate is ten inches high and one inch and a half thick.

The greatest care is used in the manufacture of the plates. It is necessary that they should be of the hardest steel, and in this country generally savage steel made of pig metal is used. The French take two lateral parts of a compound bar, one part being of iron and the other of a sort of steel called *potin*, which is obtained by melting the fragments of cast iron pots to a paste with white wood charcoal and then cooling and heating the metal a dozen or more times. The iron and steel pieces are fused and hammered until their union is complete. The plate is several times heated, and then punched with punches of different sizes to secure a tapering hole from one side of the plate to the other. The draw plate is firmly fixed in a bench. There are three or four holes in each plate, conical in shape, and the smaller orifice of each is carefully finished to the size of the wire intended to be drawn through. The holes are made smaller by minute gradations, so that the reduction of the size of the wire and the effort required shall be as nearly uniform as possible in the successive drawings. If very fine wire is needed, the draw plate is made of the hardest precious stones. A silver wire 170 miles long was once drawn through a ruby. It was 0.0033 inch in diameter, and was so nearly uniform that no difference in its size could be detected either by a micrometer or by weighing equal lengths.

The wire is drawn at a bench where there are a number of heavily-built cylinders that are ro-

tated by vertical shafts under the table. Under each cylinder is a cam which acts on a pivoted lever. A chain at the end of the lever is fastened to a heavy pair of nippers or to a dog. The coil of steel is thrown over a reel ten feet from the draw plate on the floor and the pointed end of the rod is put through the largest hole in the draw plate. The workman watches his opportunity, and when the lever is free makes the dog grasp the point of the wire protruding through the plate. The cam, in the revolution of the cylinder, strikes the lever with great force. The wire is drawn through the hole for several inches, and then the nippers are made to take a fresh hold, and it is dragged through until there is enough of it to go around the cylinders, where the end of it is put in the grasp of a vice. The cylinder is put in motion and the wire is drawn out of the steel rod continuously. If it breaks in the operation, the nippers are again used. The wire required for the bridge is No. 8 gauge, or 0.165 inch in size. There are 331 strands of this wire, the full length of the bridge, made into 19 cables, which are united in the great cable. There are in all 6,289 wires in each cable. The wire is drawn twice and perhaps a third time, to reduce it to the proper size.

The contract requires the wire to be galvanized, to protect it from the salt air. This process is accomplished by passing the wire over rollers into a bath of diluted muriatic acid heavily charged with zinc. Then, to comply with the rule that the wire must be straight, with no tendency to spring back into a coiled form when unrolled, it is led a long distance by wooden sheaves to a large wooden drum, around which it is wound. The drum is of such size as to prevent the wire bending. This process of keeping the wire straight is patented by Colonel Payne, one of the Assistant Engineers of the bridge. The wire is carried a sufficient distance to allow it to cool and become set. The wire is tested in the factory by the bridge engineers. The sample is adjusted between jaws connected with a long scale arm, on which hangs heavy weights. It is stretched to test its tensile strength until a breaking point is reached. The contract requires a tensile strength of 3,400 pounds, and a stretch of three and a half per cent. So far the tests have been most satisfactory. The breaking strength of the wire has reached 4,480 pounds, and averages 4,000 pounds. It has a stretch of four per cent. The wire is bent in every direction to determine its behavior under flexional and torsional stretch.

Verdict on the Ashtabula Bridge.

The coroner's jury investigating into the Ashtabula railroad bridge disaster have agreed upon a verdict which notes several points in bridge building. They find that the fall of the bridge was the result of defects and errors made in designing, constructing and erecting it; that a great defect and one which appears in many parts of the structure, was the dependence of every member for its efficient action on the probability that all or nearly all the others would retain their position designed, and do duty for which they were designed, instead of giving to each member a positive connection with the rest which nothing but a direct rupture could sever. The members of each truss were, instead of being fastened together, raised one upon the other, as illustrated by the following particulars: The deficient cross section of portions of chords and some of the main braces, and the insufficient strength and bad arrangement of both the horizontal and vertical transverse bracing; in the construction of the angle blocks, as finally modified, without sufficient lugs or flanges to keep the ends of the main and counterbraces from slipping out of place; in the construction of the packing and yokes used in binding together the main and counter braces at the points where they crossed each other; in the shimming of the top chords to compensate the deficient length of some of their members; in the placing, during the process of erection of thick beams where the plan required thin ones, and thin ones where it required thick ones. That the railroad company used and continued to use the bridge for about 11 years, during all of which time a careful inspection, by a competent engineer, could not have failed to discover these defects. For the neglect of such careful inspection the railroad company alone is responsible. The responsibility of this fearful disaster and its consequent loss of life rests upon the railroad company, which, by its chief executive officer planned and erected this bridge.

POWER.—Man-power is the unit established by the French engineer, Morin, and is equivalent to 50 effect, the power which an ordinary man can exert during a time of eight hours' work. Therefore, the power in effects, divided by 50 gives the *man-power*. Horse-power is the unit established by Watt, and is equivalent to a force of 33,000 pounds moving with a velocity of one foot per minute, which is the same as a force of 550 pounds moving with a velocity of one foot per second, and denoted by the character *HP*.

OPENING OF A RAILWAY IN JAPAN.—In Japan the ceremony of opening a railway between Osaka and Kioto was performed on February 5th, in the presence of a large assemblage of Japanese dignitaries and most of the foreign diplomatists, which latter traveled from Tokio to Kioto by special invitation, as guests of the government.

The Sutro Tunnel.

The following descriptive article on the Sutro tunnel is from the *Gold Hill News*: In 1869 ground was first broken, at the mouth of the Sutro tunnel. For eight long years the work of running the same has been prosecuted at an average expense of \$1,000 per day. As the tunnel is rapidly nearing the Comstock and the completion of the undertaking, at an early day, is already assured, we now proceed to lay before our readers such information in regard to the progress of the great enterprise as we have been able to gain from personal observation. Of the prospective advantages to be derived from the tunnel, as regards mining operations on the Comstock, we leave our readers to judge for themselves. At the present rate of progress the header of the tunnel will reach the eastern corporate limits of Virginia inside of two months, and before the first of January, 1878, will strike the Comstock at a point 100 feet south of the Savage shaft at a depth of 1,750 feet below the surface of the mine. The rate of progress for the month of January was 388 feet and for the month of February 361 feet. The total length of the tunnel, from mouth to header, is 3 1-11 miles, approximately speaking, or 16,310 feet. The men employed in driving the header are skilled workmen, many of whom worked for years in the Hoosac tunnel, Massachusetts. They are pushing forward the work with tremendous energy, an extra stimulus being offered in the way of extra pay for all advancement made over a specified number of feet during the month. The bonus thus distributed among the miners for the month of February amounted to \$1,000. The aggregate number of men employed on each of the three hour shifts is 24.

The Drilling Machinery.

The most effective agency which within the past two or three years has revolutionized and greatly expedited the advancement of the tunnel is the drilling machine, driven by two powerful air compressing engines stationed at shaft No. 2, at present 9,000 feet distant from the header. The drill carriage, 30 feet in length and very substantially built, armed with six 12-foot Ingersoll steel-pointed octagon inch and a quarter drills, widening out two and a half inches, is rammed up to the face of the header and set to work drilling holes to the depth of eight feet, each separate drill making 300 seven-inch strokes per minute with a striking blow amounting to nearly 1,000 pounds, oftentimes twisting the drills out of shape or breaking them like pipe stems. The din of this huge engine of war hammering away at the face of the header with tremendous blows, is such as to render conversation impossible for a distance of a quarter of a mile. The time occupied in drilling the holes to the number of 12, averages about six hours, in hard rock. The harder the rock the faster the rate of progress. A jet of water shot into the holes, alongside of the drills, dislodges and drives out the drill dust. The amount of giant power consumed in 24 hours ranges from 150 to 200 pounds. Great caution is required in firing the blast, which is done by electricity, as there is danger of knocking down two or three sets of timbers if the charge is too heavy. The concussion from the blast is such as to knock a man's hat off at a distance of half a mile from the header. Immediately after the blast is fired, the valves in the compressors and reservoirs are opened and the bad air and powder driven out, about half an hour being required for this purpose. A long train of cars, to the number of twenty or more, drawn by two mules, speedily arrives, when the work of removing the waste rock commences energetically. Half an hour is required in making the trip from the header to the mouth of the tunnel, the waste rock dumped on the outside being used in forming the walls of an artificial lake. Mr. Sutro claims that when the tunnel is completed the trip can be made by steam in 12 minutes.

The Tunnel Itself

Is as straight as an arrow and is a signal triumph of engineering skill. For the entire distance from the entrance to the header it is ten feet in width and eight in height, with ample room for a double car track the whole distance. For 1,000 feet or more from the entrance it is enlarged still more, and is provided with double timbered alleyways. Where the ground passed through is found to be soft and treacherous, the sets of timbers fairly touch each other; in other places the rock is sufficiently hard to make the work of timbering unnecessary. The grade of the tunnel is three inches for each 100 feet. The present flow of water averages 130 miners' inches. The line of the tunnel passes the combination shaft of the Savage, Hale & Norcross and Chollar mining companies, at a point 200 feet north of the same.

A Subterranean Ride.

At the time of our visit to the tunnel, being desirous of making a personal inspection of the same, the "Superintendent's car" was kindly placed at our disposal—not exactly a Pullman, but a modest, low platform car, capable of accommodating two persons besides the mule driver. Divesting ourselves of our every-day apparel and donning an india-rubber coat, with overalls and gum boots, we took our seat on the ke-ar. A frisky mule by the name of "Dandy" was detailed to haul our party into the tunnel. His right eye was blindfolded as he came from the stable, but the blind was removed when he got the word to go. At the given signal he rattled off at a lively gait, and we found ourselves plunging along through the tunnel, leaving daylight rapidly behind us. Riding back-

wards, we watched the entrance daylight growing smaller and smaller until it seemed like a bright shining star; then smaller and smaller still until it assumed the dimensions of a pin-head; at the distance of two and a half miles it went out altogether. Our readers will be surprised, perhaps, to know that the curvature of the earth has something to do with this phenomenon. Of this we may have more to say hereafter. After a ride of ten minutes there was a perceptible increase in the temperature of the tunnel, which was decidedly conducive to perspiration. As we kept on we perspired more and more freely all the way to the header, although the temperature at that point is only 89° Fahrenheit. In passing into the tunnel you travel with the air current. In going out you run against it, the air being cool enough to make an overcoat acceptable. When the tunnel reaches the line of the Savage mine it is estimated that a current of air will sweep through it strong enough almost to lift a man off his feet. Up to the present time a number of heavy streaks of quartz, carrying ore, have been passed through by the tunnel, but no large body of ore. The problem of what benefit the tunnel is to become to the Comstock will be solved ere long. The successful completion of the undertaking may now be regarded as an assured fact. The moving spirit in the enterprise is

Adolph Sutro,

A man of giant constitution and indomitable enterprise. No other man, in all probability, in the face of the opposition he has encountered, could have accomplished what he has. Whether in Washington, New York, London or Paris, he is constantly supervising and directing the prosecution of the work, even to the minutest detail. His whole heart and soul is in the undertaking; in short, it is the one great work to which he has devoted his life. Mr. Sutro is sanguine that the tunnel will greatly benefit the mining interests of the Comstock. He says that when the tunnel is completed he will engage to deliver wood in Virginia at \$8 per cord, and then he can haul low grade ore to mills on the Carson for ten cents per ton. In reply to our question as to what course he would take if the mining companies refused to avail themselves of the proposed advantages of the tunnel, he replied that he would not enter into litigation with them, but that he would bulkhead the tunnel so tightly that not a drop of water from the mines should pass through it.

The Management

Of Sutro tunnel affairs is under the direction of the following named gentlemen: General Superintendent, Adolph Sutro; Assistant Superintendent and Cashier, R. S. Raw, Head Foreman, John Bluet; Foreman at shaft No. 2, Edward Biddle; Shift Bosses, Harry Bishop, John Sullivan, Robert Andrews; Foreman of the machine shop, Peter Savage; Chief Clerk in charge of store-house, Joseph T. Banks, son of Hon. Nathaniel P. Banks, of Massachusetts; Master of Transportation, Geo. Rammelkamp; Sutro's Private Secretary, Frank S. Young, a nephew of General Winfield Scott; Civil Engineers, Messrs. Brown and Hoffman; Surgeon and Physician, Doctor Bolan. One hundred and five men are employed in and about the tunnel, and some 50 mules.

From an editorial in the *News* on the same subject we extract the following:

Summing up the whole matter the following are among the merits and advantages to be accorded to the Sutro tunnel.

First.—It is the most important prospecting enterprise on the Pacific coast, as it is very liable to open up new mines east of the regular Comstock, and is even now entering upon very interesting ground where important developments may be encountered at any time.

Second.—It can be made to assist very materially in the working of the Comstock mines, as affording far better, much less expensive and more thoroughly efficient drainage than can be obtained by any other means.

Third.—It should prove beneficial in the way of ventilation in the mines, and also as a means of escape in case of fire, a cave, or other unforeseen accidents.

Fourth.—It might prove profitably available in the extraction and milling of ore from the Comstock, and especially from mines east of the lode.

Fifth.—In bringing in supplies of wood from Carson river for the mining works and mills of the Comstock at cheaper rates than rule at present. Some other advantages might be enumerated, but the foregoing are sufficient.

We have endeavored in this article to show that while not indispensable to the working and drainage of the Comstock lode, the Sutro tunnel can be made of great advantage and valuable utility in that respect. The greatest and in fact the only objection we have ever urged against the project was the "royalty" of \$2 per ton claimed by the Sutro Tunnel Co. This royalty was honestly forfeited long ago through failure to perform what the royalty was granted as a consideration for—the drainage of the mines of the Comstock. The tunnel will not be completed for several months; yet the mines have been worked for hundreds of feet below the tunnel level without any advantage or assistance whatever from the tunnel.

In conclusion: If Sutro would abandon the "royalty" proposition, cease striving for what he has not earned and does not rightfully belong to him, and depend upon the real merits of his tunnel for success, he would do well enough. Moreover, he would find the mining companies no longer antagonistical, but willing to meet him more than half way on any proposition for mutual advantage.

Nevada's Resources.

The population and wealth of Nevada bear but slight proportion to the value of her product and the extent of her resources. In the first place we are the least of all States in the Union, but in value of products in proportion to population we may claim the highest rank. These are shown by the figures of the statistician, and are proof of a wealth unequalled in any part of the known world. With a population of about 60,000, we produce annually about \$40,000,000 in gold and silver, besides other minerals, manufactures and the products of grazing and agriculture. From the great yield of our mines, this has obtained the sobriquet of the "Silver State," and well does she deserve it. From \$35,000,000 to \$40,000,000 of treasure a year for so small a population is most wonderful and should attract the attention of every one throughout Christendom who can read or hear the statement. With such production and such evidence of wealth, our slow advance in population and development is a subject of inquiry. It has been the popular custom to speak disparagingly of the State, of its sage-brush plains, its barren hills, its alkali deserts and its cold climate, constantly comparing the latter with that of California and all similar comparisons as unfair.

From this pernicious and unpatriotic custom a bad impression has been made abroad that has deterred many from seeking this for a home. Also it has been, and still is, the custom to speak of mining as but a temporary resource that is in danger of exhaustion every succeeding day. They say the State is thoroughly prospected and all parts occupied. The same was said 10 years ago; nevertheless, discouraging as the constant repetition of it is, explorations have gone on, new discoveries have been made, the production increases and a slight advance has been made in the population. From 50,000 in 1865 to 60,000 in 1875 is not such an increase as could have been expected, and by no means has it kept pace with the increased production of the precious metals. We contend that the mineral developments of the present time justify and demand, for their proper exploitation and the business consequent upon them, a population of several hundred thousand. New mines are every day discovered in some section of the State, and still there are thousands everywhere that have been but partly opened and abandoned after giving undoubted proof of great value, and, which, under different circumstances, or if in other countries, would be worked with great success and profit. In every mountain range of Eastern Nevada are silver-bearing veins, and each range constitutes a territory equal in size to the mineral regions of Devonshire and Cornwall, England, and generally of greater wealth of mineral deposits, yet either of those counties contain a larger population than our entire State. The mines have been worked for many hundred years and still give forth their treasures, and there seems to be no danger or expectation of their exhaustion. In other sections of the world are mines equally as lasting, then why should it be expected or said that the mining interest of any locality of this State can be only temporary? Nevada is a new mining country, appears to be one of the richest ever known, and it may be calculated to be as lasting.

The great Comstock ledge seems to be taken as the unit from which all must be reckoned, and if they do not come up to it they are, by the great part of mining operators, treated derisively and with neglect. It is seldom considered that if there was no Comstock ledge we would still have the richest mineral region now known. That being the first discovery and of a size and value previously unequalled, caused a concentration of energies upon it, and there the attention is still riveted. While it is worthy of its fame, we hope to call the attention of the world to the great undeveloped wealth of other sections of the State. Our own great ledge we have previously shown to be a fair rival of the Comstock, but it is so undeveloped that but few understand its grandeur and character. It is traceable for upwards of two miles in length and where explored shows a size and value not inferior to the great vein of the West. In the few years it has been worked \$40,000,000 has been taken from it, and it may be said that as yet, has been scarcely opened. Here is a field for capital and labor of the most inviting character. Here is the basis for a city as large as Virginia, and more pleasant as a place of residence; and here too we expect to see such a city. East and west of us are as important districts, containing ledges in great number and value and almost without occupants. On all hands it is conceded that White Pine mountain is a vast storehouse of base ores, but without development, and capitalists are unreasonably shy of it. The English capitalists, who through many discouraging circumstances, continued the working of the Eberhardt and Aurora, at Treasure Hill, have never had cause to regret their investment. Without doubt many of the mines in the hill will prove as valuable and that district will regain its former good name. Further east is the new district of Ward, where are a number of very large and very rich ledges, each of which claims a bonanza equal to the Con. Virginia or California. There, it is claimed by the enthusiastic mine owners, will be the great city of the State, and we hope their expectation may be gratified. There are districts too numerous to mention throughout the State where large communities would be most profitably engaged. —*Eureka Sentinel.*

USEFUL INFORMATION.

How they Raise a Ship.

The apparatus used for raising one of the heavy iron Atlantic steamers is quite extensive. A correspondent who witnessed the operation writes: Over the entire deck are massive chains, ropes as large as a man's leg, and blocks and falls that seem big and strong enough to move the whole Transatlantic Company's fleet. This network of chains and cables and blocks and falls resolves itself into five immense hawsers, that lead from the stern and the starboard quarter of *L. Amerique* far out into the sea, at the bottom of which they are anchored and held in yet firmer place by other equally large cables, also anchored, which cannot be seen at all. The first of these great hawsers is a 15-inch rope, 206 fathoms in length, and its anchor is made doubly secure by a chain of two and three-eighth inch wire, 15 fathoms long, held by an anchor weighing 4,500 pounds. The second hawser is 200 fathoms long, and is worked by the forward donkey engine. The chain attached to the anchor of this cable drags its own anchor of 4,400 pounds. The third hawser or cable is worked by an after donkey engine, and is 200 fathoms in length and 15 inches in circumference. Bent on above the 4,200-pound anchor that secures this cable is another cable equally large and nearly as long, secured by an anchor weighing two tons. The fourth and fifth cables lead direct from the stern of the steamer, and are each 160 fathoms in length. Each is strengthened by a duplicate of itself, and held by anchors weighing more than 4,000 pounds. The two hawsers leading from the vessel's stern are to pull her straight backward out of the sand she lies in, and the three great cables that are run out from the starboard quarter are to ease her gently outward toward the sea as she is dragged along. At first the cables were all run out from one side and anchored, so that they pulled more from the side than the stern, but the high walls of the sand bed in which she has settled were insurmountable. With the present arrangement, the waves that whirl past her stern keep eating out the sand ahead and open a roadway as she moves. In working, all the cables are tightened until they are stiff and straight. They are so flexible and elastic that, with a steady, even strain upon the vessel, they gradually slacken lower and lower, easing the ship along until they sway with their own weight.

TO MAKE STONE WALLS WATERPROOF.—A correspondent asks the *Journal of Chemistry* for a process which will make stone walls waterproof. What is known as Sylvester's method has been thoroughly tested, and so far as we know has proved effectual. It is said to have been applied to the walls of the gate-house of one of the New York reservoirs, and to have remained impervious to water under a head of 36 feet after a trial of six years and a half. The process is described as follows: Dissolve castile soap in water, three-fourths of a pound to the gallon; dissolve one half pound of alum in four gallons of water; both to be completely dissolved before using. The walls should be clean and dry, and the temperature of the air not below 50° (F.) when the solutions are applied. First, with a flat brush lay on the soap wash boiling hot, taking care not to form a froth on the brick-work. Let this remain 24 hours, to become dry and hard; then apply the alum wash, which may be at a temperature of 60° or 70° and allow it to remain 24 hours before repeating the soap wash. Repeat the washes alternately till the wall is impervious to water.

DEPOSITION OF STEEL ON METALLIC SURFACES.—Prof. Boettger, a pioneer in the solution of this problem, suggested for this purpose, some 30 years ago, the use of the double sulphate of iron and ammonia, as an electro-plating bath. Since that time Pro. B. has greatly improved upon his original observation, and now suggests the following procedure: He dissolves 10 grammes ferro-cyanide of potassium and 20 grammes of tartrate of sodium and potassium in 200 c. c. of water, and adds thereto a solution of sulphate of iron in 50 c. c. of water. The result of this addition is a small deposition of ferro-cyanide of iron (Prussian blue). If now a solution of caustic soda is added, drop by drop, the blue coloration entirely disappears, and a perfectly clear solution results—which is the bath employed. The deposit is affirmed to be extremely hard and durable. If the steel coating should become injured by the bending or protracted use of the plates, it can be easily removed by the use of hydrochloric acid and re-deposited.

FLUX FOR CAST STEEL.—The *Revue Industrielle* describes a flux for cast steel as follows: One of the greatest difficulties to a smith is the welding of cast steel, and this is an operation in which he rarely succeeds. A mass of ingredients and recipes are sold for the purpose of welding cast steel, but the simplest and best method is the one employed by Mr. A. Fiala, of Prague, Bohemia. He uses pulverized white marble for the purpose. The two pieces to be soldered together are heated, and after rolling the same in marble dust, promptly joined together and subjected to a good hammering. By this means we are able to weld the smallest pieces together.

Experiments Upon Cements Used in Gas-Holders.

La Compagnie du Gaz Parisien, previous to constructing some large gasometers near Paris, experimented on the different materials to be used in their construction; among others, on the cement which was to be used for the vertical walls of the reservoirs (*caves*), with the following results: The cement used was Portland cement of Pouilly, in Burgundy. It was found that a brick of pure cement six weeks old, which had been kept in water during that time, broke under a tensile strain of 170 pounds to the square inch, 12 kilos. per square centimeter; but a brick six months old, which had also been under water, broke a strain of 441 pounds per square inch, 31 kilos. per square centimeter; that cement hardens more rapidly, when exposed to the sunlight and fresh air, then when affected by humidity; but that this is at the expense of the tenacity and impermeability of the product; hence masonry walls should be sprinkled regularly until the cement is set; that the degree of fineness has an effect on the setting of cement, and consequently upon the ultimate tenacity, for it is a rule that the tenacity is in inverse proportion to the rapidity of settings; that a mortar made of two parts sand to one of cement broke under a strain of 277 pounds to the square inch, 19 kilos. per square centimeter, while a mortar of equal parts of sand and cement broke under a strain of 427 pounds to the square inch, 30 kilos. per square centimeter. The effect of sand upon the shrinkage was shown by the fact that pure cement was defaced by cracks a little more than a foot apart; when mixed with equal parts of sand, the cracks were little more than a yard apart; when three parts sand to one of cement were used, there were no cracks at all; hence it was this mixture that was used in constructing the reservoirs. —*Van Nostrand's.*

GOOD HEALTH.

Vegetable Diet.

EDITORS PRESS:—The writer has well considered the subject of sickness and health for many years past, and one of the many duties in our daily life is the question of diet, the most proper food, to promote health and longevity in the human race. And now as the question is up for discussion, allow me to join hands and state my experience:

Some 20 years since, I fell in company with gentlemen from Michigan, on a Mississippi boat, bound for St. Paul. I was attracted to the man on account of his freshness, fine health, active and youthful appearance. I did not judge him to be over 40; but when I learned that he was full 20 years above those figures, I had the curiosity to enquire of his mode of life; he informed me, that strictly, he was a vegetarian, with the exception of butter, fish and eggs, and no intoxicating drinks or other narcotics; never had a day of sickness; in fact, he was a perfect picture of health.

I came to the conclusion that whatever a person eats and drinks is done to satisfy the craving of his body, and that as edibles are applied to sustain the constituent parts of the whole system, every function is maintained from the food taken up, from the earth and the elements. It is allowed that this body is rejuvenated once in every seven years or less, that which makes up the bodily frame to-day, passes away, and within the seven years a new one supercedes the old. And supposing that by ill health, or any cause, you lose 30 pounds of flesh, and, again, in a brief period, this falling off has been more than fully restored again unto you. And during this time of gain, what was your principal diet? "Hog and hominy" is the response. Then, of course, you replace this loss by a draft upon cooked corn and hog. One-half of this new flesh is laid on from the consumption of the flesh of the swine, and here is where scrofulous and other loathsome skin diseases take their rise. The pork boils out in a natural way to relieve you from sudden death. How little thought is given to this important subject.

I would simply question the reader, who feels interested in the best method to promote long life and enjoy good health for himself, and his or her family and who is ascending the ladder of life, whether he ever paid any attention to the life and habits of swine? Have you ever witnessed their greed in gobbling up food, scattered carelessly upon a manure heap, or in a pool of filthy mud? or have seen them ravenously devouring some dead animal, which might have been as blue as a fishing-hook? at the same time, perhaps, holding your breath as you pass by, to keep off the stench. Ah! vultures could do no less. Remember those great swine shepherds, "out in the West," who have been losing their porkers by the hundreds, dying with a disease called the "hog cholera," and is it not supposable that all of these swine shepherds are suffering this dead loss to pass without some gain?

The United States Agricultural Commission reports, that in some counties—where great attention is given to the raising and fattening of swine—that 95% have died by cholera. Even if you were living upon the five per cent. saved, how could you feast upon it quietly and with a relish?

The writer who now stands at the foot of his

70th year, apparently in perfect health, claims that he has suffered but little—perhaps one per cent.—from sickness or prevailing epidemics, from his youth up. His simple and regular diet has been of a vegetable nature mostly; one-third of his food, at least, has been bread, milk and fruits. Up to 28 years of age, his living consisted most wholly upon bread and milk, with apples baked or in pies. At this age he was told that he "looked like a great baby," and he takes up this philosophical reasoning thus, that the child-like countenance was the result from living as the child lives, always eating and sleeping at regular hours, doing all his business and labor by sunlight. At 45, he carried as youthful, as healthful and fresh-looking face as others at 30 years of age. He has never been addicted to the common use of tobacco or spirituous liquors and tea or coffee.

It is very uncommon to find a vegetarian's clothing saturated with a tobacco stench, or caught unloading the filthy juice of tobacco upon others carpets and floors.

Why is not that food which comes directly fresh from the products of the earth as palatable, useful and healthful as that which is first modified by the animal creation?

Is it not a mistaken notion, that mankind must daily devour meat to bring him the strength and health to endure labor? The stomach assimilates and accommodates itself to the uses to which it is obliged to yield to satisfy the whims of its master or gormandizer.

Rice has been for ages the principal food of the Chinese. You find them generally looking hale, stout and cheerful, and they subsist upon and require less food than the average American; the cause of which may be solved in this wise: Like any person who lives mostly upon one kind of food, the demands of his stomach are satisfied and require less to satisfy his hunger; and then again, instead of scooping up his rice and forcing downwards, without proper time given to masticate, the Chinese takes up his food with a pinch, between two long sticks, and but very little at a time, which food is mixed with the gastric juices before it leaves his tongue. Nature, in this case, governs the quantity, not the "appetizer," which the epicure has to call in, as "side issues," and this is the secret of the Chinaman's "living so cheaply." They look more fat and fair than our American born people do.

If you care to live a long life, with health as an accompaniment, you will do the best to discard the flesh pots of Egypt, in the main, and choose more from the grains, fruits and vegetables. There is no grain diet more healthful than oat-meal, properly cooked and prepared. When properly served up it is delicious; and even buttermilk has its votaries, its strong, healthful, old and honored friends. Tropical fruits are good and useful in their seasons.

As a rule, those who eat the least meat and drink the least stimulants will be less troubled with the gout, ruptures and skin diseases of every nature. In fact, vegetarians usually escape fevers and other ailments, and with regular outdoor habits, are generally the longest-lived and the most happy people.

SOLOMON W. JEWETT.

Merino Farms, Kern Co., March 20th, 1877.

[There are strong points in favor of Mr. Jewett's position, and he is a grand "living example" of a life of temperance and moderation. The subject is, however, possessed of a negative which can be strongly fortified.—EDS. PRESS.]

Remedies for Phosphorus Poison.

So great use is made of phosphorus in the different industries of this coast that we have thought a list of remedies, in case anyone should take the poison into his system, would be valuable for all to preserve for reference. *The Doctor* says: The treatment of cases of phosphorus-poisoning is not very satisfactory. The stomach should be thoroughly evacuated. The best emetic appears to be sulphate of copper, inasmuch as Eulenberg, Guttmann, and Bamberger have shown that phosphorus quickly combines with the copper to form the less active phosphides. The minute particles of phosphorus adhere very closely to the mucous membrane, and can only be dislodged by chemical means. Hydrated magnesia, lime-water, liquor chlori, and chloride of lime have been recommended as oxidizers, but their action is too slow to be of any use. Turpentine appears to be the best antidote. It unites with the phosphorus to form a spermaceti-like, crystalline mass, which is soluble in ether, alcohol, and alkaline solutions, and can be eliminated unchanged by the kidneys, without injuring them. Perhaps it also promotes the oxidation of a portion.

It seems that the common commercial turpentine is the most effective, probably because it is richest in ozone from having been exposed to the air. Turpentine appears also to prevent fatty degeneration of the tissues. To repair the damage to the blood Jurgensen has employed with success transfusion, and Dr. Roussel's improved apparatus makes this operation more available than before. Schousard and Dybkowsky attribute the poisonous effects of phosphorus to its depriving the tissues of oxygen by being converted into phosphuretted hydrogen, and this into phosphoric acid at the expense of the blood, and then the tissues it feeds. The readiness with which phosphorus combines with all fatty matters renders it imperative that animal fats should be wholly excluded from the food of patients recovering from poisoning by solid phosphorus.



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, March 31, 1877.

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NEW ADVERTISEMENTS.

Notice of Assessment.—Dolores Consolidated Mining Company; Wanted, "Sawyer," N. Y.

THE PLANET VULCAN.—Professor Davidson was at the summit of the Sierras on March 21st to 23d, on the lookout for the possible transit of Vulcan over the sun's disc, reports that the weather was favorable except on the afternoon of the 21st, and late on the afternoon of the 22d, but no signs of a planet were visible, although one spot and disturbed area was seen on the 21st and 22d, and a second disturbed area appeared on the 23d. These were important as indicating what size of spot could be observed, and it is believed that had the planet appeared with a diameter of five seconds of arc it would very readily have been seen. The disc of the sun is reported to have been very sharply defined during the greater part of the time of observation. In this city Mr. Pratt of the Coast Survey made similar search for the planet; and at San Bernardino, W. G. Wright of that place, with less favorable weather, observed through the three days. The former saw the spot on the 21st and the disturbance on the 23d, and the latter saw the spot on the 21st. These observations indicate that, at the time of observation on this coast no planet was visible on the sun's disc.

The persons who committed the outrage of killing four Chinamen on Lemm's ranch at Chico, Butte county, last week, have all been arrested. There are five of them; they have confessed to the outrage and also to others which have been committed in the vicinity. They have been taken to Oroville to await the action of the Grand Jury. There is considerable excitement over the matter, and the citizens of Chico are determined to go to the bottom of it, there being a suspicion that other persons are implicated as well as those already arrested.

ALMOST the entire business portion of Humboldt Wells, Nev., was burned up on the 25th inst. The railroad depot was also burned, but the round-house was saved.

California Mines.

The California mining interests have to shoulder the blame of a good deal more than they ought to. If a mine on any part of the coast proves a failure, or the managers get up a swindling operation, no matter whether the mine itself is in Nevada, Arizona, or Idaho, the people in the Eastern States, when they hear of it, lay the whole thing to California mines. This is one very important reason why California mines are in bad repute in the East, and why it is very hard for any one to enlist the aid of Eastern capital in developing California mining property. Stock transactions also have had their effect in bringing about this state of affairs. It is of course difficult to get people who are so far away to understand the difference between one mining locality and another, or to understand the difference in mines, or the way they are managed or worked. Some of the newspapers which should know better occasionally publish paragraphs which mislead their readers in this matter. Witness the following from a late number of the *Engineering and Mining Journal* of New York, in speaking of transactions at the stock board in that city: "The California stocks are, as a rule, wisely let alone, and are thrown about among the brokers on washed sales in the endeavor to entrap some unwary outsider into parting with his money."

This is a nice reputation for the stocks of California mines to have in the largest city in the United States. It would be bad enough if it were true; but when California mines have to take an evil reputation which belongs to those of other localities, it is worse. The *Journal* probably meant when it spoke of California stocks to include all those which are called at the stock boards in this city; but the phrase is apt to convey a wrong impression, and is one which has done much harm before this to the mining interests of this State. In the same paragraph, however, it is stated that a certain Consolidated mining company, of Colorado, "has sold from \$2.50 up to \$4.00 with fair transactions, and will probably become a prominent stock." Seeing the two ideas we have quoted in the same paragraph, would lead one to suppose that all the California stocks were swindles and that the Colorado stocks were a much better investment.

Without at all intending to detract anything from the Colorado mines, it is but just to say that as between those of that State and this, the Eastern people have lost much more in Colorado mining ventures than in California. This, for the reason that being nearer at home, they invested there in preference to here; and knowing very little of the business, they went into it in an extravagant manner, and many failures were the result. Now they have gained wisdom with years, and mine more carefully, although the early experience of Colorado still has its effect on the mining interests of the new State.

As far as California stocks are concerned, it is a great mistake to suppose that there are many of them even here in the State. Most of the California mining is done by small companies or by individuals. Some of the companies are stock corporations, but very little of the stock is ever sold at the stock boards. Whenever it is sold it is a private transaction, just like any other business. It may surprise some to know that of all the long list of mines called on the San Francisco Stock and Exchange Board only twenty-two of them are California mines. It may be still more a matter of surprise to be told that these twenty-two mines have paid since they were listed the sum of \$2,651,500 in dividends, against \$962,000 in assessments, or \$1,689,500 more than expenses.

California mines are not often listed on the board—they are not favorites with brokers, and individual capitalists can make more out of them legitimately than by stock transactions; it is for these reasons that so few are on the boards. With these figures before them any one can see that the general opinion of California stocks in the East is unjust, and that the mines of the State have to bear a reputation that belongs somewhere else. It is very evident that twenty-two mines comprise a very small proportion of the thousands there are in this State, and still they are all the "California stocks" called at the board; so that even if the flings at such stocks were just and the figures given above prove them not to be, they would not prove anything against the mining industry of California.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Modoc, March 20th, \$4,345—total to date, \$42,642; Tybo Con., 17th, \$16,604.58—total to date, \$53,406.86; Con. Virginia, 21st, \$21,280.43—total to date, \$189,847.03; California, 21st, \$171,990.62—total to date, \$803,268.89; Ophir, 21st, \$7,045.26; Northern Belle, 20th, \$10,154.65; Modoc, 22d, \$8,962—total to date, \$51,604; California, 24th, \$250,695.79—total to date, \$1,053,964.68; Con. Virginia, 24th, \$42,356.80—total to date, \$232,203.83; Grand Prize, 24th, \$7,600; Tybo Con., 21st, \$10,906.37—total to date, \$64,313.23; Grand Prize, 24th, \$7,634.32; Modoc, 24th, \$4,779—total to date, \$56,383; Ophir, 26th, \$8,127.27; Arizona, 25th, \$2,083.61; Northern Belle, \$14,869.41; Con. Virginia, 27th, \$49,158.22—total to date, \$281,362.05; California, 27th, \$163,974.78—total to date, \$1,217,939.46; Manhattan, 26th, \$11,200; Grand Prize, 28th, \$5,400—total to date, \$68,684.46.

Foundry Notes.

There is not very much activity manifested in the foundry business so far this season, although it is rather early yet to expect any increase over that of the winter months. At the

Golden State Iron Works

They are making a large lot of Frue's concentrators for a company working the gold beach sands on the northern coast. These concentrators have been tried on this work and are found to answer the purpose admirably. It is expected that a much larger number will be made as soon as those now being constructed are fairly at work. The owners of the mine for which they are now being made think that this machine has solved the problem of working these sands. An illustration of this concentrator will be found elsewhere in this issue.

They have just shipped from this foundry a complete 20-stamp mill for working gold quartz at Sherman City, Idaho. They are now making 24 drying cylinders for the Sulphur Banks quicksilver mine and some quicksilver retorts for the same place. They are also making an eight-inch mining pump for a mine near Coulterville, Mariposa county, and sending off a lot of small castings to the Comstock.

The Sacramento Boiler Works,

At No. 47 Fremont street, corner of Mission, are busy on several jobs in their line. In the shop now is a new patent boiler which they think will be a first-class thing. It is the invention of Mr. E. H. Thompson of this city, and this is the first one made. It has two fire boxes, hanging one inside of the other and has about three times the heating surface of an ordinary boiler of the same size. The two fire boxes are connected with four pipes for circulation of the water at the bottom, with a combustion chamber at the top. It is claimed for this boiler that it is a great economizer of fuel. It is stated that it will raise steam in about fifteen minutes and keep up steam with about one-third of the coal used by an ordinary boiler. This boiler will be used by Mr. Miller in a grist mill in this city.

They are also making at these works a small boiler to go in a launch to be used on Clear lake. This launch is to be run by jets of water forced from its sides by the steam, against the water in which it floats; no propeller or wheel will be used. This principle has lately been tried in England with more success than when experiments were made with it formerly. The boiler in this case is quite small and is of a new type. The same firm made the boilers for the steamer *Lakeport*, which has lately been provided with new machinery and is now running on Clear lake. Messrs. Hall & Kelshaw, proprietors of these works, inform us that they design, if possible, to have completed for exhibition at the next Mechanics' fair an iron steam launch to show the people of this city that such things can be made here as well as in England. Both of the proprietors have had a great deal of experience in this line in England in the large ship yards, and desire to do something of the kind on this coast. They have no room in the shop for this work just now, but if work admits it they will start a launch and have it done in time for the Fair. They are making also at present a number of iron tanks for an oil refinery in Los Angeles county. They are busiest at present, however, making tanks for the new

Beet Sugar Mill.

This is being built for the California Sugar Manufacturing Company, an enterprise which is about ready to start up. There are 250 of these tanks to be made altogether. The largest are 8 feet by 4x4; the next size 8 feet by 4x4; and the others are smaller. The sugar mill for which these are intended is on Andrus island, beyond Sherman island on the San Joaquin side. F. A. Roe, of Oakland, is the principal owner and President of the company. Most of the other stock, we believe, is owned by farmers in the neighborhood of the mill. The farmers near by have taken a contract to furnish beets for \$4 per ton; there are 600 acres in beets on the island now. The company do not propose to raise any beets themselves but will leave that to the farmers, as the experience of other factories has proven that it costs them about \$10 per ton when the companies attempt to raise them. The mill is rather small, being of 40-ton capacity. It is a second-hand one and was originally put up in Hungary for making melon sugar. It was brought here to make that kind of sugar also, but it was impossible to get any one who understood perfectly how to run it to make melon sugar, so it has been reconstructed and turned into a beet sugar mill. Those who have hold of the enterprise now are represented to be energetic men, and mean to make a success of it if possible. They have a good Superintendent in Mr. Ortman, who was at the Sacramento Beet Sugar Works for three years. With the exception of the tanks now being made the mill is all ready for business.

On the 1650-ft level of the Consolidated Virginia mine the slacking and swelling of the ground in many places has been so great that it has been found necessary to timber in the most secure manner portions of the drift that appeared to be perfectly solid and impregnable before the current of air reached it.

The United States Mining Laws.

We are frequently asked questions concerning the changes in the mining laws of the United States, the inquirers seeming to suppose that the laws relating to mines are frequently changed. This is not so; but when any changes are made by Congress we are always careful to give the amended sections in full and explain the changes. The law of May 10th, 1872, is the mining law of the United States, all previous laws having been repealed by that. No laws affecting mines have been passed up to March 4th, 1877, since the act of May 10th, 1872, except the acts of June 6th, 1874, extending the time for labor to be done on mines located prior to the act of 1872; of February 11th, 1875, providing that money expended on a tunnel run for developing lodes, shall be considered as expended on lodes; and of May 5th, 1876, excluding Missouri and Kansas from the operation of the mining laws.

There are, however, frequently decisions of the Commissioner of the General Land Office concerning questions relating to the mining laws. Decisions are also given by the Secretary of the Interior, either confirming or reversing those rendered by the Commissioner. These decisions are considered merely explanatory of the existing laws; that is the interpretation given them by the officials before whom conflicting rights are settled. Neither the Commissioner of the Land Office nor the Secretary of the Interior have any power to change the laws passed by Congress any more than a private citizen would have. The laws themselves, like most laws, are capable of so many interpretations that the decisions of the officials referred to sometimes seem like changes of the laws. Important changes of practice are sometimes made, but no real changes in the law itself except by act of Congress.

The United States mining laws have been codified in common with all United States laws; that is the act of Congress of May 10th, 1872, has been made part of the code and is now numbered in sections in the code in a little different form than it appeared in the original act, but it has not been changed in the least, except in the instances mentioned above. We published in pamphlet form some time since these laws precisely in the form in which they appear in the code, with the proper numbers to the sections, etc. In the same pamphlet are the laws relating to coal fields, placer mines, mineral sections, etc., so that everything relating to mines and mineral lands is handy for reference, and miners need not consult lawyers to find out what the law is.

Mining Patents.

Since our last list patents have been issued for the following mining claims:

California—El Dorado county: O. D. Lombard, Mount Pleasant quartz mine. Inyo county: Hudson River M. Co., mine of same name; Wm. A. Greenly, Ignacio silver mine. Nevada county: Eureka Con. Co. Eureka copper mine; Omaha Co., Omaha mine. San Bernardino county: Heirs of Isaac Ogier, Jesus Redondo and Ramona quartz mine. Oregon placer mines—Baker county: Gadlair, Grant Co., S. C. Hollis, John Long; Jackson company, William Hoffman, J. A. Wilson. Josephine county: J. H. Reed, James Steel. Nevada—Eureka county: Jackson M. Co., Wilson and Jackson mines; A. Benedict and others, Bald Eagle lode. Nye county: Barcelona M. Co., Barcelona mine No. 1, south extension. White Pine county: Tehama Con. Co., Allen No. 2 and War Eagle lodes. Arizona—Solomon Warner, Eicantine mine; Keystone Nos. 1 and 2 G. and S. M. Co., Keystone mine.

Utah—George A. Lowe and others, Grand Chief; John A. Hughes and others, Hawkeys mine.

NICARAGUA MINES.—Robert Teats, who is mining at San Ramon, Nicaragua, has taken a 10-stamp mill from San Francisco down to the mines. The mill was to have started up the middle of last month. The ore in the mines there pays from three-quarters of an ounce to three ounces per ton in gold. In a private letter to Cincinnati, Mr. Teats says the mines are huge, there being any amount of ore, the only question being that of proper reduction works. Two of the ledges, which are traceable for three miles in length, have been worked by the natives for half a century. Timber and labor are both cheap. Mr. Teats is in 200 feet on a four-foot ledge. The Leonese mine, which is worked by a tunnel, has out 200 or 300 tons of ore, which is worth from \$15 per ton upwards. Most of these mines have been worked by arastras, and we believe the mill referred to above is the first one at the mines. We should be pleased to hear direct from Mr. Teats about this interesting mining field.

In the Hale & Norcross mine the struggle with the flow of water still continues; sometimes the pumps will get the control and the water will be rapidly lowered for several feet, then a delay in the joint operation of the Savage pumps, caused by some breakage or bad working of the machinery, will let in a flood that the Hale & Norcross pumps will not be able to keep down, and the water will again rise rapidly in the shaft. It is now held in check at a point about 22 feet below the 1900-foot station.

First Settlement and Early History of the "Eastern Slope."—No. 1.

The phrase "Eastern Slope," as formerly applied to a section of country, may be supposed to have covered a district corresponding in extent to what is now denominated Washoe, being that part of the State of Nevada comprising the counties of Douglas, Ormsby, Storey and Washoe, with the western portion of Churchill and Lyon counties. This region was so designated because of its position on and beyond the easterly slope or declivity of the Sierra Nevada mountains, and the name was retained in popular use till the discovery of the Comstock lode, when it gradually gave place to Washoe, the new mines being in the territory inhabited by the Washoe tribe of Indians. Prior to that event the people of California always spoke of this region as the "Eastern Slope." Afterwards and for several years it was universally called Washoe, which term is in turn being superseded by Nevada, the name of the State.

The First White Settlements

In this region, then a portion of Utah Territory, were made by the Mormons, a company of whom, while on their way to California in 1848, coming upon the fertile and well watered valleys that stretch along the easterly base of the Sierra, were induced to stop and make their homes there. Some of them settled at and near Genoa, then and for many years after called the Mormon station, while others took up their abodes in Jack's, Eagle, Washoe and Pleasant valleys, further north, selecting in all cases only the choicest spots for their homes. These settlers having been joined by others from Salt Lake, as many as 60 or 70 families had arrived in this part of Utah by the summer of 1857, when the greater portion of them, in obedience to a mandate from the church, abandoned their comfortable homes and made their way back across the deserts to the City of the Saints.

How they Built and Worked and Lived.

The only points at which these people settled in sufficient numbers to constitute anything like a town or even hamlet, were Genoa and Carson and Franktown, in Washoe valley; these places having been laid out with broad, regular streets and built up after the much-to-be-commended Mormon fashion. Along either side of the streets ran small ditches carrying water before the doors and upon the fields and gardens for irrigation, this being necessary to insure a crop of either grain or vegetables in that region, while with it excellent crops of both are quite certain, not only upon the alluvial soil of valleys, but also on the better class of sage lands. Water, pure and cold, is supplied here in the greatest abundance by the many streams that descend from the Sierra, which, tall and steep, lifts itself over these valleys on the west.

Nothing was here cultivated for ornament; no vines or flowers graced the houses or gardens of these Mormons. They were a thoroughly practical people. The fields and the gardens were filled only with useful products, even the door yards being planted with potatoes, squashes, turnips and the like. The houses, which were simplicity itself, stood far apart, each being surrounded by ample grounds devoted to the above uses, including a spacious corral for herding their stock.

The houses, consisting of a single story, and hardly ever containing more than one apartment, or two at most, were constructed of hewn logs, rough lumber, adobe and undressed stones laid up with mud. Windows, owing to a scarcity of glass, they did not always have, the apertures that served for such being closed by wooden shutters at night. Paint, for the same reason, was applied to but few of these dwellings, in some of which the well impacted earth was made to do duty for the usual wood flooring. Coarse and plain as their houses were the home-spun and home-made garments of these modern Ishmaelites. Their persons like their dwellings were strangers to ornament and finery. They neither cultivated nor wore nor did they ever own anything calculated to gratify the aesthetic taste. They were the most utilitarian people under the sun. From infancy nearly all had been brought up to self-denying hardship and toil. Brave, patient, ignorant, industrious, hardy and frugal, they knew only to work and to save, the luxuries and enjoyments that others consider the chief objects of life hardly entering their thoughts. They had as little sense or appreciation of the elegant and beautiful as the animals of the field. To spin and weave much and well was the pride of the girls; to perfect themselves in "bull whacking" and the use of the rifle the greatest accomplishments to which the young men aspired. The women, and the children as soon as sufficiently grown, worked in the fields, plowing, digging, hoeing and harvesting the grain the same as the men. Polite literature and the fine arts had no place in their schools nor their thoughts. To read and write was the *ultima* rule of youthful education, nor did the entire juvenile population reach even this to them advanced stage of instruction. Like their other pleasures

Their Recreations

Were few and simple, the principal of these consisted in dancing, which was practiced by all, being considered as much a religious exercise as a secular amusement. All engaged in it, the old and the young, the preacher and his congregation, the church service being generally wound up with a dance. The fiddle was their favorite instrument of music, and was played with a vigor that made up, in the estimation of those entertained, what might be lacking in artistic skill.

An Epoch in their History.

And so they lived on, these simple people, in their isolated homes, until 1857, when, fearing some great curse threatened to the outside world, they disposed of their lands and other property for what little they could get, and the greater part of these deluded people left for Salt Lake. Here they remained till the time fixed for the impending evil had passed, when the most of them returned to their former homes to find them in the possession of others and themselves forced to take up with such poorer localities as were still to be had.

The Miners Come In.

As early as the fall of 1849, a few of the overland emigrants bound for California stopped and remained permanently in this part of Utah, a company while camped on Carson river near the mouth of Gold canyon having discovered on an extensive bar formed at that point such prospects of gold as induced them to stop and go to work there. As very good wages could be made there these emigrants were afterwards joined by a few others, all of them remaining on the bar over winter. Every year after that, between some small parties who went over from California and such additions as were made to the population by the incoming emigration, the number of the miners was considerably increased, there having been as many as 200 or 300 at work along Gold canyon at one time. Among others who went over to that region from this side were a company of Chinese, num-

The Mountain Meadows Massacre.

One of the events of the past week has been the execution of John D. Lee, in Utah, for his share in the brutal massacre of a train of emigrants which was crossing the plains for California in 1857. The incident calls to mind, not only the terrible crime which was perpetrated on the Mountain Meadows, but brings up a thought of the many hardships and deaths which were almost milestones on that overland trail which the early comers followed. Many of the emigrants were attacked by Indians along the road, and sometimes a whole train would be swept away by the fierce aborigines. The worst of all these occurrences was the terrible Mountain Meadows massacre, which occurred in Utah, twenty years ago. It was all the more horrible because it was participated in by white men, who, under the guise of friendship, treacherously turned the poor emigrants over to the Indians, whom they had previously told their plan, and then joined the red-skins in the brutal murders which took place. The following description of this terrible outrage was written from the testimony brought out at the trial of Lee:

In the summer of 1857, a train of emigrants, hailing from Arkansas, and bound for California, entered Salt Lake City. It was a wealthy and populous train. There were in it 150 persons, men, women and children, 400 head of cattle and 70 or 80 fine horses.

Suddenly at daybreak Monday morning, September 7th, 1857, the emigrants were attacked, and at the first fire seven were killed and 15 wounded. Unprepared, and, while most of them were yet asleep, they fell helplessly before the bullets of their unseen foes. With a promptitude unparalleled in the history of Indian warfare, these emigrants wheeled their wagons into an oblong corral, and with shovels and picks threw the earth from the center of the corral against the wagon wheels. In an incredibly short time they had an excellent barricade. So rapid was their work that the plans of the assassins were turned.

and cut their throats from ear to ear. It is the most heartless, cold-blooded deed that ever disgraced the pages of history. The cowardly assassins could not have performed one single act that would have added to the blackness of their perfidy. They feigned friendship and sympathy, they induced these brave men to lay aside every weapon, and then shot them down like dogs. The venerable gray-headed clergymen, the sturdy farmers, the stalwart young men and the beardless youths, all were cut down, and above their dead bodies waved the stars and stripes.

The Execution of Lee.

The execution of Lee occurred on Friday morning, March 23d, on the spot where the massacre occurred. Arrived within a few yards of the monument, which is shown in the engraving on this page, and which was a huge irregular pile of stones, whereon the cross stood erected to the memory of the butchered emigrants and which the Mormons subsequently tore down and defaced, the Government wagons were placed in line together, and the six men who had been selected for the execution were posted, armed with needle-guns. Lee came forward. After allowing the prisoner to say his last words, Marshal Nelson partly faced the condemned and gave the word "ready!" The guns were dropped. "Take aim!" The guns were leveled on the victim. Then after a silence which seemed an age of duration to the bystanders, the word "fire!" rang fatally on the air. Six simultaneous reports followed and John D. Lee fell backward on his coffin, his feet remaining on the ground. There was no quiver or struggle. Five balls had passed through his body in the region of the heart.

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Mechanical Ore Concentration and Separation—No 27.

[Written for the Press by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.]

The Old Plashen-Hearth.

Of which Bruntner's wash table is a mere imitation, consists of an endless belt (india rubber)

Passing as an inclined plane from below to above, being fed at a proper point with a thin coat of ore-pulp, and above such point with a thin stream of water. The heavier parts are then carried beyond the upper edge and washed from the belt when it submerges below the inclined plane. The lighter parts (waste,) flow with the water over the lower edge. I abstain from closer description because all the essential features of this apparatus are preserved in

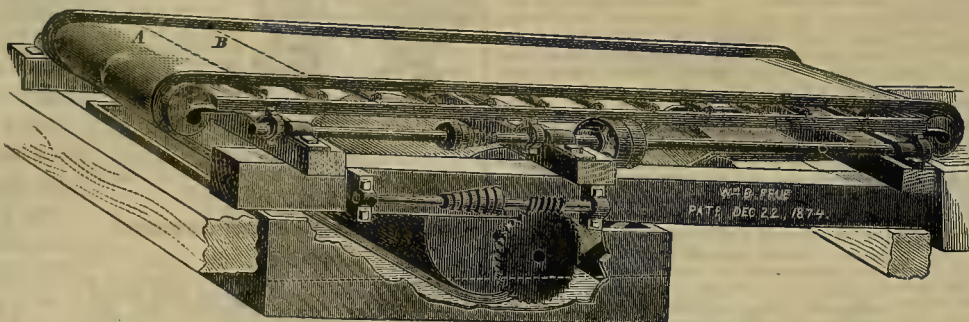
Frue's Percussion Plashen-Hearth.

Frue's table was mentioned in Vol. XXXI, No. 4, of this journal, and has since found its way into practice. It is a combination of the old plashen-hearth with the percussion table principle, and a lucky and ingenious combination, without doubt. A good rubber belt, about four feet broad, constantly shaken from side to side with a regular slow motion, is the principal feature of the machine. This belt is about twenty-seven feet long, and has projecting flanges of elastic rubber along its outer edges, to keep the sand and water from splashing over. The progressive motion is communicated to the belt by a driving drum, which is connected by a small rubber belt to the front end roller, thus enabling the apron to be run more loosely and with less strain than if only driven by the drum. The driving drum dips into a tank of water through which the endless apron travels in passing around. On leaving the water tank the belt passes over the tightener and guiding roller.

The ore sized by the described second mode, where the waste is present in larger size than the valuable material, being shaken with a small amount of water will divide evenly on the inclined plane, and the heavier and smaller ore particles will resist the down-flowing water sufficiently to be carried along by the belt over the upper edge into the water tank below; and the waste (lighter and larger particles,) will pass over the lower edge. It is successful only on material classified in funnel boxes and of the size of one-half millimeter or less. That some kinds of slimes require to be passed over the apparatus twice or three times before being exhausted of their valuable parts, should not prevent a recognition of the true merits of the apparatus, as its capacity is, notwithstanding, as great as that of any other apparatus constructed for the same purpose.

LAST week, says the Yreka Union, the Joseph Corry company, while ground sluicing, found a piece of gold in their claim weighing 10 pounds, and worth \$2,000. It contains a small quantity of quartz—experts say about eight or ten ounces. The claim in which it was found is located on McBride's gulch, a short distance north of Hawkinsville. It was found about two feet above the bedrock.

IN the Ophir mine a strong flow of water was struck in the bottom of the main incline a week ago, and the sinking temporarily suspended until the pumps can be put in working order in the incline below the 1600-foot level. That is being done as fast as the work can be accomplished.



FRUE'S CONCENTRATING PERCUSSION TABLE.

bering in all some 50 or 60, the most of whom settled at Chinatown; hence the name of that place, since changed to Dayton. A few of these Mongols also settled at Johnstown, two miles further up the canyon, a name also derived from the presence of these people.

Along about 1858 the number of miners on Gold canyon began to diminish, owing to a partial exhaustion of the diggings, which, by the time the Comstock lode was discovered, were pretty well worked out, that event putting an entire stop to further operations of this kind. For several years at first these diggings yielded on an average about an ounce per day to the man, the dust here obtained being worth only about \$12 per ounce, owing to its being so largely alloyed with silver. Afterwards the daily earnings here declined, their average towards the last not amounting to over half an ounce and finally not even that much.

As early as the summer of 1850 parties from California had been in the habit of going over the Sierra Nevada for the purpose of meeting the incoming immigration, and supplying them with provisions, exchanging the same for stock; many of the animals, by the time they had reached Carson valley, where the most of these traders met the immigrants, having become so poor and weak that they could go no further. In this strait the owners being glad to part with them for a small consideration, the sharp Californians were enabled to get many a good bargain, since, after resting and recruiting them for a few weeks, they were driven into the farming and mining districts west of the mountains, where they were in demand at high prices.

Finding these valleys of western Utah good places for settlement, especially after the vacancies created by the departure of the Mormons, quite a good many of these speculators and traders took up their quarters permanently there, their number having amounted to several hundred by the time the mines were discovered. Joining with the other Gentiles, as the Mormons styled all persons not belonging to their church, these farmers and stock raisers constituted an element antagonistic to these religious bigots, the differences between these two classes having at length culminated in many bitter feuds, some of which were attended with violence and bloodshed; a state of affairs that did not wholly cease until the summer of 1861, when the act organizing this portion of Utah into the Territory of Nevada having gone into effect, the offices, with full political control, passed into the hands of the Gentiles.

They were too strongly fortified to be attacked again without loss of life. The plan resolved upon was to decoy the emigrants out under a white flag protection, and the plea that it was necessary to save them from the Indians. But all this recruiting had taken time, and the emigrants held their ground all the week. Their camp was in a hollow overlooked by low hills, and from there and from behind stone breastworks Lee and his men kept them under constant fire, killing the cattle, wounding and killing emigrants and making the corral a veritable death pen.

Meanwhile the decoy plan at the camp was put into effect. A white flag was displayed,



Monument at Mountain Meadows.

and Lee marched under its cover and met an envoy from the beleaguered camp. He promised the emigrants protection if they would lay down their arms and march out. They could do nothing else, and acquiesced. The arms, the wounded and the children were put into two wagons, driven by Mormons; behind them came the women, marching in single file, and a little back of them came the men, unarmed, starving, many wounded, and utterly despondent. On went the mournful procession. Lee marched between the two wagons. Suddenly he brought his gun to his shoulder and fired at a woman in the forward wagon, killing her instantly. It was the signal for the massacre. Indians rose from behind bushes, painted Mormons stepped from behind concealments, and all along the line the men and women were shot down like cattle in the shambles, while Lee and his aids dragged women and youths from the wagons

A New River Mining Machine.

Some weeks ago, says the Oroville Mercury, we gave a description of the new mining machine built by Messrs. B. Hedge and J. N. Walker, of Augusta, Maine, and at work in Feather river, near the town of Oroville. That description went broadcast over the land, and hundreds of the best miners in the State flocked here to see it work. They examined it carefully and well, and all went away satisfied that it will do more than ever claimed for it. It now lies just below town, in the river, near the north bank, at work on Parks Bros. & Shaeffer's ground. People are constantly going down to see it work. The people of Oroville have all seen it, and thoroughly understand the principle on which it works. Now, people from a distance are coming daily, and they are completely astonished at the simplicity of the thing. It is upon the very same principle that the infant draws its nourishment, the smoker the sweet fragrance of the Havana. Each creates a vacuum, and the milk in the one case, and the smoke in the other, makes haste to fill it. So here, a vacuum is formed in the upper part of the cylinder, and up flies the earth to fill it. If the lower end of the cylinder is on the bed of the river, the earth, gravel and stones, even of the size of a water bucket, rush to the top of the cylinder like shot out of a gun, to fill the vacuum produced by condensing the steam in that part of it. But we will again tell our readers of its manner of working, and our statement is absolutely correct in every particular, as hundreds of men can affirm. In our other report some inaccuracies occurred, owing to the fact that we wrote without knowing the measurements of the boat, etc.

The boat is 90 feet in length and 20 in width. The deck is probably three feet above the surface of the water. On this deck is a house in which the workmen eat and sleep, a 12-horse power steam engine which hoists and lowers the cylinder by means of pulleys fixed to a common derrick, and a lot of such implements as are needed for every day use. By the side of the boat, and affixed to its deck, is a common mining flume, 100 feet in length and 20 inches in width, provided with the same blocks and apparatus for catching gold as any other flume. At the upper end is a pump worked by steam that pours a constant stream of 100 inches, miners' measure, of water into the flume. Now, suppose a fire is built and steam got up and the machinery set to work. The first seen is the 100-inch stream of water pouring into the sluice; then the long arm of the derrick lowers until the cylinder hanging from the end of it by a bale, the same as any common kettle has, rests on the bottom of the river. The engineer, by turning a faucet, sends the steam into the upper part of the cylinder (the lower end of course being filled with water which stands inside nearly as high as the outside) until the air is displaced; this is instantly followed by a deluge of cold water which condenses the steam, and then up comes the bed of the river immediately below the bottom of the cylinder, to the amount of from one to three tons. Next up rises the long derrick arm, bringing with it the cylinder, with its load of earth, stones and gold, and swinging around to the sluices into which it is discharged, and is washed away by the 100 inches of water that are constantly running. It takes a minute and a half to do all this, that is, from the time the arm of the derrick begins to lower until it again reaches the same position. The amount of earth taken up is from one to three tons. If they had a 25-horse power engine they could easily haul up five tons. As it is now the lifting capacity of the engine is their limit. A day's work of ten hours, so far, has been to bring up and wash 300 tons. More could be brought up, but no more can be washed in the present sluices with the amount of water used. They have been at work in water running from six to 16 feet in depth. Of course the depth of water makes no difference, only that the deeper it is the longer must be the cylinder. Will not the machine revolutionize river mining? There is no longer any need of drying the river. In fact it can be mined best when the water is in its bed. The gravel is so thoroughly pulverized that all the gold is washed in a very short sluice. No longer any difficulties exist about dumps or tale races. Turn the lower end of the boat a little and you have all the dump you need for a time, and another change will give you more. With an engine and derrick on the shore, the bed of the river can be mined as far as the arm of the derrick will reach. A few days ago Mr. Hedge found a new piece of gravel that it became necessary to remove. But little water was flowing over it. It consisted of boulders as large as a water bucket, gravel and cement from the mining claims above. Picks and bars were tried in vain upon this substance. It seemed to be almost as hard as asphaltum. The cylinder was lowered upon it, a vacuum produced, and up came this hard substance to the depth of 18 inches, thoroughly pulverized. A large number of these machines will be put upon the river as soon as they can be made. A number will also be set at work in the lava beds. It will be recollected that the Chinamen were always driven out by water after reaching such a depth, and just when the richest streaks of earth were found. This same water is just what is wanted to aid this new machine in working a lower strata here.

The Dangers of the Town.

Much has been written about the condition of the agricultural laborer in this State. We do not deny that in some respects it is hard, as a general rule, and that some things which are his customary prerogatives in the older States are not given him here, but on the other hand there is the superior opportunity which he enjoys here of getting a start for himself if he be wise and saves his wages. It is not the general subject which we design to discuss at this time. We rather would say a word to the young men who are now working for wages on the farm and whose future for good or evil depends altogether upon the acts of the next few years.

So far as our observation goes the earnest young man who is true to the interests of his employer meets with as much encouragement in California as in any other State. Being a young man ourself we have taken occasion to speak to many farmers who have favored us with visits, asking them what they thought the chance was for a young man to build up in their service. They have all answered with one accord: "I am disposed to help a young man if he be true to my interests and to his own. I like to see the young men grow up to do well. I like to see them save their money, for I know they can soon be owners of their own homes if they will do it. I give them my papers to read and help them all I can. But there is one thing which ruins young men and that is the desire to waste their substance in the towns. Here they lose their money, their health, their ambition and the next step is to become one of the army of blanket strappers who work during harvest and wander the balance of the year."

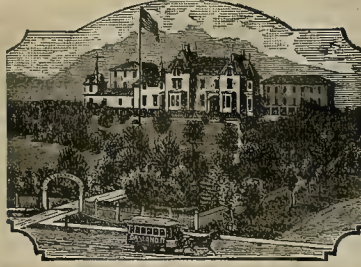
This is just the point which we wish to enforce at this time. The young man who has a chance to hire out for the year, say for \$300, can save \$200 of it and still have all a moderate desire will call for. If he have the genius of saving and can enjoy the satisfaction which every step toward being his own master gives such a one, he can save more than the amount we have named. At the beginning of the second year if his master is doing well he can increase his wages by \$50 or more and without any great deprivation of himself he can have \$500 in ready cash for his two years' work. If to his spirit of economy he adds fair business sagacity, he can get a start for himself with this amount. Mr. J. C. Smith, of Sutter county, who made us a call last week told us of a case of this kind which occurred within his own experience. A young German worked for him for two years and saved about the amount we have named. He then went to work for a neighbor by the year and took his pay in horses and farm tools. At the end of the third year there was a ranch for sale cheap in the neighborhood and the young man bought it, paying down what he had saved and having his horses and tools to begin with. This young man began in 1864, coming fresh from the old country and having none of the advantages which most young Americans possess. The last time Mr. Smith saw him he had his ranch paid for and \$7,000 in the bank. There was nothing peculiar in this young man's method except his desire to save his money and his resolute turning from those influences which destroy our young laboring men. He cared nothing for the allurements of the town. He rode to the village with his employer and was always ready to return with him. He saved his money and he saved himself.

Mr. Smith has had cases of directly the opposite character during his experience as an employer. He had one bright young man, for instance, who began his year well and worked until harvest time, then when harvest hands were getting twice his wages he deserted. He soon became associated with "certain lewd fellows of the baser sort." He passed his nights and Sundays in carousals in the town. He lost his self-respect; his health gave way to shameful diseases and he sank to utter worthlessness.

These two cases are real as the life of the two young men. There is nothing uncommon about them. Both experiences are repeated many times within the observation of many of our readers we doubt not. Are words necessary to enforce the lessons which the cases teach? If so let us make them brief: First, stick to steady employment, because its rewards are always accruing and because no time is at hand for the demons which rule in idleness. Second, hold yourself above the waste of money and of health which nights and Sundays of town dissipation will certainly demand from you. Third, begin at once to lay up capital by the zealous saving of your earnings. Hundreds of young men are doing this on our farms to-day and thousands more ought to be doing it. The way is open. The State demands thousands of good citizens of the kind which these young men can make of themselves if they will. What young man who reads this article will begin at once and enter upon a career which will ensure him a home of his own and the respect of his fellow-men?—*Pacific Rural Press.*

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Continued from page 197.

which have been opened up in Nevada, this and Tuscarora, 25 miles from here, are the only ones which have produced mines that have paid from the beginning. This fact has been demonstrated in this district by the results obtained by the workings of the celebrated Leopard mine, which you often hear about. Their mill has been in continuous operation all winter and there is no prospect of its shutting down only temporarily for repairs during the coming season. At the mine there are now working about 100 miners, who ought to get out ore enough to supply their 20-stamp mill. Of the other mines in this district, some have worked all winter. The Hussey keeps up its progress and are now working down to the depth of 500 feet. I think they are not extracting much ore, the work done there being mostly of a prospecting nature. They have no mill, but some of their ore worked this winter at the Leopard mill yielded handsomely, I believe about \$220 per ton. There has been continuous work done all winter on the O. K., and there is every indication that it will be one of the best mines in the district. The Panther and Fisher are being worked with every prospect of their turning out well. All these mines which I have mentioned, also the South Leopard, are in the vicinity on the same range, and contiguous to the Alameda. There is no reason in the world why, if the last named mine or location was developed, would not prove as good as the Leopard.

Arizona.

VULTURE—*Arizona Miner*, March 16: Work is being pushed forward on the Vulture mine most successfully, the latest development being the striking of a rich lead north of the front vein, the ore averaging over \$60 per ton. They are now crushing 18 to 20 tons per day. Thirteen tons of ore from the Tip Top mine, in Humburg district, yielded the highest value of \$4.00. Mr. P. W. Smith started from Wickenburg to San Francisco the other day with \$7,000 worth of silver bullion from Humburg district, and about \$15,000 worth of bullion from the Vulture.

MINERAL PARK—The mill at this place is well supplied with ore from the Keystone, Lone Star and other mines, and the amount of bullion which will be forwarded from the Park will be immense. The Index, La Porte, Lone Star, Keystone and various other mines in this vicinity are developing well.

Idaho.

THE MINES—*Idaho Avalanche*, March 24: The mining outlook continues to be regarded as favorable. From all sections of the Territory there are reports of promising developments in the mines, and the operations in quartz the coming season will undoubtedly be on a larger scale than those of the past. In Owyhee it is generally conceded that we have got down to low water mark. Business will steadily improve as the season advances. The great want is outside capital. Good management, prompt payment of workingsmen and an honest development of our mines would pave the way for a new era in mining operations here. The dawn of a brighter day is not far distant.

GOLDEN CHARIOT—The developments at the 1300-ft level continue to be the great central point of interest in the mine and the progress of work there is characterized by a continuance of the most favorable indications. The water is increasing, and the quantity removed from the mine daily exceeds 100,000 gallons. The ledge continues to improve and there are unmistakable evidences of a large ore body in the vicinity. The work on the level has now progressed inward a distance of about 240 feet. At a distance of 60 feet further, which will be reached some time in April, the work will be directly under what is known as the Linkton shute, and several hundred feet further down than that of any point previously worked in that section of the mine. Abundance of rich ore will be taken from that point in a short time, and the bullion product of the mine for the coming summer will, it is confidently believed, be equal to the yield of the Chariot in its palmy days. The machinery of the Golden Chariot mill is being renovated, repaired and put in thorough condition.

POORMAN—The shaft is down about 700 feet, and the bullion products of the mine since the period of its discovery, amounting to little less than three million dollars, afford a guarantee of the richness of the ledge, while the past development furnishes indications that the vein increases in richness as it goes down, and must, under judicious management, yield a greater amount of treasure than has ever been produced from this mine before.

BELLE PECK—The main shaft has been completed and tunnels have been started both north and south. Stoping will commence next week. There is abundance of good rock in sight, and Mr. Peck anticipates that the bullion yield of the coming season will be much larger than ever.

There is a splendid ledge in the Folsom, and a handsome yield of treasure is expected the coming season.

The Douglas mine, near town, is said to be exhibiting marvelous wealth. The rock has been getting richer and richer for several weeks.

The South Chariot, it is rumored, will be worked on a large scale in a few weeks.

Montana.

ELKHORN DISTRICT—*Butte Miner*, March 13: A new six-stamp mill is at once to be erected at the Elkhorn mine, a hopper, Elkhorn district, about 30 miles west of Bannack. The mill is intended for the reduction of silver-bearing quartz, by wet crushing. A supply of ore will be obtained from the Storm lode. This mine has been quite well developed and shows a large body of ore which is free from bases and yields on an average 80 ounces of silver to the ton. Business is dull about Bannack at present, but it is expected that when the season opens work will be prosecuted on all the mines in the locality.

BULLION—A shipment of crude bullion, valued at \$5,000, was made to-day from the Davis mill to the Helena assay office. The returns from the former shipment received from the assay office show a larger percentage of gold in the bullion than was previously estimated, as it contained 47½% of gold. This is a heavy yield of gold and is very encouraging to the Lexington mine.

The Centennial mill has just completed a run upon a small lot of ore from the Walker Bros. claim, on the Rainbow. The high grade character of the ores taken from the Rainbow lode has been fully established by the reduction of several tons taken from various mines along the vein. Messrs. McKinn & Co. are now having 20 tons of ore from the Rainbow crushed at the Centennial mill.

Messrs. Donnellie Clark & Larrabee purchased last week and will ship East in a few days 50 tons of copper ore, which is the best by a small amount of any heretofore taken from this mine. The Parks mine has the deepest shaft upon it of any in the camp, and the ore has continued to improve in sinking, until it is now found to contain more than one-half of its weight in copper.

Utah.

LEEDS—*Cor. Salt Lake Tribune*, March 20: Silver Reef is about two miles from Leeds, and is a flourishing mining camp. It has about 100 houses, and about 1,000 inhabitants. Three months ago this place was covered with sage brush and granite boulders, but now life and activity are visible on every hand. The ledges in this district are of a most promising character. The ore averages from \$1 to \$500 per ton silver, and some has been known to go as high as \$16,000 to \$20,000 per ton. The great want of this camp have been mills to mill the ore which is lying on the dumps in large quantities, but we think this difficulty will soon be overcome. The Leeds M. Co. has started their 10-stamp mill, and are turning out about \$2,000 worth of bullion per day. This mine works about 60 men. Two miles south on the same ledge, the Harrisburg M. Co. have incorporated a very valuable mine. Two miles southeast of Leeds, on the Grapevine Pass, things are looking away up. The Toquerville S. M. Co. has incorporated a rich mine on the Morning Star reef. There have been large quantities of rich ore shipped from this mine. Close to this mine there is a large spring of water, and there is also a town site located here. Within a few hundred feet is a 20-stamp mill in course of erection, which, when completed, will considerably increase this valuable mining property.

Curious Ore.

A few months since we published in the PRESS an item clipped from the *Arizona Miner*, headed A Queer Discovery, giving a statement of the discovery of a vein of micaceous iron, carrying silver and gold in paying quantities, with the assays of the same. During the winter the Sumner company have been working the vein, and a careful statement of what has been done is published in the *Miner*. A correspondent of ours in Arizona has sent us a piece of the ore, which assayers and mining men consider an anomaly; the specimen is from the pay streak of the mine. It has had both ends broken off, and was burned in a blacksmith's forge, causing the silver to show freely. The mine from which it came is better known as the plumbago, stove-polish or micaceous iron mine, than by its proper name—the Sumner. It is about 15 miles from Prescott, on the very head of the east fork of the Hassayampa. Messrs. Deroche and Bigelow have been working on the mine for two months past and have run an open cut into the vein, to cross-cut it at right-angles, 50 odd feet in length, the last 26 feet being in the vein, five feet wide and 24 feet deep, and they have not yet reached the hanging wall of the ledge. The whole of the vein matter is permeated with streaks and threads of the mineral, all carrying more or less gold and silver, which all run into one well defined pay streak, which is encased in soft, green soapstone, and varies in thickness from the surface to the bottom of the cut mentioned from two to 11 inches—the thickest portion of the ore being the richest.

The surface ore ran as high as \$800 per ton in gold and \$1,500 in silver. The *Miner* now gives the following assays from average samples of the ore as assayed on the dump, calculated per ton:

No. 1. Silver, \$290.57; traces of gold. No. 2. Silver, \$122.51; gold, \$1.25. No. 3. Silver, \$72.90; gold, \$5.02. No. 4. Silver, \$43.95; no gold. No. 4. Silver, \$4.70. No. 6. Silver, \$3.14.

The above assays were from Mr. Blake, the Nos. 5 and 6 being ore taken from the threads mentioned outside of the pay streak, and the four first from the ore stacked up for reduction, as are the two following by Mr. Kelley:

No. 1. Silver, \$113.13. No. 2. Silver, \$181. A choice lot of ore was sent to the Pinal company's smelting works, at Walnut Grove, from which Mr. George T. Hogle made an assay, which yielded in silver \$2,252, gold \$25; total, \$2,277, which is the highest we have heard of from this very peculiar ore.

Tests made have proven that the ore is not milling, and the nearest smelting works are 30 miles from the mine; the charge for smelting being \$75 per ton. The specimen which was sent us we have at the editorial rooms of the PRESS, where it may be seen by any one desiring to examine it. Some of the ore is being examined by Mr. Henry G. Hanks, and as soon as the analysis is completed we shall publish it. It is more than likely that the mineral is new.

Drift Mining.

In our last we gave an article from the Nevada Transcript on the above subject, and now take the following from the same source: It does seem to us that this is the direction and here the opportunity for capital to invest with a certainty of success. The more shallow and easily developed parts of the channel are already worked, but there are yet miles and miles of the same material undisturbed. In many places it is covered with lava and pipe clay, too deep for profitable hydraulic mining; and for the want of capital (with the exception of a few instances) to open out and drift, it has remained all these years untouched, when the ground is positively known to be very rich. A few years ago we knew nothing of drift mining, but still these mines were worked with great profit. Now, with improved machinery, 20 years of experience and the aid of a little capital this can be made the most certain and profitable mining of any in the State. Most of these miners are, as a rule, unable to reach capital. We are pleased to know, however, that we have some men of means and enterprise in this country, who are now commencing operations on a large scale. From the character, energy and long mining experience of these men, we shall expect to see the work pushed forward with all the vim characteristic of these gentlemen. Their location is on the channel between North Bloomfield and Moore's Flat. We feel that their success is already assured.

The Moore's Flat blue gravel mining company are steadily and energetically pushing their work forward. The drain tunnel to the main shaft, which will conduct the surface water, is now more than half completed. The main shaft has been sunk 100 feet, and finding too much surface water to contend with, they were forced to stop the sinking and complete the drain tunnel, which they are running day and night. All of their machinery is in place and, as soon as the surface water has been drained, sinking will be resumed with vigor, so that the bedrock will be reached by the first of June. Then we expect to hear of large results, as that portion of the channel is known to be very rich. The Moore's Flat company have as fine ground as there is in the State. Their location is convenient, with plenty of wood and water for

economical working. The ability displayed in the management and the perseverance in overcoming every obstacle has given the community confidence in the company's final success. The Bald Mountain mining company have just cleaned up their dump of gravel which had accumulated during the dry weather, and taken over \$200,000 in gold out of it. They have over 150 men drifting in the mine. They are in on the channel about one mile, and have a small locomotive to draw the gravel out. The locomotive has proven to be very efficient. The mine is in splendid shape, and we look for large returns from there this year.

The North Bloomfield hydraulic mining company have just made their monthly clean-up. From the quantity of gold in the sluices, it must have been large, although we do not know the exact amount. This company has a very large claim, and it is now well opened and in good condition for work. We presume that they will clean up not less than \$800,000 this year. We are pleased to note the recent purchase of hydraulic property on the channel at Hunt's hill, by San Francisco and Eastern capitalists. From our knowledge of the ground they have made a good selection.

Coast Railroad Items.

The Southern Pacific railroad is advancing very rapidly. It is stated on the authority of Governor Stanford himself, that the Southern Pacific railway managers have made arrangements to build 140 miles of road across the Colorado, into Arizona, before the next regular session of Congress. The company are empowered to do this under the general law passed at the last session of that body. This will have the effect of inducing rapid immigration to Arizona, and will effectually open up that country, where there is probably some of the best mineral ground in the United States.

The Northern Pacific is just now engaging the energies of the Central Pacific Railroad Company. This branch railroad is to connect Oakland and (by ferry) San Francisco with Bantast station and the main line, and so shorten the time and distance to Sacramento and the midland and southern counties. It will skirt the bay, penetrate some of the most isolated but pleasant towns in Contra Costa, turn Mt. Diablo upon its northern flank, and tap the coal mines near Antioch. It will tap the San Ramon and other rich valleys opening on San Francisco, San Pablo and Suisun bays, and ought to be, from its local traffic, a paying concern. It is said, too, that it will shorten the time by the way of Stockton to Sacramento by three hours; for, in addition to the great distance saved, it will avoid the heavy grade through the Diablo range, and run over comparatively level ground. Should this shortage of time be realized, the new route will take San Francisco passengers to the State capital more than an hour quicker than the average passage by way of Vallejo. The road is being built around the bay rapidly, and the men we believe are at work at San Pablo laying track.

The San Francisco and North Pacific Railroad Company have agreed to put in a branch track from the road, to terminate at or near White Sulphur Springs.

The contract for building the narrow-gauge railroad bridge across the Russian river, at Moscow, has been let to Martin & Co. for \$35,000. The contractors gave bonds to have the work completed so that trains may pass over it on or before the 1st of June.

In January and February of this year the Central Pacific railroad earned in gross the sum of \$2,076,000. This is largely in excess of its earnings for the corresponding period of any previous year of its existence. But the through freight for the East this year was only 6,751,000 pounds, against 10,208,300 pounds last year, and larger quantities in each of the preceding years.

County Assessor Burroughs, of San Diego, has received the statement of the assessable property of the Southern Pacific railroad for San Diego county. According to this statement, there are 100 15-100 miles of the road completed in San Diego county, valued at \$400,600.50. The pro rata of rolling stock for San Diego county is \$105,941.70. Improvements, \$4,000; personal property, \$1,000; making an aggregate of \$511,541, or about \$5,015.40 per mile.

Meetings and Elections.

AMERICAN FLAG M. Co.—March 23d. Directors—L. S. Adams, Robt. Sherwood, O. F. Griffin, H. E. Griffin, W. E. Hale, B. F. Sides, A. H. Bogden.

WARD M. Co.—March 22d. The old Board of Trustees and officers were re-elected.

EQUITABLE TUNNEL & M. Co.—March 23d. Directors—John Esten, N. A. Hardy, Henry F. Grinnell, E. S. Farnsworth, Chas. H. Marble, Chas. S. Healy. President, John Esten; Treasurer, N. A. Hardy; Secretary, Charles S. Healy.

BALTIMORE CON. M. Co.—March 23d. Judge Heydenfeldt has been elected President and Coll Deane succeeds A. K. Grimm as Trustee of the company.

MINT M. Co.—March 25th. Directors—H. L. King, S. P. Taylor, Isaac Cook, Wm. Harney, Alexander Lowthwaite, H. C. Partridge, John Landers.

DANBY M. Co.—March 25th. Directors—J. P. Canton, A. E. Everett, O. F. Griffin, H. E. Griffin, Robert Sherwood.

MELONS CON. M. Co.—March 27th. Directors—G. K. Stevenot, E. K. Stevenot, George W. Dent, J. Care and Jas. Hamilton.

Two charges of forgery and one of misdemeanor, for obtaining goods under false pretences, are recorded at the city prison against A. Blacklock, alias McCaw, President of the Gulf of California Oyster and Canning Co.

General News Items.

THE proposed building for the deaf, dumb and blind asylum is to cost \$79,652.

THE geographical limits of the military divisions and departments of the United States are about to be rearranged.

A PENNSYLVANIA correspondent of the New York Herald says that 400 collieries and 60,000 men are idle in that State.

LARGE Catholic colleges will be erected at Omaha, funds for the same having been bequeathed by the late Edward Creighton.

GOVERNOR HENDRICKS, of Indiana, the defeated candidate for Vice-President at the late election, has been in San Francisco for several days.

MESSRS. ROTHSCHILD telegraph from London that the Syndicate are ready for another call of \$10,000,000 for the redemption of United States six per cent. bonds of 1865.

A DISPATCH from Red Cloud agency says: Spotted Tail has been heard from. He was going on to complete his mission of peace to the hostiles. He had been delayed by the bad weather and poor condition of his horses.

A DISPATCH from Rome announces the arrival of congregations to counsel the Pope to fulminate the great excommunication against Victor Emmanuel, should the clerical abuses bill pass.

THE President has appointed Samuel B. McLean Associate Justice of the Supreme Court of New Mexico, and Wellington Bird, of Iowa, agent for the Indians of the White River Agency, Montana.

ABOUT 800 tons or 16,000 bunches of bananas are now shipped monthly from Aspinwall to New York, worth, when delivered there in good order, at the rate of \$600,000 a year. This industry is constantly increasing.

WASHERWOMAN's bay, that nucleus of pestilence back of the city, is to be cleansed at last. To perform this Augean task 100 prisoners will be chosen from the county prison, and will be kept busily at work until the bay is filled up. The residents of the neighborhood have subscribed \$1,200 for the purchase of the necessary tools.

ADVICES from Congo, west coast of Africa, state that the British war steamer *Avon* had destroyed seven villages on the Congo river and killed three natives as a punishment for plundering the American schooner *Thomas Nickerson*, of New York. This vessel had been captured by the natives and about 30 tons of coffee were carried off. She was fired by the *Avon* in order to prevent further plunder.

ANOTHER disaster through the breakage of a dam is reported. This occurred this week at Staffordville, Conn. There was plenty of time for the removal of property before the dam burst, as it had leaked and every effort was taken to mend it. The dams of the Phoenix company, the Howe company and the Valley company were destroyed. The damage is estimated at \$350,000. About 1,000 hands are thrown out of work.

THE Spring Valley Water Company intend to follow the example of the gas companies here and elsewhere, and measure the quantity of water used by its purchasers. They contemplate attaching meters to all the connections with their pipes, and if more than 3,000 gallons are used during any month the consumer will be obliged to pay for the excess at the rate of \$1 per 1,000 gallons. Manufacturing houses and hotels now receiving water at the rate of 50 cents per 1,000 gallons will continue to pay so much a month for that privilege, and if they use in excess of their allowance will pay for the quantity so used, at the rate of 50 cents per 1,000 gallons.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

COMET COAL M. Co.—March 24th. Location, Amador county. Directors—C. B. Hand, E. Heydenfeldt, E. R. Palmer, John Landers and T. P. Hittle.

MINEERS' BANK OF SAVINGS—March 24th. Object: To do a general savings bank business. Capital stock, \$5,000,000. Directors—Geo. H. Wheeler, Chas. E. Scranton, H. C. Barnes, T. A. Waterhouse and Wm. Hood.

NEVADA CON. COPPER & S. M. Co.—March 26th. Location: Nevada. Capital stock, \$10,000,000. Directors, D. McDougal, E. de F. Curtis, T. H. Alexander, John Cornwell and F. A. McGee.

FRANCO-AMERICAN SAVINGS BANK—March 26th. Capital stock, \$300,000. Directors—Geo. C. Perkins, A. Comte, Jr., A. Brand, F. Chevalier, L. Peres, M. Kane, P. Hasson, F. de St. Germain and Charles B. Brigham.

EMMETT CON. M. Co.—March 26th. Location: Nevada. Capital stock, \$6,000,000. Directors—S. P. Dewey, G. T. Lawton, G. F. Bragg, J. A. Paxson and C. D. O'Sullivan.

OAK RIDGE HYDRAULIC M. Co.—March 26th. Location: Placer county. Capital stock, \$1,000,000. Directors—W. Wilson, J. H. Crossman, C. Nelson, H. G. Maynard and John Apple.

EUREKA BONANZA M. Co.—March 26th. Location: Nevada. Capital stock, \$10,000,000. Directors—A. S. Robbins, F. E. Atkinson, C. Convis, J. M. Starkweather and D. McLauren.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

Don't trifle with a poor watch when you can buy a good one of Dewey & Jordan, 433 Montgomery street, San Francisco, at prices according to the times.

Cost of Mining in Deep Mines.

Every ton of ore extracted from the Con. Virginia and California mines leaves a corresponding vacuum. That space is filled with solid 14 and 16-inch timbers, leaving only a sufficient space between the huge bulkheads for the passage of men and cars. The timbers used for this purpose are cut at the summit of the Sierra Nevada mountains, floated in flumes to the line of the Virginia and Truckee railroad and then brought by rail to Virginia City. The cost of these timbers at the mines are about \$21 per thousand feet.

At even those figures it is much cheaper to fill the vacancies occasioned in the mines by the extraction of ores with timber than to employ men to excavate and fill in the same deficiencies with waste rock.

Aside from the cheapness and convenience of this method of securing a mine, there is yet another very important feature to be considered. It is a fact that the ore bodies above, below, on every side, are continually working—literally alive.

This is not noticeable to any great extent while the miners are at work, for the noise and confusion drowns the sounds, and the continual change of operations hides, in a measure, the signs. But let a man unused to mining tarry for a few hours on the lower levels after the departure of the workmen, and listen to the snapping of the timbers, watch the pebbles break loose and roll down the face of the ore stopes; see huge rocks and slips of clay leave their places and drop from the sides of the drifts, and hear the grinding, crunching sounds that greet his ear on every hand, and the hair will almost rise on his head, and a dread, shrinking feeling of awe and fear take possession of his soul.

In the California mine the ore body is worked in sections. In one place where the second section was carried up, and while rising a distance of 50 feet, the length and number of sets of timbers being exactly the same, they would not match by three feet or more. On the south line of the Ophir where there had been no extraction of ore, the timbers have sunk until the tops of a set seven feet in length are now just on a level with the car track.

The necessity of filling a mine with such material creates a fearful responsibility on the part of both the managers and foremen. These immense blocks and piles of pine wood soon become dry as tinder, and in many places are ground and crushed by the fearful forces at work to a mass of splinters, ready to ignite at the slightest touch.

Should a fire occur, aside from the loss of life which might ensue, the lapse of years would not make it safe for a miner to attempt to again work his way into the ruins.

In the Consolidated Virginia and California mines nine watchmen are employed with each shift of men, whose sole duties are to follow and watch the men, and see that no candle or light is left carelessly in any portion of the mines.

Smoking is strictly prohibited by either employees or visitors, and a man caught breaking any of the regulations in that respect is instantly sent on top. Wherever it is necessary to place a stationary light at a turn in a drift, shallow tin dishes filled with water are used, so that if the light burns down no accident can possibly occur. To the miner eternal vigilance is alone the price of safety.—*Gold Hill News.*

INDIA RUBBER TREES.—The Para india-rubber tree (*Hovea Braziliensis*) is so superior to the kinds which produce the gum in other parts of the world that the English government are raising large quantities at Kew, to be sent to British India. In the raising of these it was found that their rate of growth was remarkable. In a few days after sowing the plants were many of them 18 inches high.

RUMOR has it at Lagrange that three Celestials, who have been mining at Don Pedro's Bar, struck it last week, taking \$5,000 out of a small crevice in a few hours.

SENATOR SHARON denies that he has purchased, with James Keene, a controlling interest in the Sutro tunnel.

Dewey & Jordan have been at 433 Montgomery street, S. F., for 13 years. They are reliable—like the "New York watches" they sell.

THE GRAND PACIFIC.—This fine hotel, in the city of Chicago, cost \$1,300,000, and occupies an entire block. It is 130 feet high and has 500 rooms. It is a very elegant structure, and is a favorite resort for people from the Pacific coast, as everything is in the best style and all the arrangements are as complete as an efficient management and great experience can suggest. The building is specially secure against fire, as it was constructed with this object prominently in view, and every appliance known for the prevention of fire is at hand. In all its features the Grand Pacific has been guarded against the chief enemy of all large structures.

We can recommend the New York watch, of Springfield, Mass., as A. 1.

Choose a good companion only—one of Dewey & Jordan's "New York watches."

METALS.

WHOLESALE.

THURSDAY, M., March 29, 1877.

IRON.—			
American Pig, ton	29 00	@	32 00
Scottish Pig, ton	31 00	@	32 50
White Pig, ton	30 00	@	32 00
Oregon Pig, ton	29 00	@	32 00
Refined Bar	4 00	@	4 00
Plate, 13 to 20	4 00	@	4 00
Sheet, 10 to 14	4 00	@	4 00
Sheet, 16 to 20	4 00	@	4 00
Sheet, 20 to 24	4 00	@	4 00
Sheet, 24 to 28	4 00	@	4 00
Horse Shoes, keg	6 00	@	6 00
Nail Rod	8 00	@	8 00
Norway, Oval	8 00	@	8 00
Rolls	7 00	@	7 00
COPPER.—			
Copper Tinned	37 00	@	40 00
Sheathing, lb	37 00	@	40 00
Sheathing, Yellow	37 00	@	40 00
Sheathing, Old Yellow	37 00	@	40 00
Composition Bolts	21 00	@	21 00
Composition Nails	24 00	@	24 00
STEEL.—			
English Cast, lb	14 00	@	25 00
Amstrong & Woods, ordinary	16 00	@	25 00
Drill	16 00	@	25 00
Flat Bar	15 00	@	20 00
Flaw Steel	9 00	@	12 00
TIN PLATES.—			
10x14 I. C. Charcoal	8 00	@	9 50
Banca Tin	24 00	@	24 00
Australian	18 00	@	18 00
ZINC.—			
By the Cask	11 00	@	11 00
Zinc Sheet 7x3 ft, 7 to 10, lb	11 00	@	11 00
7x3 ft, 11 to 14	11 00	@	11 00
8x4 ft, 8 to 10	12 00	@	12 00
8x4 ft, 11 to 10	12 00	@	12 00
NAILS.—			
Assorted sizes	3 75	@	3 75
QUICKSILVER.—			
By the lb	42 00	@	45 00

GENERAL MERCHANDISE.

WHOLESALE.

WEDNESDAY M., March 28, 1877.

BAGS.—Jobbing.			
Eng Standard Wheat, 5 @	2 75	@	3 00
Neville & Co's	2 75	@	3 00
Hand Sewed, 2x36, 9 @	10 00	@	10 00
2x40	10 00	@	10 00
Machine Swd, 2x36, 9 @	11 00	@	11 00
Flour Sacks, halves	6 00	@	6 00
Quarters	6 00	@	6 00
Eighths	6 00	@	6 00
Hessian, 50 inch, Yd	11 00	@	12 00
45 inch	8 00	@	9 00
40 inch	7 00	@	8 00
Wool Sacks	5 00	@	5 00
Hand Sewed, 3 lb, 50 @	45 00	@	45 00
Machine Sewed	45 00	@	45 00
4 lb	55 00	@	55 00
Standard Gunnies	11 00	@	12 00
Bean Bags	7 00	@	8 00
CANNED GOODS.			
Assorted Pie Fruits	2 75	@	3 00
2 lb cans	2 75	@	3 00
Table do	3 75	@	4 00
Jams and Jellies	4 25	@	4 50
Pickles, 1/2 gal	3 50	@	4 00
Sardines, 1/2 box	1 65	@	1 90
HF Boxes	3 00	@	3 00
COAL.—Jobbing.			
Australian, ton	8 50	@	9 00
Col Bay	9 00	@	9 00
Bellingham Bay	8 00	@	9 00
Seattle	8 00	@	9 00
Cumberland	14 00	@	17 00
Diablo	5 75	@	7 75
Lehigh	22 00	@	22 00
Liverpool	8 50	@	9 00
West Hartley	14 00	@	9 00
Scotch	13 50	@	16 00
Scranton	13 50	@	16 00
Vancouver Id.	10 00	@	12 00
Charcoal sack	75 00	@	75 00
Coke, bbl	60 00	@	60 00
COFFEE.			
Sandwich Id, lb	24 00	@	24 00
HF Bbls	30 00	@	31 00
Guatemala	20 00	@	21 00
Java	24 00	@	24 00
Manila	19 00	@	20 00
Ground, in cs	25 00	@	25 00
TEA.			
Sac'd Dry Cod	5 00	@	7 00
Bonellus	8 00	@	8 00
Eastern Cod	9 00	@	7 00
Salmon	9 00	@	10 00
HF Bbls	3 00	@	5 00
2 lb cans	3 00	@	3 00
Pkld Cod, bbls	22 00	@	22 00
HF Bbls	11 00	@	11 00
Mackerel, No. 1	15 00	@	16 00
HF Bbls	15 00	@	16 00
In Kits	3 00	@	3 25
Ex Meas	3 50	@	4 00
Pkld Herring, bx	3 00	@	3 50
Boston Smk, 40 @	50 00	@	50 00
SPICES.			
Sac'd Dry Cod	5 00	@	7 00
Bonellus	8 00	@	8 00
Eastern Cod	9 00	@	7 00
Salmon	9 00	@	10 00
HF Bbls	3 00	@	5 00
2 lb cans	3 00	@	3 00
Pkld Cod, bbls	22 00	@	22 00
HF Bbls	11 00	@	11 00
Mackerel, No. 1	15 00	@	16 00
HF Bbls	15 00	@	16 00
In Kits	3 00	@	3 25
Ex Meas	3 50	@	4 00
Pkld Herring, bx	3 00	@	3 50
Boston Smk, 40 @	50 00	@	50 00
SOAP.			
Castle, lb	10 00	@	10 00
Common brands	4 00	@	6 00
Fancy brands	4 00	@	6 00
SPICES.			
Cloves, lb	45 00	@	50 00
Cassia	22 00	@	25 00
Nutmegs	85 00	@	90 00
Pepper Grain	15 00	@	17 00
Pimento	15 00	@	16 00
Mustard, Cal	1 50	@	1 50
1 lb glass	1 50	@	1 50
Cal. Cube, lb	13 00	@	13 00
Circle A crushed	13 00	@	13 00
Powdered	13 00	@	13 00
Fine crushed	13 00	@	13 00
Local or "drop" letters	15 00	@	17 00
Golden C	11 00	@	11 00
Hawaiian	10 00	@	11 00
Cal. Syrup, lbs	72 00	@	72 00
Hawaiian Molasses	25 00	@	27 00
YOUNG HYSON.			
Moyune, etc	35 00	@	50 00
Country pack Gun	50 00	@	60 00
powder & tea	50 00	@	60 00
Hyson	30 00	@	35 00
Poo-Chow	35 00	@	60 00
Hyson, quality	35 00	@	60 00
2d quality	25 00	@	35 00

LUMBER.

WEDNESDAY M., March 28, 1877.

CARGO PRICES OF UPGUT SOUND PINE.			
REDWOOD.			
Rough, M.	18 00	@	22 50
Refuse	14 00	@	22 50
Clear	30 00	@	35 00
Clear Refuse	20 00	@	25 00
Rustic	32 50	@	35 00
Refuse	25 00	@	35 00
Surfaced	30 00	@	35 00
Refuse	25 00	@	35 00
Flooring	25 00	@	35 00
Beaded Flooring	30 00	@	35 00
Refuse	20 00	@	25 00
Half-inch Siding	15 00	@	20 00
Refuse	15 00	@	20 00
Half-inch Surfaced	25 00	@	35 00
Refuse	20 00	@	25 00
Half-inch Batens	20 00	@	25 00
Pickets, Rough	1 00	@	1 00
Rough, Pointed	13 00	@	13 00
Fancy, Pointed	25 00	@	25 00
Shingles	35 00	@	35 00
RETAIL PRICE.			
Rough, M.	22 50	@	22 50
Fencing	22 50	@	22 50
Flooring and Step	32 50	@	32 50
Narrow	35 00	@	35 00
Clear	35 00	@	35 00
2d quality	25 00	@	25 00
Surfaced	35 00	@	35 00
Refuse	25 00	@	25 00
Rough, M.	22 50	@	22 50
Refuse	18 00	@	18 00
Pickets, Rough	18 00	@	18 00
Pointed	20 00	@	20 00
Fancy	30 00	@	30 00
Siding	25 00	@	25 00
Surfaced	35 00	@	35 00
Long Beaded	37 50	@	37 50
Flooring	35 00	@	35 00
Refuse	25 00	@	25 00
Half-inch Surfaced	32 50	@	32 50
Rustic, No. 1	40 00	@	40 00
Batens, lineal ft.	25 00	@	25 00
Shingles, M	3 00	@	3 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]

LEGAL TENDERS in S. F., 11 A. M., 36 1/2 @ 36 1/2 SILVER, 60 @ 60.			
GOLD in New York, 104 1/2.			
GOLD BARS , 880 @ 880. SILVER BARS, 10 @ 10 1/2 cent. discount.			
EXCHANGE on New York, 50 @ 50-100 @ cent. premium for gold; on London bankers, 49 1/2; Commercial, 49 1/2; Paris, five francs @ dollar; Mexican dollars, 53 @ 54.			
LONDON CONSOLS , 3 1/2; Bonds, 102 1/2.			
QUICKSILVER in S. F., by the flask, 1 lb, 42 @ 42 1/2.			

LEATHER.

WHOLESALE.

WEDNESDAY M., March 28, 1877.

Sole Leather, heavy, lb	26 00	@	29 00
Light	22 00	@	24 00
Joket, 8 Kil, doz	48 00	@	50 00
11 to 13 Kil	58 00	@	60 00
14 to 19 Kil	82 00	@	84 00
Second Choice, 11 to 16 Kil	57 00	@	59 00
Cornwallian, 12 to 16 Kil	57 00	@	59 00
Females, 12 to 16 Kil	53 00	@	55 00
14 to 16 Kil	71 00	@	73 00
Simon Ullmo, Females, 12 to 13 Kil	58 00	@	60 00
14 to 15 Kil	58 00	@	60 00
16 to 17 Kil	58 00	@	60 00
Simon, 18 Kil	58 00	@	60 00
20 Kil	58 00	@	60 00
24 Kil	72 00	@	74 00
Robert Calf, 7 and 9 Kil	35 00	@	37 00
Kipsa, French, lb	1 00	@	1 25
Cal. doz	40 00	@	40 00
French Sheep, all colors	8 00	@	15 00
Eastern Calf for Backs, lb	1 00	@	1 25
Best Foot Calf	9 00	@	13 00
For Linings	5 50	@	10 50
Cal. Russet Sheep Linings	1 75	@	4 50
Boot Legs, French Calf, pair	4 00	@	4 00
Good French Calf	4 00	@	4 75
Best Foot Calf	5 00	@	5 25
Leather, Harness, lb	35 00	@	35 00
Fair Brille, doz	48 00	@	72 00
Skirting, lb	43 00	@	47 00
Wool, doz	30 00	@	30 00
Buff, ft.	18 00	@	20 00
Wax Side	17 00	@	18 00

Mining and Scientific Press Patent Agency.

THE MINING AND SCIENTIFIC PRESS PATENT AGENCY was established in 1860—the first west of the Rocky Mountains. It has kept step with the rapid march of mechanical improvements. The records in its archives, its constantly increasing library, the accumulation of information of special importance to our home inventors, and the experience of its proprietors in an extensive and long continued personal practice in patent business, affords them combined advantages greater than any other agents can possibly offer to Pacific Coast inventors. Circulars of advice, free.

DEWEY & CO.,

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A. T. DEWEY, GEO. H. STRONG,
W. B. EWER, JNO. L. BOONE.

The Rates of Postage.

Postal cards, one cent each, go without further charge to all parts of the United States and Canada; with an additional one-cent stamp they go to all parts of Europe. All letters, to all parts of the United States and Canada, 3 cents per half ounce.

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Hammered Iron of Every Description and Size.

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CAPITAL.....\$1,000,000.

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TWO MEDALS OF HONOR.

HIGHEST MERIT.

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Asbestos Steam Packing, Asbestos Boards and Asbestos Steam Joints,

All manufactured from the pure utilized Asbestos Patent Fiber, and under patents granted to J. S. Rosenthal. The packing is in all sizes from one-quarter to three inches in diameter, round, and free from all grit or mineral matter. The non-utilized or crude Asbestos, manufactured by some parties into packing, is impure and gritty, liable to injure the piston rod and should not be used. The packing made under the Rosenthal patents is of pure utilized Asbestos fiber, and a very superior article and entirely different from the so-called Asbestos packing heretofore offered for sale. It is compact in form, will not fuzz or disintegrate, and will wear much longer than any other kind of packing. The indestructible, expanding, contracting and lubricating qualities of Asbestos are now universally recognized, and packing made from it is peculiarly adapted for steam engines and pumps.

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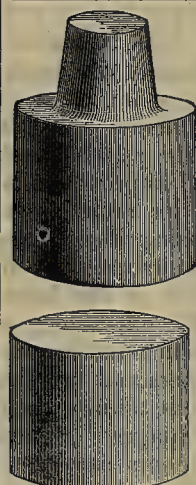
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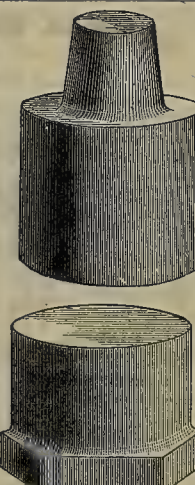
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Nevada Agency: 33 North C Street, Virginia.

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The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING AND TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

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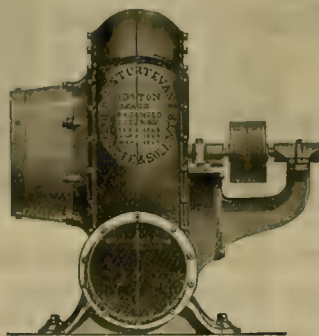
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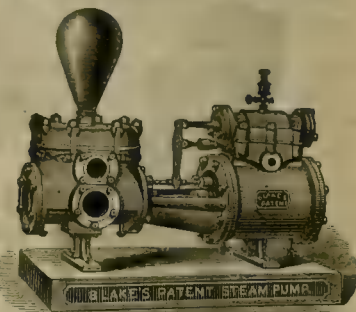
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The only Governor that has received awards at each of the International Exhibitions. American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Baltimore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals; International Exposition, Paris, 1867, One Bronze and Two Special Medals; International Exposition, Vienna, 1873, Medal of Progress and Decoration; International Exhibition, Philadelphia, 1876, Medal and Diploma.

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For Feeding Boilers and Draining Mines. MACHINISTS' TOOLS AND WOOD WORKING MACHINERY.

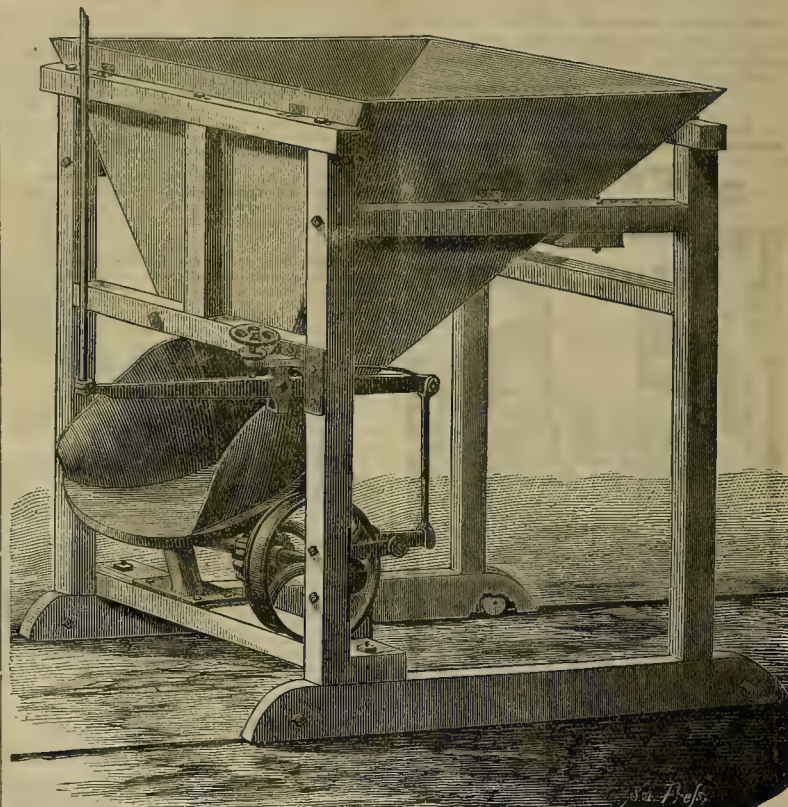
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It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

REFERENCES.

A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them."—A letter from Mr. C. C. Belding, of Amador County, speaks in the highest terms of them. Two of the machines were shipped to the Bunker Hill Mill, also Governor Mill, Amador County. Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen. Soulsby Mill, Tuolumne County. California Company, Nevada City. Omaha Gold Mining Company, Grass Valley. St. Patrick Mill, Placer County.

\$1,000 CHALLENGE.

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C. P. Stanford Fails to Come to Time on the Challenge of \$1,000 to Test the Merits of His Ore Feeder as Against Mine. The Challenge is Still Open to Him or any one else. GENTLEMEN, Put up or Shut up.

A letter has been received from the Crescent mine, Plumas County, in which it states that the Tulloch is a failure as against the \$1,000 Challenge Feeder of Hendy's.

We warrant the machines to give perfect satisfaction, and to be a better and more durable Feeder than any other in the market, and will sell them as cheap as any other of its class.

For Description, Send for Circular to

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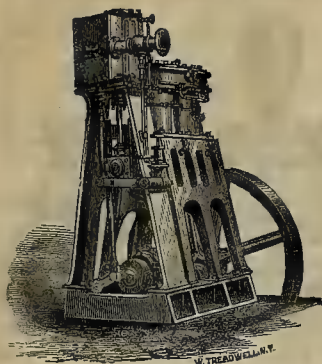
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Compound Steam Pump.

ECONOMY IN COST.
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POSITIVELY UNEQUALLED FOR
SIMPLICITY AND DURABILITY.



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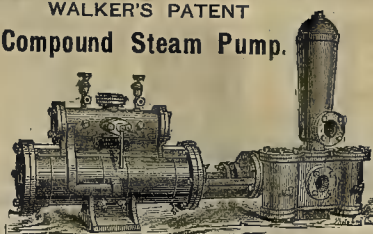
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Tunneling Machinery.

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Plunger Steam Pumps—Cope & Maxwell's.

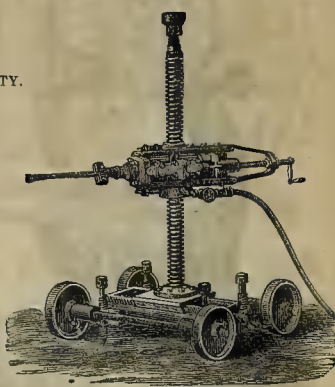
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Centrifugal Pumps—Heald & Sisco's.



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Vertical Steam Engines, All Sizes—Haskin's.

Emery Wheels—Cosmopolitan.

TWIST DRILLS—MORSE'S.

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EXPLODERS—HILL'S.

Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

VILLAGE HOOK AND LADDER TRUCKS,

Chemical Engines Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.

IMPROVED VERTICAL ENGINE.

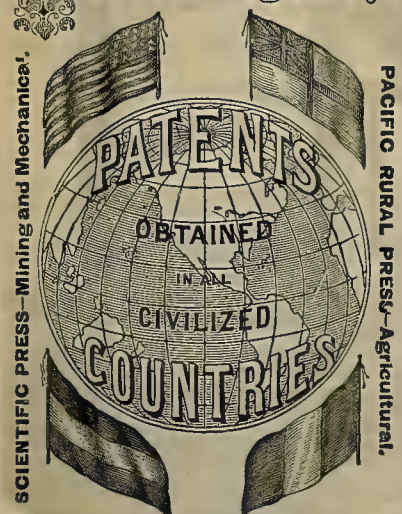
Any parties needing STEAM ENGINES, from Four to Ten Horse-Power, will do well to call on me before purchasing elsewhere. Particular attention is called to my improved Feed Pump.

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Practical Engineer and Machinist.

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DEWEY & CO., Publishers.

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Messrs. Dewey & Co.—Gentlemen: To-day I received the patent and other papers of my animal trap, that you so successfully worked through the patent office for me, for which please accept my best wishes. The chances are that I will have another application for you to make for me before long. I am well satisfied with your manner of doing business, and I think inventors of this coast stand in their own light when they do not put their business into your hands. I remain yours truly,

A. M. GASS.

Dewey & Co. { 224 Sansome St } Patent Agt's.

Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroenke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improved retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners' and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., Mining and Scientific Press, 224 Sansome Street, San Francisco.

UNITED STATES

Mineral Land Laws, Revised Statutes,
AND INSTRUCTIONS AND FORMS

UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, 1875—No. 163,940. Thanks to you for your prompt attention to the case; you will hereafter be my attorneys in such cases. I recommend all inventors on the Pacific coast to give you a call, which I think they will never have any cause to regret. Very truly yours,
GEO. G. BUCKLAND,
Stockton, Cal.

Thanks for Prompt Attention.

Stockton, June 26th, 1875.

Messrs. Dewey & Co., S. F.—
I have received the patent for my invention in wagon brakes, which you prosecuted for me; patented May 11th, 1875—No. 163,940. Thanks to you for your prompt attention to the case; you will hereafter be my attorneys in such cases. I recommend all inventors on the Pacific coast to give you a call, which I think they will never have any cause to regret. Very truly yours,
GEO. G. BUCKLAND,
Stockton, Cal.

"SPEAKS WELL," ETC.—We would return thanks for an exchange and back numbers of the MINING AND SCIENTIFIC PRESS, published by Dewey & Co., of San Francisco, Cal. It is a well edited, interesting, and valuable journal and speaks well for our Pacific neighbors.—U. S. Mining and Manufacturing Journal.

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SAN FRANCISCO, SATURDAY, APRIL 7, 1877.

VOLUME XXXIV.
Number 14.

Boiler Incrustation and Corrosion.

There is, perhaps, no subject connected with engineering science, which at the present time commands more attention or causes more perplexity than this. In marine engine practice its difficulties are most keenly felt; and of itself that is a field of operation large enough, as it involves interests sufficiently extensive to give great importance to the subject, and to demand the utmost exertions of engineers towards the solution of its problems, and the providing of remedies or preventive measures against the ravages of what is an active and powerful agent in the destruction of their work. But the range of action which this destructive agent has is bounded only by that which puts a limit to the use of steam, and hence many other interests besides those of engineers are involved in the matter.

The state of general information about this subject is very unsatisfactory, because it amounts only to the fact that obscurity, or at least uncertainty, prevails. Yet many facts of the greatest importance and interest have been noted, and, as is usual in such cases, there are some men who have considered these in the light of their own experience, with the intelligence which is needed in order to turn all to good account. As the subject is partly a chemical and partly a mechanical one, it demands, in order that it may be successfully grappled with, a combination of scientific and practical information which, in consequence of defective educational methods, has not been frequently found among many engineers. These scattered facts and observations have been brought together in a paper by F. J. Rowan, which forms No. 27 of Van Nostrand's Science Series (for sale in this city by Payot, Upham & Co.). This writer states that the course of investigation and inquiry called forth has been marked by the suggestion of various remedies. The earlier stages have produced the recommendation of a variety of empirical remedies or nostrums—substances which have been proposed for apparently every conceivable reason except an intelligent perception of the nature of the action to be counteracted, and consequently of the qualities requisite in their remedy. A list of these applying to incrustation is given in a paper by Mr. Jas. Napier, in the proceedings of the Philosophical Society of Glasgow, who gives also some account of the more rational methods proposed in his day. For corrosion a similar list has recently appeared—too large, however, to quote at length, and some methods have been proposed which have been more or less successful under special circumstances, but all partial in their application. Of these comes the endeavor to form a scale of salt by the use of a proportion of sea water, the use of zinc in the boilers, the filtering of the feed water, etc.

Incrustation and corrosion, although they both result in the destruction of boilers, are not one and the same action. The two actions are very dissimilar, yet they are often united in effecting the destruction of boilers and are often present successively in the same boiler (a crust being formed and then decomposed or partially decomposed), and are therefore often confounded. In the little treatise to which we refer this whole subject is treated at length and all the facts available have been condensed and the remedies suggested. Persons interested in the subject will find it of use to them.

W. A. GOODYEAR has issued a circular announcing that he will publish a comprehensive treatise on the coal mines of California, Oregon and Washington Territory, if he should obtain sufficient encouragement. As a mining engineer and member of the late Geological Survey of this State, he has had an excellent opportunity to study the subject thoroughly, more especially as he has within the past few years paid especial attention to this class of mines. Mr. Goodyear is a ready writer and the work will be of great value to the State. There is now no literature on the coal mines of this coast, although miners are sadly in need of it, and Mr. Goodyear's proposed work should meet with every encouragement.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening last. The following donations were received:

Yucca draconis, from Mohave desert, by J. T. Murphy; lynx, by R. H. Stretch; minerals from Oregon, by Prof. Davidson, from Arizona, by J. T. Jerome, and from Kern county, by J. P. Moore; crustacea, by Mr. Lockington.

Prof. Joseph LeConte, of the University of California, read a paper entitled "On Critical Periods in the History of the Earth, and Their Relation to Evolution."

Mr. J. R. Seupham read a paper on the introduction of foreign plants that are very rapid in

An Improved Metal Punch.

The invention herewith illustrated, besides being of novel mechanical construction, includes a simple and efficient arrangement for putting in and removing interchangeable dies and punches of different sizes. It is sufficiently powerful to punch readily a five-eighth inch hole in plow steel, and it has been practically tested with excellent success during the year which has elapsed since it was patented.

The operation is as follows: At *A* are the housings, near the top of which a cam lever, *B*, which forces down the punches, is pivoted. *C* is the die block, which slides freely in between the housings and is locked by a suitable spring pin. *D* are guide plates for the punch over the

Fish Breeding.

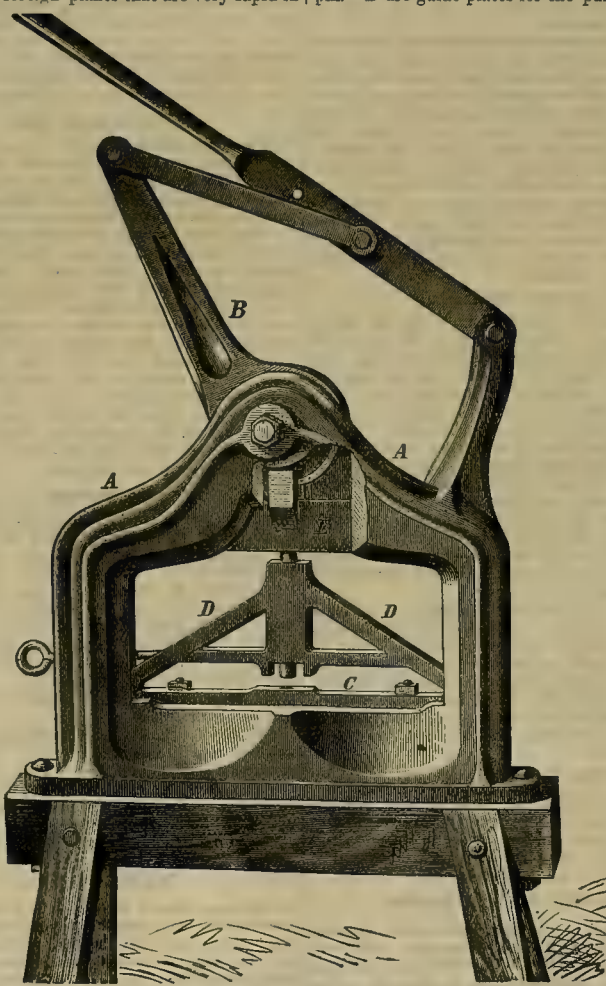
We are doing very well in this State in the way of introducing desirable kinds of fish and stocking our public waters with them. Last week we mentioned an appropriation which had been obtained from the general Government to forward this desirable work. We are also doing a good deal in the way of stocking private waters, and many a land owner will draw a cheap and nutritious breakfast from his ponds and streams as well as from his hennery, his garden or his herd. We hear of many cases of farmers who have introduced the carp from the ponds of Mr. Poppe, of Sonoma, and are obtaining satisfactory growth. Others are putting in trout. Reservoirs and streams are peopled in this way, and the latest note which we have upon the subject is that a man in Santa Cruz is going to stock his large tanks with this fish. We presume his water is cool and living, and, if so, we see no reason why he should not succeed. Some of the fattest trout we ever saw were in a tank or "pool," built in a New York dairy house, in which cans of milk were set for cooling. The water was constantly running in and out, and the fish were very thrifty. We have no doubt our farmers could do a great deal more in the way of making their water as productive as their fields if they were to give the subject attention.

In some parts of the mining districts, also, where water is plentiful, fish could easily be raised, which would afford an agreeable variety in the usual miner's food. Small ponds are easily made and if pipes were laid to a convenient flume or ditch, the fish could have fresh running water at all times without decreasing the supply of water. We have seen many places where this could be done with little trouble, and some of our friends in the mines might easily carry out our suggestion with benefit to themselves.

The last time we saw the late Mr. Quinby, the celebrated bee-keeper, he was busily engaged in hatching trout to fill a group of ponds, which he had contrived on the side-hill which rose behind his house, filling his ponds with the water from springs which issued forth above. Indeed, the Eastern farmers are awakening to the opportunity which lies in their water resources. In the report, January 1st, 1877, of the Connecticut Fish Commissioners, we read: "There are few enterprises enjoying public attention at the present time that promise more profitable results than the multiplying of food fishes in fresh water ponds. It is the belief of all who have studied the subject, that fresh water fishes of all kinds can be multiplied almost indefinitely, and so cultivated as to be improved not only in quantity but in quality, and made to be the cheapest of cheap food. This fact should be repeated over and over again, until every one who has a patch of water on his premises large enough for tadpoles and shiners, can make it yield an abundance of wholesome fish food, at not half the trouble and expense with which he cultivates a like patch of ground. The food thus produced is too much neglected by the whole community; it affords elements of nourishment necessary to a healthy condition of the body, for which no cheaper available substitute can be found." The report describes 256 ponds of five to 2,000 acres each, aggregating 31,604 acres in Connecticut alone—"These contain a considerable number and variety of food fishes—although probably not a thousandth part of what this may be made to produce at a little expense of time and money. Besides these (256) large ponds there are a greater number of ponds of less than five acres each, that are in like manner capable of development." From this it appears that the undertaking does not require any great stretches of water, and doubtless in our own State, as in Connecticut, there are chances for profitable work on a small scale.

HUMBOLDT district, Arizona, has about 20 miners, who are all doing well, working ores by the old Mexican process, *arrastras*.

The law taxing the net proceeds of mines is hereafter to be enforced in Yavapai county, Arizona.



BUSH'S METAL PUNCHING MACHINE.

growth and destructive to agriculture and gardening. He specially passed censure upon two grasses—the knot grass, introduced from the West Indies, where it grows very rank and is a deadly nuisance to the plantation, and the Bermuda grass, imported from India, and known in Sacramento as the witch grass. Animals eat it readily, but it has little sustenance, and if allowed to grow freely is almost ineradicable. In the Southern States it is used as a protection to the levees, but is found objectionable on the plantations. The first nip of frost changes this grass to a brown color, and it remains brown all the summer.

QUICKSILVER.—There were 4,312 flasks of quicksilver exported last month, valued at \$143,570. The above shows an average of 43¢ per pound, which is the lowest this year. During the previous month we shipped 6,779 flasks by sea, the largest quantity ever exported hence. For the month of March, 1876, we exported 3,923 flasks, valued at \$178,500, against 2,027 flasks, valued at \$169,700, for the same month in 1875.

die. A head block, *E*, serves to connect the punches to the cam lever, the attachment being effected by lugs which engage the lever by its grooves. The punch is secured in place by sliding the head into a channel above the slotted plate through which the shank hangs, the lower end being in the guide plates, *D*.

It will be observed that the mechanical power is very advantageously applied, that the punch and die, although easily removable, are tightly held, and that the general construction of the device is strong and durable. Two sizes of the machine are made, weighing respectively 175 and 275 pounds. They are excellently adapted for use in ironing wagons and blacksmiths' ordinary jobbing work.

All that is necessary to change to a different sized punch, is to loosen two burrs, change the die-plate and punch, and return the die-block to its place and tighten the burrs. For further particulars address Clayton Bush, Sextonville, Richland county, Wisconsin.

THE PRESOTT *Miner* records the discovery of a garnet mine near that city.

CORRESPONDENCE.

Silver Mines in Sandstone.

[From our Traveling Correspondent.]

It has been but a few years since the investment of capital in limestone was deemed hazardous in the extreme. It is now a well established fact that some of the most productive mines of Montana, Utah and Nevada are encased in this formation. The idea is perhaps almost universally prevalent that silver is not to be found in paying quantities in the sandstone. Instances of its occurrence in this kind of rock are by no means frequent, it is admitted, judging from the discoveries already made. It has, therefore, been thought advisable, in view of the present chronic skepticism upon the subject, to make the following short citations from Prof. Dana's "Manual of Mineralogy"—an authority in such matters that none will call in question:

"Silver occurs in rocks of various ages; in gneiss and allied rocks, in porphyry and limestone, as also in sandstone and shale, as recent, even, as the middle secondary, as in Prussia, and probably in the mining region of our own Michigan."

Again: "The Chilean mines on the western slope of the Cordilleras, in South America, are connected mostly with stratified deposits of a shaly sandstone, and occasionally of a conglomerate character."

This much seemed to the writer required by way of introduction to the comparatively recent discovery of what gives promise, so far as can be judged from present developments, of becoming

An Exceedingly Inviting Field

For mining enterprise. With the exception of some prospects, which will receive attention in proper order, the active operations are confined to Silver Reef and Leeds, or to the immediate vicinity of these villages, which are situated in Washington county, southern Utah, 18 miles north of St. George, and 300 miles south of Salt Lake City.

The Sandstone,

However, covers a large area compared with that of the silver deposits, as these have thus far been found mostly in the white species, which is highly impregnated with lime—the formation, as a whole, of every shade and hue, having an extent north and south of at least 70 miles, with nearly as many in width. It occupies, apparently, a great basin, bounded on all sides by lofty ridges of granite and limestone, against which the waters of the ocean must have dashed for ages almost countless before such vast

Mountains of Stratified Rock

Could have been built up inch by inch as they must have been, carrying us in all probability far beyond the "middle secondary;" some facts not fully verified pointing as far back even as the carboniferous era of the earth's great past history. In the immediate vicinity of the mines, old craters are visible and other evidences of great volcanic activity are everywhere marked; trap, basalt and similar metamorphic rock being seen strewn on hillside and plain or capping the highest summits of the sandstone.

The White Reefs

Containing the mineral tilted up in opposite directions from a common center, as it were, by volcanic and other internal forces; and to be seen (the two great eastern and western reefs in particular) stretching southward as far as the eye could reach.

The Main West Reef

Forms something of a horse-shoe at its northern extremity, and dips west and north under a massive red reef—whether or not the old red sandstone of Hugh Miller is too difficult a problem to solve with the data at hand—but found in turn underlying or closely bordering upon lofty granite-ribbed and limestone-capped mountains in the background.

The East Reef

Has a dip in the opposite direction under a similar red and yellow hued formation, looming up towards the rising sun in reef after reef, now in abrupt water-worn, precipitous cliffs, now carved into strange, grotesque, sometimes beautiful forms, requiring no great effort of the imagination to transform them into domes of magnificent temples, tall cathedral spires, lofty antique turrets or castles, or some grand old ruin of a once impregnable fortification, such only as the Titans or giants of olden times may be supposed to have built.

Questions Needing a Solution.

In brief, the whole scene, inclusive of formation, veins, and mode of mineral deposit, is a weird, wonderful and deeply interesting picture of nature's own painting—a book with many unsolved problems—written, too, in a language long since dead—requiring all the skill and acumen of the best scientists of the age to translate and unravel.

From which you will rightly infer that your correspondent has arrived at no very clear and positive conclusions of his own. Hypothesis

after hypothesis has been tried and as quickly abandoned, such as infiltration, sublimation, and the old, generally received theory for the formation of quartz lodes.

The Most Plausible Assumption

For the time being, was that the silver had been deposited at the same time with the sandstone during a period of great volcanic activity, in the form of a solution, being carried up in a vapor condition and more generally diffused, at that time through the waters of the sea. Some facts were presented by one of the observing miners that lead to the conclusion that the mineral, instead of settling on the sand from above, had come up from below, and that the vein was filled at the time of the upheaval of the strata, or perhaps long subsequently. Let us first have the facts as far as they could be gathered on so short an examination.

Some of these will doubtless need further confirmation.

1st. The silver is found in veins following the stratification, in no instance, as far as observed, cutting across the formation, except possibly in small seams connecting two veins.

2d. There are usually several parallel veins on the same reef, and at no very great distance apart.

3d. A species of talc or steatite is generally found as an accompaniment of the veins, lying on one side of the ore and in some cases comprising a portion of the gangue which frequently gives high assays.

4th. Another peculiarity is, that decayed vegetable mold, nodules and petrifications sometimes form a portion of the vein matter, running from \$100 per ton, high up in the thousands.

As the fact of finding petrified wood, except near the surface, has been questioned, a fine specimen, four inches in length, was secured, represented by Mr. Barbee, of the Barbee & Walker vein, to have come from the incline at the depth of 175 feet from its mouth. Even small specimens of stone-coal are said to be discovered.

5th. Quartz is nowhere seen and forms no part of the gangue.

6th. Sandstone cannot be regarded in any true sense as the matrix, the mineral not being generally diffused through it, but found deposited principally on the sides of the strata as a chloride, frequently very rich and abundant in that form of it known as horn silver. Where it is seen penetrating the rock, it takes the form of dark spots, or nuggets—spaces probably occupied by vegetable matter—which become a receptacle for the mineral, possibly an attractive home. As the unusually high assays from the ore in this quarter point strongly to the existence of a warm affinity on the part of the mineral for the vegetable.

A Final Hypothesis.

It is difficult to determine whether the talc in such intimate connection with the principal veins is itself a stratified deposit, having been previously erupted, or whether, as is possible, (not to say probable), it may not have been intruded between the strata of sandstone by the same force from some great smelting furnace near the great mineral belt below, that rent the rocks sufficiently to allow the fumes to escape and find their way into every seam and crevice on their passage to the surface, filling the cavities made by the decayed or decaying vegetable matter—the fissures forming so many long underground flues and condensing chambers where the richly laden fumes, dust and mineralized vapors found a lodgement.

The last hypothesis, modestly suggested, seems to correspond as well with the facts as any other, besides having the merit of being an encouraging one for the miner, for it must be almost self-evident from the assumption that the deeper he sinks, the wider and richer will be his flues, till he reaches the pure, solid plates of glittering silver, fresh from the anvil and hammer of Vulcan.

Some Detailed Statements.

Having theorized to some extent, and described in a general way the appearance of this novel and interesting region with its reefs and mineral veins, some facts and statements will be given in detail, going to show that

Ore, Both Rich and Abundant,

Is found here near the surface, (the greatest perpendicular depth being less than 150 feet), and thus far manifesting not the least tendency to a decrease in either value or quantity, but on the contrary, furnishing every evidence from week to week, as greater depth is attained, of improvement, both in the quantity and quality of ore, besides giving greater promise for permanence. Much of the ore, as will appear in the sequel, has been sufficiently rich to ship to Pioche or to Salt Lake, and at the same time pay a fine profit. But the prosperity of the district depends probably far more upon the thousands upon thousands of tons of a grade too low for shipment, running from \$20 to \$50, which can and will be extracted as soon as mills can be erected. On the authority of Col. D. E. Buell, who is familiar with the veins and character of the rock, the whole cost for mining, hauling and milling need not exceed \$17 per ton, while others make even lower estimates. Commencing at the north end of the west reef where it forms a semi-circle, just above Silver reef,

The Luna Mine.

(Lawson & Bush), at the depth of 45 feet shows a width of four and a half feet; the course of the vein east and west at this point and dip to the north. Here the talc crops out on each side of the sandstone ledge from 10 to 12 feet in thickness,

The Barbee & Walker,

Situated immediately west of the village, extends north and south 2,000 feet. It is owned and worked by Mr. W. T. Barbee. An incline 175 feet and drifts of 40 each way from the 150-foot level, show a vein five feet wide, with dip to the west at an angle of 40°. Character of ore, horn silver. The whole of the ore is mined and worked, yielding from \$75 to \$100 per ton. A few tons, selected for shipment, brought at the rate of \$160.

The Bonanza Mine,

of 1,500 feet, lying further south on this same reef, has been opened by a shaft 85 feet, cutting one vein at 45 feet in depth, with ore averaging \$110 per ton, and reaching another at the depth of 65 feet, from which point a drift is run for 35 feet in a solid vein of fine ore, said to be from four to six feet thick.

Hanly & Co.'s shaft, located in the valley some distance west of the Bonanza, is down 80 feet, and will probably reach the main vein at a further depth of 40 feet, with the chance of cutting another in its course.

The Leeds Mining Company

Occupy the next ground south, of 2,000 feet. Besides laying open their vein at three different points on the reef, a double compartment shaft has been sunk on the flat to the depth of 130 feet, where the dip of the vein was reached, cutting a small vein 40 feet above their main lode.

The company deserve much credit for the energy displayed in their operations. Their fine 10-stamp mill was put up and in readiness for running within less than 30 days from the laying of the first timbers. About 25 tons are crushed per day worth from \$90 to \$100 per ton, the whole of the ore being milled just as it comes from the mine, and is paying a fine profit.

The mill has been running about six weeks, and, notwithstanding some necessary delay in the meantime, some 40 bars of bullion, valued at from \$900 to \$1,000 each, have been turned out. Facts such as these need no comment. A few of such companies would soon work a wonderful change in the district. The remaining claims on this reef need not be described, as they are all much of the same character.

The Tecumseh Mine,

Located on a hill of the same name to the east, the property of Messrs. Barbee & Maynard, is worked mostly by chlorides, who receive a stipulated per cent. of the ore extracted. The veins on this part of the ledge are usually small, varying from four to 18 inches, but generally carrying ore of high grade. They differ from most of the other veins in the district in the slight inclination of their dip, some of them, in fact, being nearly horizontal. In the neighborhood of 400 tons of ore have been shipped from the hill during the past six months, giving a working value of from \$150 to \$1,000 per ton. The Maggie, owned by M. V. Coschina further south on the middle reef, is four feet in width, carrying ore from \$60 to \$90 per ton. From this point to the junction of this ledge with the main west reef, there are several fine locations, the most promising being

The Stormant,

Belonging to Messrs. Smith & Hardy, which is opening up beautifully, showing at the foot of an incline, 45 feet, a six-foot vein of solid ore. It runs from \$34, the lowest assay ever had, all the way to \$5,000 or upwards. It is pretty safe to conclude that the whole of the rock, from wall to wall, will work from \$100 to \$120 per ton. It is thought that every foot sunk on the incline will yield its two tons of ore, worth from \$200 to \$240 in the aggregate. The prospects here for a large and valuable mine could not be better.

Mr. R. T. Smith, of the Stormant, claims not less than 10 veins for the reef, at this point, running parallel, and from 12 to 15 feet. The proprietors of the Stormant also own the Emily Jane, the next claim adjoining on the south, which has four feet of high-grade ore, first-class averaging \$150, and second running from \$60 to \$80 per ton.

The Great Western,

On the east side of Kessell hill, has been laid bare for 150 feet along the reef, and also by incline on the vein. It varies in width from two to four feet. Some of the assays of ore have been as high as \$13,000. It samples \$75 per ton. It is the property of Kessell Bros., Ed. Kessell and B. M. Pearlman. The Crown Point, on the same hill, opened by incline 30 feet, shows a five-foot vein of ore, that is said to give average sample assays throughout of \$75 per ton.

The Vanderbilt Segregated,

Belonging to Messrs. E. Kessell, F. Brown and others, is situated on the main east reef, two miles from Leeds. An open cut of 20 feet has been run down on the vein, which widens in that distance from a few inches of good ore to three feet, the ledge matter running from five to six feet in width, the whole of which is represented as giving average samples of \$300 per ton. Sample assays for three classes show a value for the poorest grade of \$144; for second class, \$244; and for the highest grade, \$1,294, as per certificate of assayer—first class being probably pretty closely selected.

Friends Brown and Kessell, both acquaintances of long standing, may be congratulated as the fortunate possessors of what is believed to be a valuable piece of property, even if the ore should not work up to one-fourth the above figures, and they will, no doubt, pardon a little skepticism manifested on the part of the writer

when they expressed the belief that the whole of the ore had an average working value of \$600 per ton. The Steele & Lamb, south of last described and somewhat better developed, shows a four-foot vein of similar ore.

The Maud Mine,

Situated also on the east reef, from two to three miles south of the Vanderbilt, has been opened at several points by open cuts and inclines, as also by a perpendicular shaft that cuts the vein at the depth of 85 feet. It is probably 20 feet from wall to wall, and exhibits to the view an immense body of ore. The whole, from 18 to 20 feet in thickness, was estimated by Col. Buell, a fellow visitor at the time, to mill \$90 per ton on an average. Four lots of a few tons each, worked as a test, yielded as follows: First lot of four tons, \$389 per ton; second lot, \$406; third, \$609; fourth, \$1,002. Messrs. Gifford & Brisacher are the lucky owners.

The Toquerville Mining Company

(Mr. John R. James, Superintendent,) are working the Morning Star, the next claim adjoining, I believe, on the north, which is, in most respects, similar to the Maud, and probably fully as valuable. Some 12 to 15 tons, taken out near the surface on the top of the reef, averaged \$300, or upwards, per ton. There is a considerable amount of ore on the dump. The Superintendent is confident that enough can be extracted to keep a 20-stamp mill constantly supplied. The foundation for a custom mill of this number of stamps is already laid on the bank of the Virgin river, not more than 1,000 yards from this property, which will greatly enhance its value as well as that of other claims near this locality. The company are running a tunnel with the expectation of tapping the lode at the depth of 365 feet, besides cutting several veins in its course.

The Harrisburg, one mile below the village of the same name, was not visited, but is represented by Superintendent James as showing a continuous vein its entire length of 6,000 feet; the ore body four feet wide at the bottom of a 25-foot shaft, and giving average assays of \$85 per ton.

The Duffin,

Taking its name from its owner, is located some distance north of the Morning Star and the Maud on the east sandstone ledge, and, like its neighbors is giving every indication, external and internal, of soon developing into a first-class mine. Selected ore has milled at Pioche as high as \$333 per ton, a lower grade working from \$80 to \$100. There are 15 tons second grade on hand, valued at \$175, and a few tons first-class at \$350. The mine has been laid bare at different points for 1,400 feet, and has produced from \$10,000 to \$15,000 worth of ore.

The Butte No. 2,

In the suburbs of Leeds, belonging to Messrs. Williams, O'Dougherty & Aguayo, has a good strong vein of ore, four feet wide. There are 300 tons at present on dump, valued at \$80 per ton. The Loughery and Butte No. 1, the former adjoining on the south and the latter on the north, are, in all respects, similar to the above, some ore from the Loughery sampling \$200 per ton.

Advance Guard in Motion.

The Duffin, Butte No. 2, the Loughery and 750 feet of ground adjoining the Leeds company's claim on the south, together with the four-stamp water mill of seven tons capacity, belonging to Mr. Dupax, with water rights and lands adjacent, have all been contracted for by Col. David E. Buell and Mr. J. C. Clark, with the view of incorporating immediately. The Colonel, with his wonted energy, has already entered on the work of development. Mr. Clark is to have charge of the completion and running of the mill, to be increased to the capacity of 20 tons by the addition of stamps. The different claims embracing the property were personally inspected, and are looked upon as promising and valuable. The best guarantee of the success of the enterprise lies, however, in the well-known experience and ability of the gentlemen in charge.

A New District

Has been formed 22 miles north of Leeds, and is at present attracting some attention, the formation and the character of the ore being the same as those already described. The Columbia, Mountain Boy, Eureka, Centennial, Longberg and Maynard were discovered July last, by Mr. Chinn, and are said to assay from \$20 to \$800. The Columbia has been bonded to Mr. Jacob Ornstein, recently from Salt Lake City, and is represented as a 10-foot vein, assaying \$78 per ton, silver.

In conclusion, and as the reader has doubtless already inferred, there is an abundance of ore, particularly around Leeds, easily mined and milled, that will pay a handsome profit, with cheap facilities at hand for working. The very nature and singularity of the formation will, as a necessary consequence, lead to prudence and caution in the erection of mills, until the question as to the permanence of the mines is fully demonstrated by sinking, so that while crushing facilities are essential in opening up the district there is little danger of mill building going in advance of the developments. A. C. K.

MINING DECISION.—A dispatch from Eureka, Nevada, says: In the District Court, Judge F. W. Cole decided the case of Gleeson vs. The Martin White mining company in favor of the defendant. The property is situated in Ward district, and the case was tried in Hamilton in November last. The case will be taken to the Supreme Court.

MECHANICAL PROGRESS.

Effect of Quality of Steel on Tempering.

Doubtless many smiths among our readers are puzzled sometimes because the tools which they temper with the greatest care do not suit the workmen who use them. They will be pleased to know that the failure is not in their skill in tempering, but in the unfitness of the steel, although generally good for the especial purposes desired. The way in which this occurs and how it may be obviated is clearly stated in the following statement by Miller, Metcalf & Parkin, of Pittsburgh:

A piece of steel properly tempered should always be finer in grain than the bar from which it was made. If it is necessary, in order to make the piece as hard as required, to heat it so hot that after hardening it will be as coarse or coarser in grain than the bar, then the steel itself is of too low temper for the work desired. In a case of this kind the steel maker should be at once notified of the fact, who should immediately correct the error by furnishing higher tempered steel.

If a great degree of hardness is not desired, as in the case of taps and most tools of complicated form, and it is found that at a moderate heat the tools are too hard and are liable to crack, the smith should first use a lower heat in order to save the tools already made, and then notify the steel maker that his steel was too high, in order to prevent a recurrence of the trouble. In all cases where large quantities for the same purpose, as in the making of axes, springs, forks, etc., there is very little difficulty about temper, because, after one or two trials, the steel maker learns what his customer requires, and then can always furnish it to him.

In large, general works, however, such as a rolling mill and nail factory or large machine works or railroad shops, both the maker and worker of the steel labor under great disadvantages from want of a mutual understanding.

The steel maker receives his order and fills the sizes of tempers best adapted to general work, and the smith usually tries to harden all tools at about the same heat. The steel maker is right, because he is afraid to make the steel too high or too low for fear it will not suit, and so he gives an average adapted to the size of the bar.

The smith is right, because he is generally the most burried and crowded man about the establishment. He must forge a tap for this man, a cold nail knife for that one, and a lathe cutter for another, and so on; and each man is in a hurry.

Under these circumstances he cannot be expected to stop and test every piece of steel he uses, and find out exactly at what heat it will best harden and refine properly.

He needs steel that will all harden properly at the same heat, and this he usually gets from the general practice among steel makers of making each bar of a certain temper according to its size.

But if it should happen that he were caught with only one bar of, say, inch and a quarter octagon, and three men should come in a hurry, one for a tap, another for a punch, and another for a chilled roll plug, he would find it very difficult to make one bar of steel answer for all these purposes, even if it were of the very best quality.

The chances are that he will make one good and two bad tools; and when the steel maker came round to inquire he would find one friend and two enemies, and the smith puzzled and in doubt whether he ought to get mad or not.

There is a perfectly easy and simple way of avoiding all this trouble, and that is to write after each size the purpose for which it is wanted, as for instance: track tools, smith tools, lathe tools, taps, dies, cold nail knives, cold nail dies, hot nails, hot or cold punches, shear knives, etc. This gives very little trouble in making the order, and it is the greatest relief to the steel maker. It is his delight to get hold of such an order, for he knows when it is filled he will hardly ever hear a complaint.

INVENTING.—Inventing to-day, says the *Iron Age*, can be classed among the exact sciences. It is no longer a matter of happy accident or even sound mechanical judgment. The world has progressed rapidly during the last 30 years, and to-day we find that the merely ingenious man can do but little that is of value to the world. In other words, something more than ingenuity is necessary to the production of a successful invention. Thirty years ago and a good mechanic could hardly spend an hour in a shop without seeing an opportunity for improvement in something, and at that time what was true in one shop was true everywhere. Since then a whole generation has been steadily at work improving and inventing; mere ingenuity has exhausted its powers, and even originality has but a limited field in which to seek profit in inventing. The first task of the inventor now is to discover a want. He must then find out whether any attempts have been made to meet this want; if so, how, when and by whom. In other words, he must learn the state of the art, so that he may avoid traversing the footsteps of others who have failed. These are not waters which can be guessed at. They call for careful study, and when he has learned all he can about the subject he is ready to attack the problem intelligently—not before.

The Use of the File.

Most intelligent journeymen machinists, says Jesse Lord, in the *Polytechnic Review*, do not require any advice, direction or caution in the use of the file; but for apprentices and inexperienced workmen, a few words of suggestion may not be amiss.

First, as to setting the vise; the top of the jaws should not be higher than the elbow of the filler. This allows the forearm and hand to travel back and forth in a horizontal plane, a condition necessary to exact work. If the jaws of the vise are lower, the tendency of the filler will be to file most with the point, and if too high, the bearing will be on the portion nearest the handle; in neither case allowing a straight, or rather a level draw from front to rear. No good work can be done with the light of the vise jaws unadapted to the height of the workman.

No warped or sprung file should be used on work requiring straight filing. If such defective files are chosen by the "boss," they should be used simply in dressing off castings or forgings, but not to reduce work to a plane. No dependence can be placed on a spring file. The truth of a file, even in the bastard style, which has both faces and both edges curved, can be readily detected by the mechanical eye without a trial at the vise.

The file handle is important. No workman can do a good job with a file stuck into a piece of pine wood or a section of broom handle, nor even in a chisel handle. A file handle is *auis generis*—it is a file handle and nothing else. It is folly to attempt good work with a tool incompletely fitted; the handle is part of the file.

It is waste and extravagance to put a new file on cast iron until the scale has been removed either by grinding or by the use of a half-worn file. Neither is it economy to use a new, sharp file on wrought iron or steel. Give the new file to brass, then cast iron, then wrought iron.

To clean a file that is clogged with particles of wrought iron, there is but one way. The card is insufficient; it cannot remove the tenacious clinging particles. Take a piece of tough wire—No. 8 will do—and turning one end into a ring to form a handle, beat the other while cold into a flat chisel-shaped edge. The implement, when finished, is perhaps eight or 10 inches long. To use it, rest the file, point down, on a bench, and strike with the flattened edge of the wire across the teeth of the file in the direction of the cross-out. The cleaner will soon be toothed and will be found to be easily and rapidly cleaned. For ordinary clogging, wetting the file with oil, holding it over the forge fire or in a gas light for a moment, and then brushing with the card, will clean it effectually.

MECHANICAL FIRING OF STEAM BOILERS.—We lately noted the attempts which were being made in England to perform stoker's work by machinery. The following notes on the subject are from an address by Mr. J. W. Pearce: The author first pointed out some of the disadvantages of hand-stoking, and observed that so far back as 1813 mechanical firing was proposed. In 1822, Mr. J. Stanley invented a stoker with crushing rollers and a single horizontal fan, to which, in 1834, he added rocking fire-bars. In 1838 Mr. Juckes patented his first stoker, and in 1841 he invented the endless chain of fire-bars, modifying it again in 1842. In 1863 Messrs. Wilson & Smith brought out their furnace, in which the fire-bars were made to travel backwards, carrying the fuel from a hopper to the back of the grate, an arrangement which was improved upon by Messrs. Vicars & Smith in 1867. In 1870 Mr. Dillwyn Smith patented his stoker, in which the fuel is fed on to distributing fans revolving horizontally. This arrangement was improved upon, in 1870, by Mr. J. F. Deacon. Further additions were subsequently made by Mr. T. Henderson. The Henderson stoker was then described by the author. In it the supply of fuel is affected in the same way as in the Dillwyn Smith machine, but the fire-bars are made to move by simple gear connected with the stoker. Every other bar rises and falls, while the rest slide to and fro, the effect of this action being to clear off the clinker. The Frisbie feeder, improved by Mr. J. M. Holmes, is for slow combustion and intermittent feed. The coal is thrust up underneath, and in the middle of the fire, so that the gases evolved are consumed on passing through the incandescent mass. This stirs the fire and propels all clinker to the circumference of the circular revolving grate. Mr. Holroyd Smith's "Helix" fire-feeder gives a continuous feed from below by means of a screw working in a casing connected at its upper side with a trough which takes the place of one or two fire-bars. The saving effected by these stokers was stated to be two-fold, first in the quality of the fuel used, and next in the quantity consumed, a reduced first cost being also incurred, owing to smaller boilers and fire-grates serving for a given power, with more perfect combustion.

WEIGHING RECORD.—A new weighing machine, which gives a written indication of the load, has been invented by M. Chameroy, and is described in the *Bulletin de la Société d'Encouragement* for January. The impression is made on a thickish card, arranged so as to receive successively two impressions, indicating separately the gross weight of the load and the tare.

SCIENTIFIC PROGRESS.

How the Earth Might be Burned Up.

Professor Proctor, writing to *Belgravia*, notes the cases of star conflagration and "the effect which would result to the earth if our sun should thus be acted upon: These star conflagrations, it is believed, are caused by contact with other heavenly bodies—meteoric flights traveling on eccentric paths, or those in attendance of the comets. The meteors attendant on a comet continue to follow in its path years after the comet has disappeared. The effect of a comet, bearing in its flight many millions of meteoric masses falling upon the sun—should that take place—can be understood. Our sun seen from some remote star whence ordinarily he is invisible would shine out as a new sun for a few days, while all things living on our earth and whatever other members of the solar system are the abode of life would inevitably be destroyed. If a comet came out of that part of the constellation Taurus, arriving in such a time as to fall upon the sun in May or June, the light of the sun would act as a veil, and we should be instantly destroyed without knowing it. If it fell in November or December we should see it for weeks, and astronomers would be able to tell us when it would fall upon the sun. The disturbance upon the sun would be temporary, but there would be no students of science left to record the facts. The chances are largely against such an accident. Our sun is one among millions, any one of which would become visible to the eye under such an accident, yet during the last 2,000 years less than 20 such catastrophes have been recorded. Mr. Proctor moreover reassures us in another way. He says in effect that all but one of these conflagrations have appeared in the zone of the Milky Way, and that one in a region connected with the Milky Way by a well-marked stream of stars; that the process of development is still going on in that region, but that if there be among the comets traveling in regular attendance upon the sun one whose orbit intersects the sun's globe, it must have struck before the era of man, and that in our solar system we may fairly believe that all comets of the destructive sort have been eliminated, and that for many ages still to come the sun will continue to discharge his duties as fire, light and life of the solar system.

EXCRETION OF CARBONIC ACID.—A German chemist has, according to the *Journal of the Chemical Society*, made a long series of careful experiments to ascertain the quantity of carbonic acid given off in respiration and perspiration by different animals. In proportion to their weight, the largest quantity of carbonic acid is given off by birds—mammals come next—and worms, amphibia, fishes and snails form another group in which the excretion of carbonic acid is smaller; of these, worms give off the most and snails the least. Those that live in water give off more carbonic acid to the air than they do to the water; and young animals more than old ones. Experiments with colored light show that under the green and yellow more carbonic acid is excreted than in ordinary daylight; and on comparing light and darkness, it is found that much less carbonic acid is given off during the night than during the day. Among the rays of differently colored light, the milk-white and blue rays come next to the green and yellow in activity; and the red and violet are the least active of all the hues of the spectrum.

THE ELECTRIC LIGHT.—Some attempts have been lately made, says the *English Mechanic*, to improve the electric light by mixture of certain substances with the carbon, magnesium, etc., which, according to M. Achereau, greatly increases the luminous intensity. M. Gandrin has experimented with a variety of matters thus added. Phosphate of lime (from bones) thus mixed with the carbons doubled the intensity of the light; the calcium going to the negative carbon burned with a reddish flame, and abundant smoke was produced by the phosphoric acid and lime. Chloride of calcium and borate and silicate of lime give less light than phosphate of lime. They are decomposed, however. Silicon fuses, and is volatilized, and diminishes the light. (Several other substances were tried, with results which the author describes.) The flame and smoke accompanying these electro-chemical lights appear a serious obstacle to their utilization. The introduction of the substances, however, into the carbons is a useful way of studying the action of electricity on them.

TELEPHONES IN MINES.—The *Mining Journal* calls the attention of mine-owners to this wonderful instrument, which was lately described in these columns as a means of signaling in the mines. A telegraph wire can be laid through the mine, and with telephones at a few important stations, conversation can be carried on between those in different parts of the mine and those on the surface. Should an accident occur, the prompt notification of it and its nature might save many lives and much property; and the possibility of conversing freely between distant points without the necessity of skilled operators will unquestionably prove an incalculable advantage in mining, as it will be in other departments of industry.

OPTOGRAMS.—We have all heard, says the *London Medical Record*, with incredulity, of images seen at the moment of death being left imprinted on the eye. Current stories of such images being utilized for the purposes of justice in search of a murderer have been ridiculed by scientific critics. "The impossible" has, however, here once more been proved to be not far from the truth. Dr. Gamgee, F. R. S., of Birmingham, has described and verified the following experiment. Kuhne took a colored rabbit and fixed its head and one of its eye-balls at a distance of one and a half meters from an opening, 80 centimeters square, in a window shutter. The head was covered for five minutes by a black cloth and then exposed for three minutes to a somewhat cloudy midday sky. The head was then instantly decapitated, the eye-ball which had been exposed was rapidly extirpated by the aid of yellow light, then opened, and instantly plunged in five per cent. solution of alum. Two minutes after death the second eye-ball, without removal from the head, was subjected to exactly the same processes as the first, viz., to a similar exposure to the same object, then extirpation, etc. On the following morning the milk-white and now toughened retine of both eyes were carefully isolated, separated from the optic nerve and turned; they then exhibited on a beautiful rose-red ground a nearly square-shaped image with sharply-defined edges; the image in the first eye was somewhat roseate in hue and less sharply defined than that in the second, which was perfectly white. The size of the image was somewhat greater than one square millimeter. Prof. Bunsen was among the witnesses of this beautiful experiment. This permanent retinal photograph it is proposed to call an "optogram."

GLASS SILK.—The usefulness of glass silk to chemists and druggists has lately been brought to the notice of the French Société de Pharmacie by M. Limousin. The product is little known in France, but is now largely used in Germany, and especially in Austria, for filtering liquids in laboratories. (The mode of preparation, by winding fine threads of glass in fusion on rapidly rotating and heated cylinders, is probably familiar to our readers.) In the microscope the threads are as fine as those of silk or fibrillæ of cotton. They break more easily than the latter, but are excessively supple. From the inalterability of the substance, it is very well suited for filtering acid or alkaline solutions, even concentrated, and various other substances, such as nitrate of silver, albumen, collodion, Fehling's liquor, etc. It affords great rapidity of flow, with good filtration. It does not, like filters of paper or tissue, communicate organic matters to the liquids, altering and perhaps giving them a disagreeable taste. It is much preferable to amianthus, which from the arrangement of its parallel fibers cannot be formed into a flexible ball and which lets fragments pass that float in the liquid. For analysis it is very advantageous, allowing of a ready determination of insoluble matters deposited; also, by calcination and fusion of the glass may be found the volatile principles fixed in the passage of the liquid, unmixed with empyreumatic products. The price of glass silk is at present pretty high; but its excessive lightness admits of a considerable number of filtrations being made with a small weight of it. Besides, it may serve an indefinite time, if only after each operation it is abundantly washed with water and dried in air.

MAKE SOMETHING, PRODUCE SOMETHING!—Half the people of the world are idle for want of some over-seeing eye to set them to work. The advice which Haydon gave to the erratic poet Keats, to settle down to some definite purpose, needs to be given to almost one-half of mankind. There are very few persons but would find themselves comfortably well off if they would take hold of any one of a hundred pursuits and stick to it. Industry and economy will make a most wonderful change in many households. Make something. If those already at work making do not want your assistance start for yourself, make something. If you do not know how, then begin at once to serve an apprenticeship.

RUSKIN'S IDEA OF A SCIENTIFIC LECTURE.—Mr. Ruskin is a chronic growler. He says of a modern hall and a lecture in it: "Your present system of education is to get a rascal of an architect to order a rascal of a clerk of the works to order a parcel of rascally bricklayers to build you a bestially stupid building in the middle of the town, poisoned with gas, and with an iron floor that will drop you all through some frosty evening; wherein you will bring a puppet of a Cockney lecturer, in a dress coat and a white tie, to tell you smugly there's no God, and how many messes he can make of a lump of sugar. Much the better you are for all that when you get home again, aren't you?"

FOSSIL ANTS.—Mr. S. H. Scudder has been working upon a collection of fossil ants from South Park, Colorado. Heer, in his work on the fossil insects of Eningen and Radoboj, had found that most of the fossil ants discovered were winged females. It seems reasonable that this should be so, as the winged insects were most likely to fall into the water and be drowned, and especially the females, who are much more heavy-bodied than the males. Mr. Scudder had found about 40 species of ants in the collection, most of which were winged females. In amber fossils most of the specimens of ants are workers.

RINDERPEST has appeared among sheep in another London suburb. The Treasury Department at Washington recommends vigilance on part of Customs officers in the matter of importation of horses, cattle, sheep and swine, so as to provide against the introduction of the rinderpest, which is pronounced infectious as well as contagious.

The Eureka Lode.

Definite proof of the existence of a mineral-bearing lode, continued explorations on which have demonstrated to a certain extent its value, the best evidence of which is the continued and persistent bullion-producing qualities which gives the locality in which it is found an enviable status in the mining world. It has been the misfortune of Eastern Nevada to have for its neighbor a lode which has had no rival among ore-bearing veins, and the fact was so patent that it has constituted itself a gauge by which the more humble but meritorious districts have been measured, and anything that did not approach the standard of the great Comstock has been regarded as almost unworthy of notice. This state of things is the more to be regretted from the fact that silver mining is a business that requires the help of capital intelligently employed before the most valuable discoveries can be utilized, and without its aid the richest mines lie idle. The struggle during the early years of the district was a prolonged and toilsome one, rendered so in a measure by the exceptional character of the ore, which demanded processes that the early pioneers were not familiar with and the poverty of those engaged in the developments of its resources. It is hardly worth while to trace the progress of the work, as it is a subject that our readers are familiar with, but it is pleasant to record the result and know that, although we have only had a brief existence of eight years, sufficient has been demonstrated to prove that we are beyond the era of experiment, and settled in life as a permanent community beyond the reach of decay.

The Eureka Lode.

A vein that has been explored to the depth of 1,000 feet and a length of 5,000 feet, in which ore bodies are met with at all points within the vein formation, certainly deserves to take rank as beyond the reach of doubt as to its value and reliability. We have pointed out certain resemblances between the Eureka lode and the Comstock, in which we believe we demonstrated a close analogy, but, as mentioned above, unscientific persons have reasoned that because the exact conditions of that lode were not fulfilled on Ruby hill there could be no comparison between the two. Perhaps not, but every one at all familiar with mines and who has gained that knowledge in different localities, is aware that in no sense is there any universal law governing the dimensions, directions, changes and metalliferous contents of veins. Every system or group and, to some extent, every vein is a problem by itself; but there are certain conditions which must be fulfilled before the term lode can be applied and other conditions as to what kind of a lode it may be. All authorities agree that the definition of a contact lode is the existence of mineral-bearing matter in a fissure occurring between country rock of different formations. What the formation of the country rock may be does not enter into the question, as the veins occur in rocks of different ages and geological periods; thus the ores of Freiberg are in gneiss, of Bohemia in sandstone and quartzite, of Hungary in greenstone, of Cumberland in argillaceous shale; on the Comstock in porphyry and syenite, and finally

Our Own Lode

Between stratified limestone and quartzite. The list might be carried out to an indefinite extent and would prove that silver-bearing veins occur in different country rocks, the origin of which are referable to distinct geological periods, and that each district in which a true contact vein is found has its own characteristics, and if it complies with the broad definition, may still be found to slightly differ from others of the same class. In the developments of what we shall term the Eureka lode, from the Richmond on the northwest to the Jackson on the southeast, clearly defined walls have been laid bare at various points throughout the workings, at the croppings on the surface and in the levels of the different mines. These are so fully exposed that we will not enumerate the different points, but if any of our readers are curious on the subject we will refer them to the testimony of Clarence King, Mr. Luckhardt, Mr. Keyes, and other experts in the mining suits. The filling of the vein differs from the outside or country wall rock in being metamorphosed or silicified by the action of heat or vapors probably due to the thermal deposition of the vein. There are many curious and

Entertaining Theories

In regard to the filling of fissures, but the one

generally accepted at the present time is that they are filled from below by means of solutions held in vapors and gases. This action would metamorphose the sedimentary limestone in which the fissure existed, and in dissolving the carbonic acid widen and enlarge the fissure. Wherever the silicious vapors were the strongest there we might expect to find the greatest evidences of action, and the fact is borne out in this lode, for the nearer we approach the ore bodies the softer and more broken does it become, and the more impregnated with oxide of iron. Between the vein matter and country rock there interposes a selvage of clay, plainly showing the line of demarkation. Within the limits defined by the clay seam and the quartzite foot-wall, the ore up to the present time has always been found, and never beyond these limits. In places these ore bodies extend from wall to wall, and their general dip is uniform with the plane of the foot-wall. The walls present striated and polished surfaces, which in itself is proof of movement.

The General Course

Of the walls are regular and correspond throughout the workings. There are faults and dislocations, and in parts of the vein bodies of the country have intruded, but these are characteristics of all veins and disprove nothing. Such are a few of the evidences of the existence of a true fissure vein on Ruby hill; any one who will examine all the data connected with the subject will be forced to admit the fact. We consider its existence as a guarantee to the permanence of all interests in the town, for it is reasonable

The Mining Industry in Amador County.

Mining, as a means for the investment of capital, is generally looked upon as attended with more than ordinary risks. All commercial transactions of a speculative character are more or less hazardous. The possibility of loss as well as the hope of gain are inseparable from the very nature of a speculation. The amount of possible loss is determined by the largeness of the anticipated gains. This is the rule which applies to all industrial and commercial pursuits. A man is willing to risk much where the prospective profits are correspondingly large. Viewing the subject from this standpoint, it cannot justly be said that mining is a riskier business than other enterprises. It is gauged by the same laws that govern commerce the world over. It may truthfully be said of any occupation that the majority of those engaged therein draw blanks instead of prizes. Apart from the manipulations of stock-jobbers, the reason why capital has gravitated toward the Comstock is not because mining is less risky there than elsewhere, but because of the few magnificent prizes which have been unearthed in that vicinity. Considering the amount of capital invested, the Comstock has nothing to boast of over many mineral regions of lesser note. It has given us mines which can outrank all others in the surrender of precious metals and profitableness to share-holders; but it must also be borne in mind that it has distanced all competitors in swallowing up money in a fruitless hunt for treasure.

Mining in Amador has been prosecuted more

of our mineral resources is the fact that nearly all the promising prospects in the county are held by poor men. It is no disparaging commentary upon their value to say that it needs capital to develop them. It rarely happens that a mine will pay expenses from the surface down. Not a mine in the county has done this. Scores of likely claims are lying idle to-day, simply because the claimants have no means to test their value. They can be purchased on reasonable terms. Amador county stands with outstretched arms inviting capital to enter her borders. The past and the present attest the reality of the wealth yet to be disintombed; but it takes wealth to reach it, and that's what we now want.

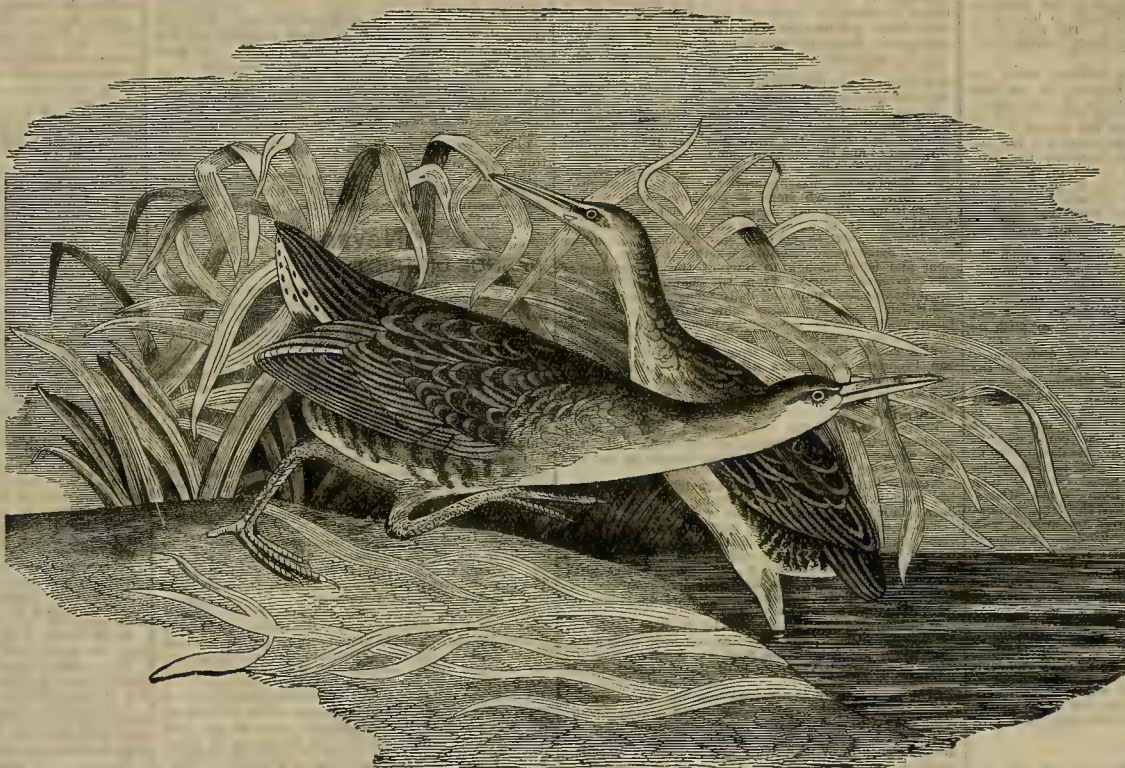
Great Red-breasted Rail.

The *Rallus elegans*, of Audubon, has been confounded with the *R. crepitans*, by other authors. The former, shown in our illustration, is altogether a fresh-water bird, and breeds and lives throughout the year far inland in the Southern States, only a few stragglers having been observed east of Pennsylvania; while the latter never removes from the salt marshes on the Atlantic, from New Jersey to the Mexican gulf.

This bird resides in the fresh-water marshes and ponds in the interior of South Carolina, Georgia, Florida and Louisiana. In the extensive marshes of the Southern States contiguous to sluggish streams, they may be seen gliding swiftly among the tangled rank grasses and aquatic weeds, or standing on the broad leaves of the yellow cymus and fragrant water-lily, or forcing their way through the dense foliage of pickerel weed and arrow-head. Twenty pairs have been found breeding within an area of 30 yards diameter in such places. The nests are built upon the ground, shallow at first, but as the nine or ten eggs are successively deposited, their walls are elevated to the height of six or eight inches by means of withered weeds and grass. The middle of April is usually the beginning of the breeding season, though some of them commence even a month earlier. They return to the same nests in successive years, and often repair or improve them. The young, which are at first black, leave the nest as soon as they burst the shell and follow their mothers along the borders of the streams and pools, where they find abundance of grass seeds, insects, tadpoles, leeches and small crawfish. At this season they may be easily mistaken for meadow mice.

In seasons of extreme drouth these birds wholly disappear from their accustomed haunts, and doubtless resort to the shores of larger and deeper ponds until after a heavy fall of rain. The young acquire the redness of their plumage the first summer and increase in size and beauty for several years, without experiencing any change in their coloring after the spring following that of their birth. The sexes differ in appearance only with respect to size, the males being considerably larger than the females. It is believed that this species raise but one brood a year, although the eggs may be replaced when destroyed during the period of incubation. Their flight is stronger and more protracted than that of the salt water species. When flushed they rise and go off with a chuck, their legs dangling beneath them, and alighting in the grass at a considerable distance they run off with surprising speed. Indeed, they depend for safety even more upon their fleetness and adroitness on foot than on the wing. They are less apt to take to the water than the *Rallus crepitans*, and are by no means so expert at diving. Their flesh is very good, especially in the autumn, when they feed on grass seeds. Their size, as well as their flavor, renders them desirable to the sportsman and epicure. Their eggs are also excellent, being preferable to those of the common fowl.

RAPID GROWTH.—When we imagine rapidity of growth we are apt to think of the lowest orders of vegetation, and to say of anything that it springs up like a mushroom is meant to be expressive of the most worthless rapidity. There are, however, some very useful plants of the higher types that grow very fast, and of these bamboo is an illustration. How very useful the bamboo is was seen in the Japanese department of the Centennial. Japan would hardly be the Japan we know without it. By some experiments recently made in Algeria, one species (*Bambusa viridi-glaucescens*), has been found to grow over 16 feet high in six weeks. This is over four inches and a half a day and beats our maize even in the warmest weather.



GREAT RED-BREASTED RAIL.

to suppose that further explorations will develop its grand resources in as marked a manner as that portion already worked. This, taken in connection with the fact that all along the lode there are uncovered ore bodies of larger magnitude than have ever been met with previously, and that these are found at the lowest point in all the mines, gives us proof that while litigation may check the development for a short time, nothing is surer than the promise of a prosperous and brighter future for those who have the faith and courage to await the fulfillment of these predictions.

MILLS AT WORK.—All the mills on Gold canyon are in full blast from the Divide to Dayton, with the exception of the Sapphire and Rhode Island. The Atlas, Douglas, Petaluma, Papoose, Pacific, Woodville, Boston, Devil's Gate, Pioneer, Sherman, Kelsey and Excelsior—12 in all—are crushing from the Justice. The Bacon and Trench are crushing ore from the Consolidated Virginia. The Hope is running on ore from the Buckeye; the Succor on ore from the Trojan; and the Humphries on tailings. The Ophir mill on the Carson, three miles above Dayton, will be started up on tailings from the Trench and Bacon mills.

MINT COINAGE.—The coinage at the mint in this city for March was as follows: Double eagles, value, \$5,420,000; number of pieces, 271,000. Trade dollars, value, \$337,000; number of pieces, 837,000. Half-dollars, value, \$233,000; number of pieces, 466,000. Quarter-dollars, value, \$366,000; number of pieces, 1,464,000. Dimes, \$22,000; number of pieces, 220,000. Total value, \$6,875,000; total number of pieces, 3,258,000. The largest number coined here in any previous month was in August, 1876, when it amounted to \$4,800,000.

with a view of securing a profit from dividends than speculating in the stock. The results go to prove that here at least mining is not such a hazardous game after all. We can point to our bonanzas, pouring their treasures into the pockets of shareholders year after year, and showing no signs of exhaustion. The Keystone makes no figure in the Stock Board, but the amount of bullion it has placed in circulation is astonishing. Among the oldest quartz mines in the county and speedily reaching a paying basis, its batteries have continued to crush out from \$30,000 to \$40,000 per month with a monotony that must be refreshing to its owners. The Consolidated Amador has had a checkered career, but altogether has achieved a name scarcely inferior to the Keystone. In the face of adversity, in spite of its double baptism by fire and flood, it holds on its way, declaring its dividends monthly with clockwork regularity. These are the solid mines of the county, for the reason perhaps that they are the oldest and most thoroughly developed.

Other mines are coming into note, and bid fair in the course of a few years to become firmly fixed in the list of paying claims. The Phenix of Plymouth is in an ore chamber of immense size; probably not equaled in the State. As far as we can learn it has proved remunerative to its owners. The Gover, near Amador City, is operating a vein of great richness, its monthly yield approximating \$30,000. It can be safely assigned a place among the dividend paying mines. Both these are comparatively new mines. Scattered along the mother lode are a number of other locations pushing to the front, and knocking for admission to the category of productive mines. Altogether we have no reason to blush at the results of mining enterprise here. They will challenge comparison with any mining region on the globe.

The great trouble that retards the opening up

The Redington Quicksilver Mine.

The *Napa Register* says: There is not much to attract the attention of a stranger in the surroundings of Knoxville. It looks like one of the waste places, vegetation having been killed by the sulphur smoke from the smelting furnaces. But she can boast of having the second largest quicksilver mine in the State. We have all heard of the Redington quicksilver mining company, and no doubt many have thought it a small affair, or it would take a place on the daily stock report. The capital stock, owned by a few persons, most of whom reside in San Francisco, amounts to \$1,025,000. They have a tract of land seven miles long by four wide, on which they keep 600 head of cattle and 100 head of horses and mules.

All the buildings are owned by this company. They have a working force of 280 men, all more or less directly connected with the mine. The Redington mine has eight levels, the ore in each showing well; there are three shafts, the main shaft having a depth of 550 feet, and is being continually deepened, the work being much retarded by water, though the pumps ordinarily raise about 80,000 gallons every 24 hours. The two air shafts have a united depth of 1,000 feet. In the hosting works are three engines, two of 40-horse power each, for hoisting and pumping, and one 20-horse power running two No. 8 Sturtevant blowers, for furnishing fresh air to the lower levels. The mine is run night and day, having two shifts of 10 hours each; about 150 tons of ore is raised daily.

There are eight furnaces, four for coarse ore and four for fine ore; they have a capacity to reduce 200 tons in 24 hours. Formerly the ores were all hand picked, requiring a large amount of extra labor, which is now done away with by what is called the fine ore furnace, a recent invention of the Superintendent, Mr. C. E. Livermore. Three important features of the furnaces are; first, they require only four men to attend them—two for each shift; second, they have a natural draft, requiring no blower; third, they reduce the ore much faster, the largest furnace reducing about 32 tons daily, with a consumption of only two cords of wood. The fine ore or screenings are placed on drying floors, which are iron plates placed over brick condensers. After being dried it is put into a hopper on top of the furnace and adjoining the drying floor. From the hopper the ore slides over an incline floor arranged in channels, through which the flames from the fire pass, and are deflected on to the ore. The ore is supported in the channels by riddle bricks two and a half inches from the floor. After being burned it is drawn out into a chamber at the bottom of the furnace, where it is allowed to cool before being withdrawn from the furnace. The fine ore furnaces have six brick, 10 iron and five wooden condensers. When all the furnaces are in running order, 1,000 flasks of quicksilver are made per month; at the present time only 500. The extremely low price of quicksilver has a very depressing effect, so much so that this company has thought strongly of stopping the mine, it costing about as much to manufacture it as they get for it. Six tons of ore yields about one flask of quicksilver. The lumber used by the company comes from Lake county; all other supplies from San Francisco. Ten thousand cords of wood are annually consumed.

The Manhattan Quicksilver Mine.

The *Lower Lake Bulletin* says: This splendid quicksilver mine is located in the northern extreme end of Napa county, a little over one mile and a half from the Redington or Knoxville mine, in a northwesterly direction, and is owned by Messrs. Knox & Osborne, the original discoverers and locators of the Redington, now one of the most complete in machinery and appurtenances on the Pacific coast. The Manhattan has but one furnace, of the Knox & Osborne patent, the capacity of which is 20 tons of ore in 24 hours. Sixty hands are employed, and are worked by shifts of 30 men each, which alternate every ten hours. The owners expend about \$2,500 per month, and the mine produces from 18 to 25 flasks of silver per week. The value of works and personal property is estimated at about \$500,000, and, with the mine included, at \$1,000,000. The owners have been offered the above sum frequently, but have as frequently refused to sell. Mr. J. M. C. Walker, the Superintendent, is a miner of large experience and an expert withal. Having but one furnace for coarse ores, the Superintendent had to devise means to reduce the fine ores, and the way he does it is novel and original with him. Instead of making adobes and drying them, as other miners do, he does just the opposite. The coarse and the fine are never separated—all the ore is piled together, and then water is thrown upon it until it is sufficiently wet for the fine ore to stick to the coarse. In this condition it is put into the furnace. One might suppose that more sulphuric acid would be formed by this process, but it is not the case—the formation in which the cinabar is found is mostly lime rock and entirely destitute of sulphur. The company own about 3,000 acres of pasture and farming lands and a large number of fine stock.

The engineers appointed to examine the suspension bridge, Niagara Falls, report it entirely safe.

USEFUL INFORMATION.

White House Whitewash.

The *American Manufacturer* publishes the recipe for the whitewash used on the east end of the Presidential mansion—the White House: Take one-half bushel of nice unslacked lime, slack it with boiling water; cover it during the process to keep in the steam. Strain the liquor through a fine sieve or strainer, and add to it a peck of salt, previously well dissolved in warm water; three pounds of ground rice, boiled to a thin paste; one-half pound of powdered Spanish whiting, and one pound of clean glue, which has been previously dissolved by soaking it well, and then hang it over a slow fire in a small kettle within a larger one filled with water. Add five gallons of hot water to the mixture, stir it well, and let it stand a few days covered from dust. It should be put on hot, and for this purpose it can be kept in a kettle on a portable furnace. It is said that about a pint of this mixture will cover a square yard upon the outside of a house, if properly applied. Fine or coarse brushes may be used, according to the neatness of the job required. It answers as well as oil paint for wood, brick, or stone, and is cheaper. It retains its brilliancy for many years. There is nothing of the kind that will compare with it, either for inside or outside walls. Buildings covered with it will take a much longer time to burn than if they were painted with oil paint. Coloring matter may be put in and made of any shade desired. Spanish brown will make reddish pink when stirred in, more or less deep according to quantity. A delicate tinge of this is very pretty for inside walls. Finely pulverized common clay, well mixed with Spanish brown, makes a reddish stone color; yellow ochre stirred in makes yellow wash, but chrome goes further, and makes a color generally esteemed prettier. It is difficult to make rules, because tastes are different; it would be best to try experiments on a shingle and let it dry. Green must not be mixed with lime; it destroys the color, and the color has an effect on the whitewash which makes it crack and peel.

THE COMMON SALT GLAZE.—To the purest accident are many of the utilizations of common substances due. One of the producing causes of prosperity of the Staffordshire pottery manufacture was the discovery of a cheap, durable glaze. The discovery was due purely to accident. At Stanley Farm, a few miles from Burslem, a maid servant was one day heating a strong solution of common salt, to be used in curing pork. During her absence from the kitchen, the liquid boiled over. Being in an unglazed earthen vessel, the solution, spreading over the outside, produced a chemical action which she little understood, and which did not compensate her for the scolding she received. Some of the elements of the liquid combined with those of the highly heated brown clay surface to produce a vitreous coating, or enamel, which did not peel off when the vessel was cold. The humble brownware vessel acquired historical celebrity. A Burslem potter, learning what had taken place, saw that glazed-ware might possibly hit the taste of the public; he introduced the system of glazing by means of common salt, a system at once cheap, easy and durable; and England has made many a million pounds sterling by the accidental discovery.

ASBESTOS PAPER.—*La France Nouvelle* gives the following account of the manufacture of an incombustible paper from asbestos. The new paper costs four francs per kilogramme. The paper mills are in the city of Tirol, where Victoria made his successful attempt to manufacture this paper, which is specially adapted for valuable documents, etc. It has recently undergone most conclusive tests by the Marquis de Barriere, at an exhibition of objects made of this substance, now being held in the Corso at Rome. Two card-board boxes containing papers, one made of ordinary material and the other of asbestos, were thrown into the fire. The former was entirely consumed, while the latter remained intact, together with the papers it contained. The most useful employment that has been made of this substance up to the present has been the manufacturing of it into theatrical hangings. This is an excellent use of it, and it is evident that if what is said of it be true, its sphere of usefulness is likely to be greatly extended.

IMITATIONS OF MALACHITE AND OTHER STONES.—A process of decoration which is calculated largely to extend the use of terra-cotta has been invented by Mr. Charles Brock, of the Watcombe Works, St. Mary Church, Devon. He mixes various earths and oxides, the colors and proportions of which will depend upon the special class of object to be imitated, and blends them at such a consistency as to prevent their mingling too much together. He then covers the surface of the article to be decorated with a veneer or thin layer of the blended materials. He next glazes the surface with a lucid glaze, and submits the article to burning, the result being an exact imitation of the description of stone or marble desired, and which is more durable than the real stone itself. This process can not only be used for ordinary pottery, but is also applicable to a great variety of purposes, such as architectural columns, bosses, panels, inlays for furniture, columns for busts, vases and other kindred purposes.

TESTING PETROLEUM.—In a recent lecture in regard to testing safe and dangerous oil, Dr. Chandler showed some interesting experiments. Some oil was placed in an open tester and gradually heated on a water bath with a thermometer. It was found to flash, or give off combustible vapors, at about 110° Fah.; and it burned at 118°, being what is called very safe oil. He then placed some of this same oil in a closed vessel resembling a metal lamp, but provided with a cork instead of the common head or burner, and having electric wires attached. On heating the oil to 85°, and sending a spark through the vapors, an explosion took place which blew out the cork with a loud report, showing that oil which has been considered safe gives out explosive vapor at ordinary summer heat.

PAVEMENT BLOCKS FROM SLAG.—A new process of casting and annealing paving blocks of furnace cinder, says the *Iron Age*, has been suggested, which is claimed to furnish a good and uniform material that resists wear and gives a good footing for horses. This process consists in taking the slag as it flows from the furnace and running it into molds placed upon a circular table. As fast as the molds are filled, they are moved away, and left to cool down to a dull red color. The molds are then opened, and the blocks are taken out and annealed in a furnace kept at a particular temperature for 24 hours. They are then finished, and may be used at once. The chief novelty of this process seems to be the annealing of the blocks of slag.

PATINA.—An imitation of patina for bronze objects of all kinds can be produced, according to the *Ind. Blatter*, by preparing a paint of carbonate of copper and any light alcoholic varnish, and applying it to the object with a brush. This green color penetrates the smallest recesses, and has, when dry, the appearance of patina. Carbonate of copper gives a blue patina, verdigris a light green, and intermediate shades of color can be obtained by mixing the two.

TO KEEP TOOLS CLEAN.—When tools are clean and bright, they may be kept so by wiping, before putting them away, with a cloth dipped in melted paraffine. If they are rusted they may be cleaned by soaking in kerosene oil, and then rubbing with an oily rag dipped in fine emery powder.

TO MAKE ROPES DURABLE.—To prolong the duration of ropes and retard their decay, steep them in a solution of sulphate of copper, an ounce to a quart of water, and then either tar them or immerse them in soap suds, four ounces of soap per quart of water. In the latter case there is no smell.

GOOD HEALTH.

Croup.

Croup is an inflammation of the inner surface of the windpipe. Inflammation implies heat, and that heat must be subdued or the patient will invariably die. If prompt efforts are made to cool the parts in case of an attack of croup, relief will be as prompt as it is surprising and delightful. All know that cold applied to a hot skin cools it, but all do not as well know and understand, that hot water applied to an inflamed skin will as certainly cool it off. Hence the application of ice-cold water with linen cloths, or of almost boiling water with woolen flannel, are very efficient in the cure of croup. Take two or three pieces of woolen flannel of two folds large enough to cover the whole throat and upper part of the chest, put these in a pan of water as hot as the hand can bear, and keep it thus hot by adding water from a boiling tea-kettle at hand; let two of the flannels be in the hot water all the time and one on the throat all the time with a dry flannel covering the wet one, so as to keep the steam in to some extent; the flannels should not be so wet when put on as to dribble the water; for it is important to keep the clothing as dry as possible, and the body and feet of the child comfortable and warm. As soon as one flannel gets a little cool put on another hot one, with as little interval of exposure as possible, and keep up this process until the doctor comes, or until the phlegm is loose, the child easier, and begins to fall asleep; then gently wrap a dry flannel over the wet one which is on, so as to cover it up thoroughly, and the child is saved. When it wakes up both flannels will be dry. The same result will follow if cold water is used, the colder the better; the cloths should be of muslin or linen and of several folds thickness, large enough to cover the whole throat and the upper part of the breast.—*Idem.*

NERVOUS COUGHING.—Dr. Brown-Sequard once gave the following directions, which may prove serviceable to persons troubled with a nervous cough: "Coughing can be stopped by pressing on the nerves of the lips in the neighborhood of the nose. A pressure there may prevent a cough when it is beginning. Sneezing may be stopped by the same means. Pressing, also, in the neighborhood of the ear may stop coughing. Pressing very hard on the top of the mouth inside is also a means of stopping coughing. And I may say the will has an immense power, too. There was a French surgeon who used to say, whenever he entered the walls of his hospital, 'The first patient who coughs will be deprived of food to-day.' It was exceedingly rare that a patient coughed then."

Coffee-Drinking.

How strong should coffee be taken? is an inquiry of much practical importance. How much should be taken at a meal? is scarcely of less moment. Coffee, like any other beverage, may wholly ruin the health; the very use of it tends to this ruin, as certainly as does the use of wine, cider, beer or any other unnatural, stimulating drink. There is only one safe plan of using coffee, and that is never, under any circumstances, except of an extraordinary character, exceed in quantity, frequency or strength; take only one cup at the regular meal, and of a given, unvarying strength. In this way it may be used every day for a lifetime, not only without injury but with greater advantage than an equal amount of cold water, and for the simple reason that nothing cold should be drunk at a regular meal, except by persons in vigorous health.

One pound of the bean should make 60 cups of the very best coffee. If a man takes coffee for breakfast only, one pound should last him two months, or six pounds a year.

One pound of coffee should be made to last a family of 10 persons, young and old, one week. Put about two ounces of ground coffee in a quart of water, or rather divide the pound into seven portions, one for each breakfast in the week, and make a quart of coffee out of it, which will be 64 tablespoons. Give the youngest two tablespoonfuls and the oldest a dozen; the remainder of the one cup being filled up with boiled milk. This will give a cup of coffee sufficiently strong for all healthful purposes, for the respective ages; and for various reasons, pecuniary as well as physical, some such systematic plan as this should be adopted in every family in the land. How to make the cup of good coffee? is a third question. It is perhaps as good and as easy a plan as any to buy the coffee in the grain, pick out those that are imperfect, wash it, parch as much as will last a day or two, with your eye upon it all the time until it is of a rich brown, with no approach of black about it. Grind only enough for the day's use; grind it fine, for the greater the surface exposed to the hot water the more of the essence you will have; pour the boiling water on the coffee, close it up, boil it 10 minutes, let it stand to clear 10 minutes, then use.—*Hall's Journal of Health.*

OVER-EATING.—If the food is wisely chosen there is not much danger of over-eating. Dr. Beard says: It is a fallacy to suppose that people, as a rule, eat too much, and that most of the diseases of the world come from over-feeding. The truth is that among all decent or civilized people the tendency is directly the reverse. In our country, and especially in our large cities, far more are underfed than overfed. Throughout our land thousands and thousands die every year from actual starvation. Some of these unfortunates are little children whose parents are too ignorant or too poor to give them what is necessary to sustain life. But many of them are adults, whom hard poverty or sad ignorance has forced into a habit of systematic though undesigned starvation. Day after day the vital powers slowly fade, the strength grows less, the spirit becomes morbid and the face wan and dejected. Disease now steps in, attacks and carries by force some important citadel of the body, and death follows: The process is a slow one—sometimes very slow—extending, perhaps, over many years, but it is oftentimes as sure as it is slow.

SUGAR OF MILK FOR DIARRHEA.—Dr. Talmay prescribes for the diarrhea of hot countries, from 20 to 300 grammes of sugar of milk daily. He administers it in the simplest way: the sugar, dissolved in a little water or as a draft in the course of the day. An excellent mode of administration consists in putting the dose of sugar of milk to be taken, into a half a liter or two liters of milk, according to the habits and the digestive capacities of the patient. The treatment is spread over several months, diminishing the dose as nutrition becomes more considerable and easier. According to M. Talmay's little work (published by Coccoz, Paris), the endemic diarrhea of hot climates is the result of a functional lesion of the liver, which results in the diminution and even the suppression of the glycogenic function of the liver. The sugar of milk may thus replace the glucose which is wanting in the blood.

CHOOSING A PHYSICIAN.—"To choose a physician," as Lady Mountcashel has well remarked, "one should be half a physician one's self; but as this is not the case with many, the best plan which a mother of a family can adopt, is to select a man whose education has been suitable to his profession, whose habits of life are such as prove that he continues to acquire both practical and theoretical knowledge, who is neither a bigot in old opinions nor an enthusiast in new; and, for many reasons, not the fashionable doctor of the day. A little attention in making the necessary inquiries will suffice to ascertain the requisites here specified; to which should be added what are usually found in medical men of real worth—those qualities which may serve to render him an agreeable companion; for the family physician should always be the family friend."

The mid-day meal should be light or delayed till the work is done. Intense brain work can not go on at the same time the stomach is strongly taxed in digesting food.

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SAN FRANCISCO:

Saturday Morning, April 7, 1877.

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LECTURE BY DR. DIO LEWIS.—The gentleman whose name is mentioned in the caption of this article delivered a lecture in the First Congregational church last evening on "Our Girls." It was given for the benefit of the new free library association. The church edifice was well filled. It would have been crowded to repletion had one-tenth of the citizens of Oakland known what kind of an address would have been delivered. No reporter could do justice to the speech of Dr. Lewis. It was inimitable. In its character it was serio-comic. In his personation wherein he eulogized his sainted mother, the lecturer threw himself up among the immortals. From the first paragraph to the closing sentence the remarks of Dr. Lewis were concise, incisive and thoroughly enjoyable to the large audience who had the satisfaction of listening to his address.—*Oakland Transcript.*

The whole lecture was good in every respect. By request of some of the prominent citizens, Dr. Lewis will repeat the lecture, with changes, at the same place on Monday evening next.

IMPORTED SHAD.—A shad weighing one and a half pounds was taken the other morning in the bay. This is the second one captured recently, and proves that the Pacific coast waters are perfectly adapted to the fish. The time will come, through the labors of the State Fish Commissioners, when shad will be found as abundantly in our markets as in those of the Eastern cities.

LLOYD B. BAXTER, of Scott's Flat, was killed on the 31st ult., in a hydraulic mining claim. The derrick with which he was at work fell, and forced his leg against a rock in such a manner as to cut off most of the flesh and muscles, and crush the bone between the knee and hip joints. A large blood vessel was severed, and it bled so profusely that the man died.

Economy in Working.

It is not the amount of money that a man makes that renders him wealthy, but rather the sum which he saves. He may have a very large income, but if he lets it slip through his fingers as fast as it comes it will take him a long time to get rich. It is the same in quartz mining. The mills which reduce the most rich rock are not always the ones which are most profitable. If a millman works rich rock rapidly and carelessly he is not so apt to make money as the one who works poorer rock in a skillful manner and saves everything he can. A great trouble in many of our mills is, that the Superintendent is anxious to make the mill give a good showing as regards the number of tons worked, and trusts too much to luck with relation to the percentage saved from the ore.

Some persons imagine it is an indication of ability to make a mill of certain size crush more tons of quartz in a day than another mill of the same theoretical capacity; but this does not by any means follow. By putting in coarse screens and crowding the mill it may be made to pass through a good deal of quartz in 24 hours, but that is no reason that the milling will be profitable. Another man may work less quartz but take the proper trouble to save all there is in it and he is the one that will make the most money.

In practice, of course, it makes a great deal of difference whether the mill belongs to the mine or whether it is doing custom work. If the latter, as the tailings belong to the mill (or are kept by it, which amounts to the same thing), the Superintendent can afford to use pretty coarse screens and rush the rock through, as he is paid so much per ton and it is the miners' lookout that the rock will pay; but in a private mill this same course is often carried out to the detriment of the owners. A great fault in all the metallurgical operations among us has been, and is yet, that our Superintendents do not keep accurate records of operations in the systematic manner which will serve as a guide to them in future operations. We do things in too great a hurry and pay too little attention to details. There are a great many small leaks in our metallurgical operations, which, in the aggregate, amount to more than one would suppose, but the mining community, as a class, has not put into practice the theory that economy in small things is as important as economy in large ones.

Of course there are men in charge of mines and mills among us who realize the importance of more careful work than the generality of those in the business, but as a usual thing we cannot praise our managers for the practice of economy. There is little more excuse for this in large than there is in small mills and mines; but large undertakings usually have more abundant means at hand and there seems less necessity for economy in little things. Still, on a large scale, expenses ought to be proportionately less, though, as a general thing in the business of mining, we do not find this the case. The remedy for this want of care rests with individuals more than with the class, so that all those in positions of trust and responsibility should try and set an example to their fellows, by doing as close work as possible and being economical in small things as well as in large.

California Copper.

The value of the copper interests of this coast is known to very few in the community, yet in looking over the country we find that nearly every county in California and Nevada has more or less veins of copper. The mines and ores are here in abundance but the question is what to do with the ore. New mines of this metal are discovered nearly every day, but as a general thing nothing is done with them, as we have no facilities here for reducing the ores and have to be content with shipping them all away. These shipments will no doubt continue as long as buyers at Baltimore or in Europe give a fair price for the ore, or until practical men with experience and capital take hold of the copper smelting business here.

Several efforts have been made in California to smelt the low grade ores, but the undertakings have not been successful or profitable. Miners are in about as much doubt now as to the real value of these mines as they were ten years ago, and unless the ores are of a very good grade they are worth nothing at all. When freights are high of course the freight has to come out of the miner, as then buyers pay a smaller percentage per unit in order to make up the increased charge for freights. As there are only two or three firms in this city who buy copper ores for shipment, and there is no other way of disposing of it, the copper miners, of course, have to take what they will give. They, having the pick of the market, naturally select such as suits them best, so that unless the ore is of the best quality there is no sale for it. We hope that before very long the immense copper resources of the coast will be more thoroughly utilized and that those persons who have been waiting so long will realize a proper reward. But at present, when so much attention is being paid to mining for the precious metals, it is difficult to engage the attention of capitalists sufficiently to induce them to do anything to help out the copper mining interests.

The Pacific Power Company's New Building.

Within the past few weeks the fine, large and new building of the Pacific Power Company, Nos. 19 to 27 Stevenson street, between First and Second has, been opened and a number of enterprising firms have taken advantage of the facilities offered and located themselves there. The building is of brick, four stories high, with a frontage of 100 feet and a depth of 72 feet. It is put up in a substantial manner to stand the jar of machinery, and shafting has been run in every direction so as to be convenient for the requirements of any kind of business needing power. Persons renting space are entitled to a specified amount of power without paying extra for it. The engine and boilers are very handsome, and are from the Newburg Steam Engine Works, Newburg, N. Y. The engine has three foot stroke with cylinder 18x36. It is supplied with an automatic cut-off and runs very smoothly and noiselessly. The boilers, two in number, are 16 feet long by 54 inches. They are very handsomely finished. At present only one is used, so there is considerable unoccupied space in the building. An artesian well 240 feet deep has been sunk on the lot to furnish a supply of water.

The Averill Chemical Paint Company have taken advantage of the opportunity offered by this building to concentrate their business in one place, instead of, as heretofore, having a factory and sales-room in different parts of the city. They now occupy the northwest corner of the lower floor of this new building, having the office in front and the manufactory and store-rooms in the rear. They also have a large room in the second story which is used to store materials used in the manufacture of the paint. In this room is the large mixer run by steam; from this the paint flows in pipes to the room below, where it is tinted and prepared for market. Another of these mills will soon be added to the machinery. In the lower room is a double row of large barrels, one for each of the colors made, and in these the colors are mixed and the paint properly tinted. Heretofore the stirring necessary in these barrels has been done by hand, but the barrels are to be replaced by metal tanks, and the stirring done by machinery. This will greatly simplify the work and will enable them to make the paint entirely by machinery.

The company now make their own boxes which are used to ship the tins of paint in. The lumber is purchased from the Truckee Lumber Company delivered cut in shape, so that the boxes are put together as occasion requires. We are informed that the boxes cost one-third less made in this way. The cans, of which a large number are required, are made by Locke & Montague. The paint is furnished in packages of any desired quantity, small or large. Some persons supposed that the Averill Chemical Paint Company would lose trade by moving on a back street like Stevenson, but such has not been the case. There is a short alley opening into Stevenson street from Market street, at what would be No. 527 1/2 Market, which gives direct access to the building without having to go either to First or Second street. This makes it open on the most central street in the city, and in a first-rate locality for business. The Paint Company state that their cash sales are one-third higher than when they had both the factory and store to sell from. The general sales have been one-third larger in the last month than is usual in the month of March, which indicates a good trade, especially when most business is so dull. The company paid about \$9,000 in dividends last year, and expect to do much better this. Then they had two places to keep running and furnished their own power and they save now about \$500 per month in the present locality, by having power furnished and having the business all together, with improved machinery and better facilities.

Although the whole building is not occupied there are several other firms which have taken space there already. H. E. Bothin, manufacturer of Chartres Coffee and Spices, has steam coffee and spice mills in the lower floor. The Standard Grain Sack Company, J. H. Cove, Superintendent, employs 75 girls and 10 men. W. & J. Steinhart have an overall factory and employ 30 hands. T. C. Hoffman, in the Steam Candy Works, gives employment to 16 hands. M. A. Graham, machinist, has a room up stairs. He makes a specialty of experimental machinery in wood or metal work, and pays special attention to manufacturing light articles and notions of all kinds. John F. Uhlhorn, a printer, also has space in the upper story, which is made easily accessible by an elevator. The remainder of the space in the building has not been partitioned off as yet and will be divided up to suit the requirements of those applying for space.

The North Fork mining company, at Forest City, are progressing finely with their works. They are in with their tunnel, as the San Juan Times has been informed, over 3,000 feet, and anticipate reaching the old channel before they run 100 feet further. That mining company deserves success if ever a set of men was worthy of it. The work thus far has cost a mint of money, and yet the stockholders are not discouraged.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

SUBMARINE BORING AND DREDGING APPARATUS.—William B. Hyde, Oakland. Mr. Hyde's invention is a new method of making submarine excavations. It comprises, first, an improvement in the hydraulic system of dredging, in which he uses two pumps, instead of one as heretofore. One pump forces the water through a tube against the material to be dredged, while the other is a suction pump and serves to withdraw the loosened material through an entirely separate and independent tube. Second, an improvement in the system of dredging, consisting in sinking numerous separate holes in close proximity to each other, so that the action of the water upon the bottom of the river will fill the holes with the loose material and thus reduce the general level of the bottom in a corresponding degree. The apparatus employed is peculiar in construction. The boring apparatus consists of a barrel or cylinder of the required length, through which are made two distinct and independent passages. The lower end of this tube or pipe is made flaring or bell-shaped, so that it will press upon the bottom of the bore and exclude the surrounding water. To the upper end of each passage in the cylinder is attached a pump, one of which acts as a force pump to force a stream through one of the passages against the earth in the bottom of the bell-shaped chamber for the purpose of cutting and loosening it up, while the other acts as a suction pump to withdraw the water and loosened material.

IRRIGATING ATTACHMENT FOR FRACTURE BEDS.—J. P. Beaman, S. F. This invention relates to an extension or part of a bedstead, the object of which is to provide a support and means for irrigating or supplying a constant bath of water to fractured and dislocated limbs, for the purpose of preventing inflammation of the wounded parts. This is a very convenient and comfortable arrangement, as it permits the limb being dressed without disturbing the patient or the position of the fractured parts. All the necessary conveniences for accommodating the patient are supplied.

MORE DISSATISFIED STOCKHOLDERS.—The stockholders of the Original Gold Hill mine have joined the great army of dissatisfied. A number of them, representing 1,330 shares out of the 30,000 of the old stock, which has been subdivided into 100,000 new shares, held a meeting this week to rehearse their grievances, which are manifold and hard to bear. It appears from the statements made by some of the gentlemen that an assessment of 75 cents per share was levied upon the stock a year ago, but the whole \$22,500 was not collected, it being alleged that some parties had their stock marked "paid," when, in reality, they had not put up the coin. The mine was closed shortly afterwards, and no work has been done since. The management now comes to the front again with a call for \$9,000 more, and the stockholders want to know the reason. They also desire to become informed of what became of that \$22,500, or such part of it as was paid. In order to satisfy their minds upon these points, they organized a meeting, elected J. H. Stebbins Chairman and Mr. Marvin, Secretary, and proceeded to business. After the condition of the company had been pretty thoroughly canvassed, Messrs. Stebbins, Captain Jessup, Burritt and Marvin were appointed a Committee of Investigation to examine the books of the concern and see where the money goes to.

THE GOLD HILL CHASM.—There has been but little perceptible change of late in the situation of affairs as regards the settling of the ground which occurred over a year ago a short distance east of Gold Hill, Nev. The News says that the ground on the west side of the fissure is on an average about five feet lower than on the other side. In many places along the line of the rent the solid rock is broken open to a great depth. The crevice at the present time is nearly filled up with loose earth. It extends southward from the flagstaff on Fort Homestead across a ravine a distance of about three-quarters of a mile. The monuments which were placed on the west side of the crevice by the U. S. topographical engineers some time since, have shifted in position until they are no longer reliable as furnishing data for future surveys. The body of earth which has settled to the westward in consequence of the break or opening in the ground is simply immense, and its cubical contents can hardly be estimated. In a geological or mineralogical point of view, the phenomenon referred to is well worth the study of some practical scientist.

INCREASE IN PATENTS.—A marked increase in the number of applications for patents is noted at the Patent Office, and is considered indicative of a general renewal of business throughout the country. The receipts of the office for the last month were nearly \$750,000, being \$12,000 more than the total receipts during February, and \$20,000 more than the receipts for January.

The total rainfall this season at Sacramento, has been 7.99 inches. At this time last year fully 25 inches had fallen there.

First Settlement and Early History of the "Eastern Slope."—No. 2.

Carson County—Its First Settlers and Officials—Antagonism Between the Gentiles and Mormons.

The whole of western Utah had been by the Mormon authorities at Salt Lake erected into a single county named Carson, which, as before remarked, covered the region that was afterwards organized into the Territory and is now the State of Nevada. The civil officers here provided for were few, consisting of three Commissioners, who exercised control over the general affairs of the county, a Probate Judge, in whom were reposed all judicial functions, with a Sheriff, Treasurer, Recorder, Surveyor, etc. Being appointed by Brigham Young, then and for many years after Governor of Utah, good heed was taken, as may well be supposed, that these positions should be filled by none but the plant tools of the central hierarchy and faithful adherents of the church; albeit, these Washoe Mormons who had left Salt Lake before the doctrine of blood atonement had been promulgated or polygamy come to be generally practiced, neither adopted the one nor approved of the other.

Nevertheless, they remained fast believers in the tenets of the new religion as delivered to them by Joseph Smith, its founder. To these they clung with a fanatic's zeal and a martyr's faith; being, in fact, a most desperate set of bigots, wherefore it was not at all strange that these county officials should have shown in their public acts a disposition to favor their own people to the prejudice of the detested Gentiles; or that the people themselves should on all occasions have treated the latter as if they considered them intruders, cherishing towards them a sullen dislike when it was dangerous or impolitic to manifest their hatred in a more open manner.

As the new-comers were not slow to reciprocate something of this feeling, there gradually grew up a strong antagonism between these two sets of inhabitants, which, confined at first to social jealousies and business rivalries, took at last the shape of an open feud and a determined strife for political predominance. Meantime, people of all kinds continued to arrive from California, there coming over besides the cattlemen and traders of the first epoch, a new and, to the Mormons, more troublesome class of settlers. Sharp business men, merchants and farmers, journalists, prospectors and miners, politicians, lawyers, gamblers and fugitives from justice all made their way over the Sierra, intent on sharing the business, the offices, the lands and whatever else there might be worth going after on the "Eastern slope."

With these new elements of disturbance it was not long till affairs over there culminated in serious difficulties, some of which were attended with bloodshed and loss of life.

Lucky Bill and His Confederates.

Among the earlier Gentile settlers, there were some who had sought a domicile in these far-off and secluded valleys for reasons they did not care to have inquired into, and were therefore not disposed to complain of or very sharply criticize the conduct of their Mormon neighbors, nor yet to actively sympathize with those who did so. To this class belonged William Thornington, or, as he was universally called among his neighbors, "Lucky Bill," a sobriquet conferred upon him because of the good fortune that seemed to attend all he undertook. This man owned at the head of Carson valley one of the best pieces of land in the whole country. Here he lived with his wife and son, a lad of 16 years or so, the owner of much stock, obtained, as was supposed, from traffic with the immigrants and in other legitimate ways, he being always on the alert for a trade and notoriously shrewd at a bargain. And thus he lived on, increasing in wealth, at peace with all, a favorite with the "Saints" and not unpopular with the Gentiles, because of his obliging ways and friendly disposition, until the summer of 1858, when in a fearful and unexpected manner his good luck deserted him.

Murderers and Robbers Meet with their Just Deserts.

In the spring of that year a Frenchman, owning a band of fine cattle, drove them over the mountains on the Truckee meadows, where he remained herding and looking after them. There were living at this time in Honey Lake valley, 90 miles north of Truckee, two men named Snow and Edwards, engaged in raising, buying, selling or otherwise dealing in stock. Passing back and forth, as was their wont, during the summer; between Honey lake and Carson valley, these men were led to notice this band of cattle, which being fat and well fitted for the shambles, so excited their cupidity that they determined to murder the owner and take possession of his property. Before proceeding to carry out this purpose, however, they deemed it best to take Thornington into their confidence, trusting to his shrewdness and proverbial good luck to help them successfully through with the business.

Seeing profit in the enterprise, which, under the circumstances, seemed to present few elements of danger, he agreed for a stipulated share of the spoils to help carry the nefarious scheme into execution. Having arranged matters, Snow and Edwards, associating with them another desperado, repaired to the Truckee and

dispatched their unsuspecting victim, who was living alone, and having concealed the body drove off his stock, a part of it to Honey lake, but the greater portion to Carson valley, as per contract, where it was delivered to "Lucky Bill," who, as a precautionary measure, distributed it about on his ranches, of which he owned several in the valley.

The Avengers on their Track.

Meantime, the friends of the murdered man living in California, hearing nothing from him for several months, came over the mountains to see what was the matter. Being unable on their arrival at Truckee meadows to find anything of either the owner or his cattle, they became satisfied that he had been foully dealt with, and getting on their trail soon after traced some of the animals to the possession of Snow and Edwards, at Honey lake. Snow was at once arrested, and having been tried by a jury of citizens, there being then no regular courts in that part of the country, was found guilty of murder and condemned to be hung, which sentence was forthwith carried into effect.

Lucky Bill Arrested and a Little Strategy Resorted to.

Edwards, getting timely notice of the threatened danger, escaped to Carson valley, where he was for a time kept concealed by Thornington. But the people there, whose suspicions had long been aroused, on hearing what had transpired at Honey lake proceeded to arrest "Lucky Bill," and, having extemporized a court, tried and convicted him of murder and sentenced him to be hung. Believing that Edwards was secreted somewhere in the valley and that Thornington and his son knew his place of concealment, the condemned was granted a respite and recourse had to a little strategy to aid in effecting his discovery. Addressing themselves to the hopes and fears of the boy, he was given to understand that the life of his parent might be spared if his accomplice could be found. The instinct of paternal love prevailing, he imparted to those having the matter in hand the desired information.

The Fugitive Entrapped and Sent to His Doom.

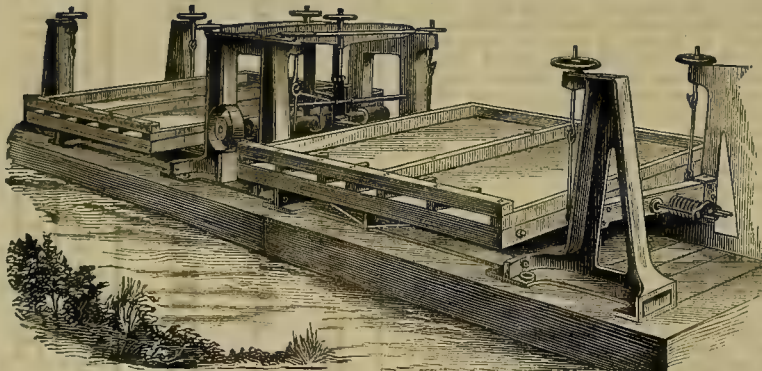
Now, Edwards, being a powerful young fellow, well armed, and rendered desperate by the

tuted authorities. To this course the most of the Gentile population strenuously objected, well knowing that a trial by a Mormon court would amount to nothing. To set him free altogether was not to be thought of, as there were grounds for suspecting that the culprit had been engaged in robberies, if not also in murders before; as there were no jails in the country, wherein to confine him, it was deemed best that the sentence of death, already passed upon him, should be carried into effect. This settled, the unfortunate man having been granted sufficient time to dispose of his earthly affairs, was taken to Clear Creek ranch, at the foot of Carson valley, and there executed in the presence of a large concourse of people. Thornington bore himself throughout these trying events and even to the last, with a coolness and nerve that denoted the possession of very superior qualities and excited the admiration of those who had been most active in procuring his condemnation and punishment. Indeed, every one of this guilty trio, the fourth having made good his escape, manifested a self-possession and courage that won for them the respect of a community so largely composed of rough and daring men, and even gained for them the commiseration of many. In fact, the execution of Thornington, instead of harmonizing tended to further divide public sentiment, many of the Gentiles considering his execution such a breach of good faith as warranted them in withdrawing their support from what was termed the "Vigilance" party, and thus new issues and factions sprang up, keeping the inhabitants in such an unsettled and excited condition that they began to think seriously of a separation from Utah and the organization of a new Territory out of that portion thereof embraced within the limits of Carson county.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city.

In the California mine the double track and switches are all completed on the 1650-foot



RITTINGER'S DOUBLE CONCUSSION TABLE

situation, his capture, unless he could be thrown off his guard, or in some manner attacked at a disadvantage, would necessarily be attended with a good deal of peril to those undertaking it; wherefore the lad was further required to lure him from his lurking place under the pretence that the father wished to meet and confer with him at another spot, Edwards not as yet being aware of Thornington's arrest. To this also the poor boy agreed and proceeded alone in the night to a solitary place in the mountains, from which a good outlook could be had of all that was going on in the valley below, and there meeting the fugitive, told such a plausible story that, after much hesitation, the latter consented to accompany him to the spot designated, telling him that if he found anything wrong he would kill him on the instant. With this understanding the two came down into the valley, crossing which they repaired to a ranch owned by "Lucky Bill," at the forks of Carson river, Edwards, who it seems entertained a fear all the while that this might be a ruse to decoy him into the hands of his enemies, keeping the boy before him covered with his revolver. In this order they advanced up a narrow lane and approached a hut standing among the willows, and in which a party of well-armed men had already been concealed. Having reached the hut Edwards paused and listened for a time, when, hearing nothing calculated to excite his fears, he pushed open the door and entered. The instant he crossed the threshold he was struck down with a club, and before he could make any use of his knife or pistol, one held in each hand, he was overpowered, secured and at once delivered into the custody of a guard from Honey lake, who, hurrying him off to that place, he was tried, convicted and hung by a vigilance committee, as his guilty companion had been before him.

And his Consort in Crime Follows After.

What to do with "Lucky Bill" was a question that now puzzled his custodians and captors. Many believed that after this implied promise of leniency he should not suffer extreme punishment. A few, among whom were his Mormon neighbors, thought he should be allowed to go altogether; or, if anything further was to be done, that he should be handed over for trial and punishment by the legally consti-

What California Has Not.

Sometimes it is easier to describe a thing by what it is not rather than by what it is. Thus when a man is possessed of many virtues it is easier to enumerate his few faults. This must be the philosophy of the gossips and fault-finders, although we never thought of their behavior in that light before. We have had such a long task in telling the many good things which have thus far been discovered in California, that we are not loth to take the other side and finish up the description by telling what California has not. The beauty of the whole matter is, too, that in our abundance we have not missed the trees and plants which Dr. Gray, in his writings about Darwinism, says do not grow naturally in California. It is true that we knew some of them were not here indigenous, but so many have been introduced and so many glorious substitutes exist, that to stop and mourn for what we have not is senseless as to forget the salmon which lies in our basket and cry for the shiner which wiggled off the hook. This is the worst which Dr. Gray can say of us: "California has no magnolia, tulip or star-anise trees; no so-called papaw (*Asimina*); no barberry of the common single-leaved sort; no podophyllum or other of the peculiar associated genera; no nelumbo or white-water lily; no prickly ash or sumach; no lobloby bay or sturtia; no basswood or linden; neither locust, honey-locust, coffee-trees (*Gymnocladus*) nor yellow-wood (*Cladrastis*); nothing answering to hydrangea or witch-hazel, to gum-trees *Nyssa* and *Liquidambar*, *Virburnum* or *Dierroilla*; it has few asters and golden-rods; no lobelias; no huckleberries and hardly any blueberries; no epigea, charm of our earliest Eastern spring, tempering an icy April wind with a delicious wild fragrance; no calmia or clethra, or holly or persimmon; no catalpa-tree, or trumpet-creeper; nothing answering to sassafras, or to benzoin-tree, or to hickory; neither mulberry nor elm; no beech, true chestnut, hornbeam or ironwood, or a proper birch tree; and the enumeration might be continued very much further by naming herbaceous plants and others familiar only to botanists."

(Copyrighted.)

Mechanical Ore Concentration and Separation—No 28.

[Written for the Press by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.]

Rittinger's Double Concussion Table.

The illustration on this page, drawn from a photograph, represents the most perfect form in use of this very effective apparatus. It consists of four tables, with one gear for motion. The percussion is imparted sideways. I shall not give a special description of its operation, as it can be found in Guido Kuestel's "Treatise on Concentration," (published by the proprietors of this paper,) a book which, though eight years old, is well worth study for all who take an interest in its object, and one which contains much useful information not as yet collected in any other work in the English language.

No Answer.

MESSRS. DEWEY & Co.—Gents: The advertisement you inserted for the Western Gun Works, Chicago, Ill., in the MINING AND SCIENTIFIC PRESS, I pronounce as a fraud. I have sent them the requisite amount of money they called for in premium certificate (March 6th), but as yet no long range revolver has been received, nor is it likely to come.—D. D. O'HARRA, Wells, Nevada, March 20th.

We have been very cautious in publishing such advertisements in the Press, and think our readers will have to look very sharp to find them hereafter, as we do not mean to make many such slips. However, when such mistakes occur, we are willing to rectify them as far as lies in our power, as we do in this case by giving publicity to the above letter.

GRASS VALLEY MINES.—The reports of the situation of the mines in Grass Valley are very encouraging. In our Mining Summary will be found a good summary of the situation there from the Grass Valley Union. In concluding that paper says: A reporter of ours went over the hills yesterday and he says that there are prospectors to be found everywhere. Many of them will positively refuse to tell what they are realizing from their work. The reason for such a refusal is not apparent. They may have the same feeling that the reporter of this paper has, when writing up the mining situation. The reader may believe that there is an exaggeration in the matter. We must acknowledge that our account of the mines of this place looks rose-colored, and yet we have not said a word in that connection but what is strictly true. We get our information from the best sources and the statements we have made can be relied upon.

THE west-bound passenger train collided with an east-bound freight train on the mountain division of the Central Pacific railroad near Cascade, about 12 miles this side of the Summit, at six o'clock on Wednesday morning. Two engineers and two firemen were killed, but no passengers were injured.

NEARLY all the Reading Railroad engineers will leave the Brotherhood and continue work.

El Dorado Gravel Mines.

The editor of the El Dorado Republican has been taking a run among several mining claims in the county, and over a section which he had not previously visited. He says:

The first claim that we encountered was that of Salter & Hancock, at Negro hill, about two and one-half miles east of town. This claim has been steadily worked for many years and is still paying handsomely, but it is now the roughest and most dangerous looking place to mine in that we have ever encountered. The bank, from the bedrock, is about 150 feet high, and the pay is on the bedrock, with the toughest kind of gravel cement above. This has been honey-combed at the base, until many feet back has given away and slid down in all manner of shapes, in blocks that would weigh from a hundred to millions of tons, leaving extensive fissures beneath them, where the work is now being done. We crawled around among intricate passages and finally came to a partially open area, where Mr. Salter with two other men were engaged in cleaning bedrock. The dirt taken out there pays immensely, probably \$100 to the ton. The bedrock is scraped and then the dirt is hydraulized out through a tunnel. In various places through the chasms we noticed the tops of peach trees protruding through crevices in the rocks, in full bloom. These trees had been carried, some of them years before, from Frank Plunado's orchard by the caving of a bank.

On the north side of the hill there is a vast belt of gravel owned by the same parties, out of which vast sums have been taken, and in which millions of dollars will yet be taken. These gentlemen now own nearly all the really valuable mining ground on what was once well known as a rich mining camp, Negro hill, of late years better known as Reservoir hill. Mr. Hancock also owns a fine ranch in the vicinity. From here we wended our way to White Rock, and the day being well advanced, had only time to visit the claim of Vineyard & Hancock, which they are now engaged in opening. It has been thoroughly tested and they know that it is good. They are now engaged in running a tunnel for a flume leading into the claim, and will soon be running out the hill above through it with 400 or 500 inches of water. The ditch company have a claim adjoining it, upon which they are not at work, but have the most ample water facilities, with a reservoir close by that must have cost several thousand dollars. There are several claims in operation around White Rock, but we had not time to visit them. We made a short halt at the Oak Ranch mine, and found that they had just struck good pay gravel in the deep channel at a depth of about 185 feet.

Mining Outlook in Kern County.

Operations on the Big Blue or Summer mine, at Kernville, have been for the last few months partially suspended, and the usually large force employed greatly reduced. The management in the meantime has been engaged in opening new leads and placing the mine in a condition fit for more successful and extensive operation. As a consequence, the most flourishing and populous mining town in the county has been suffering a spell of dullness, from which it is now confidently predicted she will speedily emerge. The late prospecting operations in the mine have developed some very gratifying results, and 12 feet of good ore has been found in the bottom. We learn that it is the intention of the management to resume operations about the 25th inst., and employ a force sufficient to keep the great 80-stamp mill running to its full capacity. For this purpose probably between 200 and 250 men will be required. It is said too that this mine has never been in such good condition before, or so capable of making rich returns. With a new and promising future opening, Kernville will soon resume her old-time prosperity.

The Bunnell.

It was hoped that this famous mine would by this time have begun to make returns that would speedily establish its claim as the successful rival of the Comstock bonanza. It was too much, however, to expect that the work of opening and developing the mine could be hastily accomplished. It has run the usual ordeal of litigation, and fortunately escaped without ruining its owners and at no great sacrifice of time or money. With just and judicious management now, there is no apparent reason why it should not shortly make floods and O'Briens of every shareholder in it. It has a complete 20-stamp mill and all the appliances necessary for the reduction of the class of mineral that is found there. A well defined lead of very rich rock four feet wide is revealed by the work already done. In the lower level, however, where this vein has been reached the water has become troublesome, and it is necessary before the mine can be opened to any advantage to overcome this obstacle. There are two ways of accomplishing this object. One is by draining from below, and the other by pumping from above. The former method is considered the most feasible and economical, as well as the most satisfactory and sufficient. It is therefore determined to go down the mountain several hundred feet and run another tunnel into the lead. It will be an easy matter then to effectually drain the upper levels and the lead will be prospected at a greater depth. This will be cheaper than the employment of expensive pumping machinery, at all times liable to break and frequently requiring repair. The water in

the creek is so low now too that there is not sufficient to run the mill, and it is therefore deemed better to place the mine in good condition for profitable and successful operation when the water does come.

The Erskine Mines.

Reports from the Erskine mines are to the effect that some work is being done, enough to keep the arastras running, but that there is no immediate prospect of the erection of a mill, or rather that the parties expect to extract enough by means of the arastras to erect a mill. Unless the rock is fabulously rich and easily worked, it is to be feared that it will be some time before enough can be realized by that process to erect a mill. The Erskine creek mines are known to be very rich, some specimens of rock from them assaying as high as \$2,000 to the ton. It seems strange and a pity that these mines should be permitted to remain neglected when they would so richly repay working. We trust they will not remain long unproductive, and we are encouraged in this hope by the fact that they have, according to report, recently fallen into enterprising hands.

Mining operations about Havilah received some impetus last spring; sufficient to justify the hope that that once flourishing camp was about to regain her ancient prestige and prosperity. But later developments have dispelled these hopes. There is still some work done there and Mr. Stretch is running one mill. There are many leads in the vicinity of Havilah that it is believed would handsomely repay working, although there is no great money in them. With cheap freights and reduced price of labor there would seem to be no reason why they should not be profitably worked.

A Ship Canal Through Florida.

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Continued from page 213.

any in Maynard district, the shaft is down 150 feet. A tunnel is being run which will tap the vein 100 feet below the bottom of the shaft, and is rapidly approaching completion. This is a bold, 12-foot vein, and the ore is of high grade, free and easily reducible by milling process. There will be a prosperous camp in the vicinity as soon as the company who owns the mine put up their mill, which we understand they will soon do. The Silver Glance mining company are hard at work developing their mine, and everything is in preparation for an extensive run upon their furnace. This company gives employment to about 50 men. On the San Francisco mine upon the McCrackin, the work of development is being rapidly pushed and the company will soon erect a 10-stamp mill for the reduction of the ore from this mine on the Sandy, four miles from Fish's springs.

Colorado.

ORE.—Colorado Miner, March 24: The ore market during the present week has been slightly depressed, under the unfavorable quotations from England. The production of the mines, on the other hand, has more than made up the deficiency in prices, and everything gives token of a prosperous season.

THE HUKILL MINE.—Among the great deposits of argentiferous ore in this country, the principal lode, owned by the Hukill silver mining company, ranks among the first and best. The lode is situated about a mile and a half west of Idaho Springs. Crossing the mountain at right angles, the mine can be worked for years by the four levels already started on the vein, without recourse to deep shafts and hoisting machinery, when these are required. Clear creek can then furnish power enough to sink 1,000 feet deeper, before an engine is needed. In its facilities for cheap transportation of ore, timber and supplies, the location of the mine is surpassed by none in Colorado. When the Colorado Central railroad shall have been extended to this point, ore may be dumped from the levels into the cars that will transport it to the best markets this State affords. The outcroppings of this vein are very strong, and gave promise on the start of great treasures below, which subsequent working and development more than verified. It has been opened by shafts and crosscuts for a distance of over 1,300 feet, everywhere showing a continuous vein of mineral. Four levels have been run, and nearly 800 feet of shafts and winzes sunk, showing an average width of ore vein of over two feet, and an extensive bonanza five feet wide of solid mineral. In this work of development 1,700 tons of ore have been produced at a profit of over \$24,000. But little stoppage has been done, and the reserves of ore in sight are estimated by the most competent mining engineers as certain to yield half a million dollars. The average value of the ore mined has been \$114.82 per ton. At the surface of the lode gold predominated, but as depth is gained the amount of silver increases and eventually becomes the most valuable product.

Montana.

SHUT DOWN.—Butte Miner, March 21: The Centennial mill for several days last week was shut down, owing to the supply of ore on hand having been exhausted and the bad condition of the roads making it difficult to obtain any from the mines. This is the first stoppage of the mill of any duration that has taken place since it has been under the new management.

THE DEXTER MILL is running on small lots of medium grade ore, picked up at various mines where limited operations are carried on. A small shipment was made on Wednesday.

MINING operations are now being prosecuted right in the heart of the town. A claim running diagonally from Main street to Montana avenue and crossing Park avenue just west of the bridge, is being represented by one of the original locators, who is engaged in sinking holes on the ground occupied for school purposes, the same being embraced in the Diadem mining claim. The owners have no disposition to interfere with property holders, but are simply representing a claim that has every indication of proving a valuable lead.

THE LEXINGTON now employs 27 hands, a greater number than at present is employed upon any other mine in this camp. This mine is engaged in driving a shaft, the direction of which are now being run, and in taking out ore which upon an average amounts to 12 tons per day. The vein still holds its width as far as the levels have been run and the ore averages about the same, being a medium grade with a strata, a few inches in width, which assays away up in the hundreds, and now being mixed with the lower-grade ore makes an average which is desirable for milling purposes.

Two bars of silver were received by Donnell, Clark & Laramie from the Monroe company's mill, at Dewey Flat. It was the product of a small lot of custom rock worked at that mill. These bricks were valued at \$1,500. The Monroe mill is now running regularly, having had all the needed alterations to it completed, and from this time shipments of bullion can be expected to follow at regular intervals.

The Davis mill has been running constantly during the week, with the exception of a half day spent in cleaning the boiler and overhauling the belts and machinery. Everything about the mill works satisfactorily. The extremely low grade of the ore which at first was treated, has all been run through and a higher grade is now being crushed, which will increase the bullion yield. There is considerable amalgam now on hand.

MESSRS. DONNELL, CLARK & LARAMIE purchased last week, for shipment to Baltimore, 40 tons of copper ore from the lessees of the Discovery claim, on the Parrott lead. The ore samples nearly 40%, and was taken from the lower level in the mine.

Utah.

BEAVER COUNTY ITEMS.—Salt Lake Tribune, March 31: The three smelters in San Francisco district are now running full blast, and the prospects are that they will continue to do so for some time to come. A new saw mill is in active operation in San Francisco district, run by Mr. Kidder, from Cottonwood. The desert lands are being redeemed by use of the artesian wells and windmill pumps in Beaver valley, the the Douglas and the Uncle John claims, the two most promising prospects in the canyon were mentioned. The owners of these prospects were all poor men, and could not afford to push the work on their claims with any considerable degree of vigor, though they kept sufficient work done to hold their property under the law. About two weeks ago, however, several old miners, Messrs. George Edington, J. P. Spaulding, Luke Shuman and others went prospecting for a new mine in the foothills above the city cemetery, and were lucky enough to strike a good one. They located 1,500 feet, naming it the Geo. H. Nettleton mine, having first sold a half interest of it to O. H. & J. F. Earl. Yesterday morning the report of this sale and the further rumor that the same parties had struck a rich silver bearing deposit near the same place created considerable excitement. Indeed, those who heard of the strike on Wednesday evening, started for the new El Dorado at 4 o'clock yesterday morning, fearing that some one would get in ahead of them. By 10 o'clock in the morning a large number of mining men had gazed upon the 400 pounds of gray sandstone which had been left in the Walker house

on exhibition. The rock appeared as unpromising as anything which comes from Leeds, but the assays made from it showed it to be rich. One assay, made by Mr. Frank Foote, went \$357.66, and Mr. Earl claimed that two other tests gave results of over \$600 and \$1,100 respectively.

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FOR WEEK ENDING MARCH 20TH, 1877.

- 188,475. STOVES FOR HEATING SAD-IRONS.—R. Martin, Portland, Ogn.
188,494. COMPOUND METAL-WORKING MACHINES.—R. Bandhauer, Denver, Col.
188,540. CONVICT SHACKLES.—J. L. Quackenbush, Portland, Ogn.
188,568. ATTACHMENTS FOR INVALID BEDSTEDS.—J. P. Beaman, S. F.
188,587. ORE FEEDERS FOR QUARTZ MILLS.—G. A. Church, Nevada City, Cal.
188,647. AUTOMATIC FEEDERS FOR FURNACES.—E. F. Littlepage, Los Angeles, Cal.
188,652. SINK AND SEWER TRAP.—J. H. Mackie, Oakland, Cal.

FOR WEEK ENDING MARCH 27TH, 1877.

- 188,731. INSIDE BLINDS.—A. T. Elford, Oakland, Cal.
188,733. BOILER FURNACE.—E. Fair, S. F.
188,748. WINDMILLS.—J. Lochhead, S. F.
188,752. LIFE BOAT.—C. Dickinson, Portland, Ogn.
188,848. MACHINE FOR SETTING THE TEETH OF SAWS.—A. Boisset, S. F.
188,888. CORN PLANTER.—C. S. Goethals, Los Angeles, Cal.
188,910. TRACE BUCKLE.—T. J. Hubbell, Yountville, Cal.
188,940. DRAWER.—A. Packescher, S. F.
188,957. SEED PLANTER.—H. J. Robinson, Carpinteria, Cal.
188,992. CIGAR-HOLDER.—F. H. W. Von Tiedemann, S. F.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

From Our New York Correspondent.

The Institute of Mining Engineers lately held in New York a meeting, which cannot be considered as great a success as the majority of its predecessors. Hitherto the society has enjoyed the supervision of Presidents who were always active members of the profession and well acquainted with the questions mooted in its circles. This time the President (Mr. Hewitt, member of Congress), was absent on political duties, and though the chair was occupied by a gentleman who may fairly be called the most popular member of the society, the repeated absence of the elected President from his duties during the past year was frequently remarked upon. The fact is that personal distinction goes but a very little way with Americans. It seems to be quite possible to organize very successful societies in England under the leadership of men who owe their selection to social prominence. But in America the humblest man can win success and eclat for a society by giving its welfare his judicious attention, while the most noted character in the world cannot counteract the effect of inattention and carelessness.

In the matter of papers the meeting was, as usual, rich and varied. Mr. W. M. Curtis, of Wyandotte, Michigan, who was not able to be present, sent a paper on the silver and other mines of the north shore of Lake Superior. He does not give a very flattering picture of the region. The famous Silver Islet mine is in trouble, as every one knows, and the deposit is so irregular that the managers have little hope of discovering a rational and certain method for finding new ore bodies. The diamond drill has been used, and is to be used in future, and, if money can be raised the shaft will be sunk 300 feet further, but the outcome of these explorations offers nothing certain, or even assuring. When this mine reached the end of its rich deposits the bottom fell out of the whole lake country, so far as its wonderful silver deposits go. The forbidding climate counteracted the seductive influences of the extraordinary mine in the days of its prosperity, and now that it has lost its good fortune the region finds that it has made no real advance, but goes down with the fall of its sole leader.

Speaking of Lake Superior I may mention that preparations are made by several parties to visit that country on professional and scientific journeys. The Institute of Mining Engineers has in contemplation a two-weeks' trip and continuous meeting on a steamer chartered for the purpose. The Council has authority to postpone the annual meeting from May to July for the purpose, if desired. Cornell University proposes to send out an ambulatory school of science to spend six weeks on the great lakes, the students to pay close attention to the animal and plant life of the lakes and their shores.

The Institute occasionally has opportunity to examine curiosities laid before it. Prof. Munroe, of the Japanese School of Mines, brought to this country two bell-shaped articles of copper, one about 18 and the other about 36 inches high. They are not round but oval, and as they exhibit no sign of wear, either on the edge or the ring by which they would be hung, Prof. Eggleston suggested that they might have been used as caps for minarets on a temple. This view is further strengthened by the fact that the castings are thin and full of sand holes, and never could have given a good sound. The in-

terest attaching to them is due to the fact that they are pre-historic; the present inhabitants of Japan dig them out of the ground and have no idea who made them, or what their use was.

Among the results of the Centennial exhibition was the gift to the Institute of a large number of mineral and metallurgical collections which had formed the exhibit of foreign and home establishments. The full number of these is not yet known. Eighty-four were reported at this meeting, and this is said to be about one-third of the gifts. Among those enumerated, Russia gives three suites of copper ores, mattes and slags, from the famous works of Prince Demidoff and the Ural, seven of iron, one of zinc and one of coal from southern Russia. Prussia contributes seven, Sweden six, mostly iron and steel, Spain, Portugal, Italy and Austria one collection each of their copper, lead and iron ores, and fuels. Belgium gives specimens of her zinc-bearing galena, the treatment of which has given rise to the admirable works for concentrating and smelting these compound ores at Bleiberg. England has five suites, mostly iron and steel, and the British provinces, Victoria, South Australia, Tasmania, New Zealand and Queensland, each sends one, the dominion of Canada three, Nova Scotia one. Brazil and Mexico present one each. Of American (that is United States) works, there are 41 in the list so far as reported. Besides all these, a number of valuable models and apparatus have been left on deposit.

Now of what use can all this be? No occupation is, or perhaps can be, duller, than looking at very sober-faced pieces of stone and slag, placed behind glass doors. Still, there is one use to which these collections can be put—they can be used for teaching. Every one of these specimens represents work actually done, and a skillful teacher can use them to give his lectures an air of reality. In fact, professional instruction is not worth much unless it is reinforced by this kind of object teaching. At present these collections are not likely to be applied to any use of this sort. They are housed in memorial hall, which all the visitors to the exhibition will remember as the art gallery. It is to be hoped that a more worthy destiny is in store for them. In that place they can only sink steadily into uselessness, as the processes they represent are superseded by new methods, as is the way of all progressive industry.

But, leaving this field of dry professional details, let me tell you that the great city of New York has its phases of change as well as all other things earthly. This year is especially marked in this respect, and the peculiar tone which has been given to the part of social activity of which I am about to speak, is not the invention of modistes and fashion makers, as is sometimes the case. It is but a manifestation of the inevitable. The times have been hard, most of the citizens are poor, and, as is but natural in such times, this has been a great season for auction sales. Artists have felt the pressure with peculiar severity. The most renowned have suffered, and all but these few famous ones have had hard work to keep on their (professional) feet. They have resorted to the auction rooms in great numbers, and many a man who has made it a point to keep his work out of Liberty street has this year deliberately stripped his studio walls and sent all the pictures he had to the auctioneer. The movement began about six weeks ago, and the consequence has been a lenten season of very peculiar character.

The devotees who, in ordinary times, take their pleasure at the theaters, parties and balls, denied these gayeties, have resorted to the auction rooms. The audiences have been composed of the best people in the city, and nowhere could more beauty and refinement be found than among the crowds of ladies who shook their handkerchiefs in rapid succession while the auctioneer put up one object after another. Nor has there been any pretension about these sales, as there was about the auction of Mr. Johnston's gallery, when the bidders went in full dress. Thousands of pictures have been sold, and the auction fever became so marked that advantage was taken of it to put several fine collections of books upon the market. But the most noticeable result has been in the sales of what are called, in auctioneer's cant, "curios." The rage for buying at auction happened to coincide with another rage for expensive pottery, enamels, Persian, Turkish, Chinese, Japanese and other work of any kind, provided it were artistic and dear. Of course nothing could be happier for the auctioneers. Sale after sale has been had, wares of the kind mentioned have been put up in such quantities that you would think they had been imported for the purpose by the cargo.

The truth is they have been so imported. Dealers in these things are very shrewd, and there can be little doubt that they had prepared for a descent upon the pockets of New York's rich men. The fact that their maneuver coincided with a temporary auction mania was quite accidental. But in addition to their goods, several private collections have been brought forward and sold. The opportunities for buying objects of present fashion and real artistic value have never been better. Prices have sometimes been extraordinary, but at most sales they were moderate. The upshot of the whole is that New York in this dull year has invested some millions of dollars in auction goods.

NESHOBEE.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

General News Items.

TRAVEL to Yosemite valley has commenced. ISAAC FRIEDLANDER, the great grain operator of California, has failed.

BISMARCK has resigned in order to get some rest from his labors.

THEY talk of fitting up the Great Eastern for transporting cattle from this country to England.

THE Internal Revenue receipts for March, 1877, were \$9,250,207, against \$8,293,252 for March, 1876.

BOSS TWEED has published his diary, which amounts to a confession, and makes an unqualified surrender of all his property.

THE Hollister folks are determined to explode \$1,000 worth of gunpowder in order to test its efficacy as a rain-producer.

THE Sun says: It is reported that J. R. Keene, who soon leaves for Europe, cleared over \$700,000 by his campaign in Wall street.

TWENTY-SEVEN removals have been made from the San Francisco mint, and a reduction in the wages of the remaining employees of from 15% to 20% has gone into effect.

SPECIAL dispatches from Berlin to the Post and news from Paris to the Standard, represent public feeling in those places as not increased in hopefulness by the signing of the protocol.

NINE vessels of the Long island fishing fleet, which left for the banks last November, are now so long overdue that it is believed they were lost in the gales which occurred some time since.

A GENERAL strike is imminent on the Philadelphia and Reading railroad in consequence of the order issued to their employees to sever their connection with the Brotherhood of Locomotive Engineers.

THE ship Frank Jones was wrecked on Fort Point last week. A tug was towing her to sea when the hawser broke and before sail could be made she drifted on shore. The vessel is now being stripped of her spars and rigging.

THE glazing mill, part of the powder mills of the California Powder Works, near Santa Cruz, blew up on Tuesday morning. One man killed and one wounded. There were nine tons of powder in the mill at the time of the explosion. The loss is about \$25,000.

THE Redwood City Gazette publishes the following concerning the source of the water supply of San Francisco: Pillaritos lake is low, the water being well exhausted, but there is yet a good supply in San Andreas lake, while Laguna has not yet been tapped.

THE returns furnished from the office of the Signal Service, shows that the highest temperature reached in this city last month was 73°, and the lowest 47°. The wind was generally in the west. There were seven clear days, three cloudy, five on which rain fell and 16 fair. The comparative temperature for the month was 66°, as against 53° in the corresponding month last year.

SECRETARY EVARTS proposes to reorganize the consular system after the plan adopted by Great Britain. In making appointments for Consuls it is proposed to select men familiar with commerce and manufactures, selecting commercial men for commercial districts, and for manufacturing districts men acquainted with the special manufactures of the district to which they may be assigned.

Meetings and Elections.

BUCKEYE G. & S. M. Co.—March 31. Trustees—C. C. Stevenson, Jos. Worrall, A. H. Rutherford, John S. Gray, W. L. Palmer. President, Jos. Worrall; Secretary, C. A. Sankey.

COMANCHE M. Co.—April 2. Trustees—Wm. M. Lent (President), Geo. S. Dodge (Vice-President), John F. Boyd, J. B. Fargo and E. McGarvey. W. W. Taylor was chosen Secretary, and John Howell Superintendent.

LADY WASHINGTON M. Co.—April 3. Directors—J. P. White (President), John T. Hill (Vice-President), C. D. O'Sullivan, E. Hestres, Archie Borland. R. P. Keating was re-elected Superintendent, and D. L. Thomas re-elected Secretary.

SUTRO TUNNEL CO.—April 2. Trustees—Elliott J. Moore, Edward N. Hooper, Charles W. Brush, Gustave Sutro, Thomas C. Wedderspoon, T. F. Low and J. J. Williams. At a subsequent meeting the following officers were elected: Elliott J. Moore, President; Edward N. Hooper, Vice-President; Anglo-California Bank, Treasurer; Adolph Sutro, General Superintendent, and Pelham W. Ames, Secretary.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

GRAND CENTRAL M. Co.—April 2d. Location: Tuscarora district, Nev. Capital stock, \$10,000. Directors—M. J. McDonald, J. W. Gashwiler, Simon Reinhart, James Morgan and M. P. Freeman.

MELROSE SMELTING AND REFINING CO.—April 3d. Object is for smelting ore, refining gold, silver and other precious metals, purchasing bullion, precious and base metals, acquiring mines and necessary real estate, and doing all other things necessary to be done in connection with general smelting and refining business. The principal place of business will be at Melrose, Brooklyn township, Alameda county, Cal. Capital stock, \$200,000, divided into 100,000 shares. Directors: Chas. H. Fish, Geo. W. Hopkins, Chas. H. Swain, A. W. Harris and Geo. C. Pratt.

WE carry the N. Y. watch, and you can refer to the publishers of this paper as to the superiority of the N. Y. Watch Company's movements, manufactured at Springfield, Mass. Also to any one else who owns one.

METALS.

WHOLESALE.

THURSDAY, M. April 5, 1877.

Amalgam, 1 lb. ton.	29 00	32 00
Scotch Pig, ton.	31 00	32 50
White Pig, ton.	30 00	30 00
Oregon Pig, ton.	30 00	30 00
Refined Bar.	4 00	4 00
Butter, 1 lb.	4 00	4 00
Sheet, 10 to 14.	5 00	5 00
Sheet, 15 to 20.	6 00	6 00
Sheet, 20 to 24.	7 00	7 00
Sheet, 24 to 28.	8 00	8 00
Sheet, 28 to 32.	9 00	9 00
Horse Shoes, keg.	6 00	6 00
Nail Rod.	8 00	8 00
Norway, Oval.	8 00	8 00
Rolled.	7 00	7 00
COPPER.		
Copper Mined.	37 00	40 00
Sheeting, B.	37 00	40 00
Sheeting, Yellow.	37 00	40 00
Sheeting, Old Yellow.	37 00	40 00
Composition Nails.	37 00	40 00
Composition Bolt.	37 00	40 00
BRASS.		
English Cast, lb.	14 00	25 00
Anderson & Woods, ordinary sizes.	16 00	25 00
Drill.	15 00	25 00
Flow Steel.	8 00	20 00
TIN PLATES.		
10x14 C Charcoal.	9 00	9 50
Sheet, 10 to 14.	24 00	25 00
Australian.	18 00	18 00
ZINC.		
By the Cast.	1 00	1 00
Zinc Sheet 13 ft. 7 to 10, lb.	11 00	11 00
13 ft. 11 to 14.	11 00	11 00
8 ft. 8 to 10.	12 00	12 00
8 ft. 11 to 10.	12 00	12 00
NAILS.		
Assorted sizes.	3 75	4 00
QUICKSILVER.		
By the lb.	42 00	45 00

GENERAL MERCHANDISE.

WHOLESALE.

WEDNESDAY M. April 5, 1877.

PAKS-Jobbing.		
Eng Standard Wheat, 5 @.	9 00	9 00
Norfolk & Co's.	9 00	9 00
Hand Sewed, 2x36.	9 00	9 00
2x40.	9 00	9 00
2x40.	9 00	9 00
Machining Sd.	9 00	9 00
Flour Sacks, halves.	9 00	9 00
Quarters.	9 00	9 00
Elphins.	9 00	9 00
Healins, 60 inch.	9 00	9 00
45 inch.	9 00	9 00
40 inch.	9 00	9 00
Wool Sacks.	9 00	9 00
Hand Sewed, 3 lb. 50 @.	9 00	9 00
Machine Sewed.	9 00	9 00
4 lb.	9 00	9 00
Standard Gunnies.	9 00	9 00
Bean Bags.	9 00	9 00
CANDLES.		
Grant's.	16 00	16 00
Mitchell's.	18 00	20 00
CANNED GOODS.		
Assorted Pig Fruits.		
2 lb cans.	2 75	3 00
Table do.	3 75	4 25
Jams and Jellies.	4 25	4 50
Strawberries, 1 lb. gal.	5 00	5 00
Sardines, or box.	1 65	1 90
Hi Boxes.	3 00	3 00
COAL-Jobbing.		
Australian, ton.	8 50	9 00
Coal Bay.	8 00	8 00
Blackburn Bay.	8 00	8 00
Seattle.	8 00	8 00
Cumberland.	14 00	17 00
Mt Diablo.	5 75	7 75
Lehigh.	12 00	12 00
Liverpool.	8 50	9 00
West Hartley.	14 00	14 00
Scotch.	7 50	9 00
Seranton.	13 00	15 00
Vancover Id.	10 50	12 00
Charcoal, sack.	75 @	75 @
Coke, bbl.	60 @	60 @
COFFEE.		
Sandwich Id, lb.	2 10 @	2 10 @
Costa Rica.	20 @	21 @
Guatemala.	20 @	21 @
Java.	24 @	24 @
Manilla.	19 00	20 00
Ground, in c.	25 @	25 @
FISH.		
Sack to Dry Cod.	5 @	7 @
Bocodine.	8 00	10 00
Eastern Cod.	7 @	7 00
Salmon, bbls.	9 00	10 00
Hi bbls.	4 00	5 00
2 lb cans.	3 00	3 00
Phil Cod, bbls.	22 00	22 00
Hi bbls.	11 00	11 00
Mackerel, No. 1.	15 00	16 00
Hi bbls.	3 00	3 00
In Kils.	3 00	3 00
Ex Mesa.	3 50	4 00
Phil Herrin, bx 300	3 00	3 00
Boston Smk'd Hg.	40 @	50 @
LINE.		
Lima, Sta Cruz.	2 00	2 25
bbl.	2 00	2 25
Cement, Rosen.	2 75	3 50
Portland.	4 75	5 50
Plaster, Golden.	3 00	3 25
Gate Mills.	3 00	3 25
Land Plaster, in 100	10 00	12 50
NAILS.		
Ass'd sizes, keg 3 25 @ 4 00		

LEATHER.

WHOLESALE.

WEDNESDAY M. April 5, 1877.

Sole Leather, heavy, lb.	26 00	26 00
Light.	22 00	24 00
Jodot, 8 Kil, doz.	48 00	50 00
11 to 13 Kil.	58 00	60 00
14 to 19 Kil.	62 00	64 00
Second Choice, 11 to 16 Kil.	60 00	62 00
Cornellins, 12 to 16 Kil.	57 00	59 00
Females, 12 to 16 Kil.	53 00	55 00
14 to 16 Kil.	51 00	53 00
Simon Ulmo, Females, 12 to 13 Kil.	58 00	60 00
14 to 15 Kil.	58 00	60 00
16 to 17 Kil.	58 00	60 00
Simon, 15 Kil.	51 00	53 00
20 Kil.	55 00	57 00
24 Kil.	52 00	54 00
Robert Calf, 7 and 9 Kil.	52 00	54 00
Kip, French, lb.	1 00	1 25
Cal. doz.	40 00	40 00
French Sheep, all colors.	8 00	15 00
Eastern Calf for Bucks, lb.	1 00	1 25
Sheep Roans for Topping, all colors, doz.	9 00	10 00
For Linings.	5 50	10 00
Cal. Russet Sheep Linings.	1 75	4 50
Boot Legs, French Calf, pair.	4 00	4 00
Good French Calf.	4 00	4 75
Best Jodot Calf.	5 00	5 25
Leather, Harness, lb.	35 00	35 00
Fair Bridle, doz.	48 00	50 00
Skirting, lb.	33 00	37 00
Wax, doz.	30 00	30 00
Buff, ft.	18 00	20 00
Wax Side.	17 00	18 00

Choose a good companion only—one of Dewey & Jordan's "New York watches."

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(Corrected Weekly by STEWART & CO.)

SAN FRANCISCO, April 5, 3 P. M.
GOLD IN NEW YORK, 104 1/2
GOLD BARS, 88 1/2 @ 90. SILVER BARS, 10 1/2 @ 11 1/2
EXCHANGE ON NEW YORK, 50 @ 55-100 cent. premium for gold; on London bankers, 49 1/2; Commercial, 49 1/2; Paris, five francs 50 dollar; Mexican dollars, 23 1/2 @ 24.
LONDON COIN, 104 1/2 @ 105.
QUICKSILVER IN S. F., by the flask, @ 12 @ 13 1/2.

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Roasting of Gold and Silver Ores, and the Extraction of their respective Metals without Quicksilver.

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UNITED STATES

Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, postage free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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Subscription, \$4 a year in advance. Sample copies, post paid, 10 cents. As an

ADVERTISING

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THE GRAND PACIFIC—This hotel, well known to all persons from the Pacific Coast who have visited Chicago of late, under the new management is a perfect success. It is well for travelers to remember that at this house, in order to meet the expectation of the public in these times of financial depression, a sliding scale of prices has been arranged, from \$3 to \$5 per day, with board, according to location of apartments, the service, table and all other accommodations being the same to all guests. The entire house has been re-furnished and decorated, so that it is handsome both externally and internally. All the conveniences and modern improvements for the convenience of the guests are at hand.

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Look out for a man calling himself J. Livingston. Last whereabouts in Yuba county.

A VALUABLE MINING BOOK.

BY J. S. PHILLIPS.

The Explorers', Miners and Metallurgists' Companion, 682 pages, 83 illustrations. Second Edition. A California publication.

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The book is exactly calculated to suit the views and meet the requirements of those for whom it has been written.—*London Mining Journal.*

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It affords a vast quantity of information as to the appearance and value of different ores.—*S. F. News Letter.*

It is the best single English treatise we know for the use of prospectors and practical miners.—*The Engineering and Mining Journal, New York.*

Sold by Dewey & Co., at this office. Price \$10.50.

Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of chloride of copper and protoclauride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the Kriches, Smalting, Mexican process, Chilean process Kriches' process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improved retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners' and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome Street, San Francisco.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
E. W. CROWLEY—Colusa, Butte and Sutter counties.
C. W. MCGOWAN—Santa Clara county.
A. C. KNOX—Nevada, Montana and Utah Territories.
A. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMPION—Sonoma and Marin counties.
A. U. STRONG—Lake, Napa and Solano counties.
G. KUTNOW—Contra Costa county.
W. D. WHITE—San Bernardino and Los Angeles counties.
E. G. LAERNER—Arizona Territory.
ED. T. PLANK—Dakota Territory (Black Hills.)

"Faith and Confidence."

LIVERMORE, Oct. 1st, 1875.

Messrs. DEWEY & Co., Patent Solicitors: Gentlemen—Yours of the 29th ult., containing my patent to Elevated R. R. duly received, and I hereby return my sincere thanks to the MINING AND SCIENTIFIC PRESS Patent Agency for your promptness and honesty in regard to our business connections. I have received a flood of circulars from Eastern firms, desiring to deal with me, but I have declined any communication with them and prefer as soon as circumstances will permit, to negotiate with and patronize a home institution; one in which I have faith and confidence—DEWEY & Co.

Again thanking you for your promptness in securing my patent, I remain, obediently yours,

WM. H. HARRISON.

EVERY new subscriber who does not receive the paper and every old subscriber not credited on the label within two weeks after paying for this paper, should write personally to the publishers without delay, to secure proper credit. This is necessary to protect us against the acts and mistakes of others.

WRITE for the MINING AND SCIENTIFIC PRESS. We invite not only professional men, but practical miners and mechanics to contribute to our columns. All communications will be kindly treated. Authors, as well as readers, will be benefited by corresponding.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

California and Arizona Mining Company.

Location of principal place of business, 507 Montgomery Street, San Francisco, California. Location of works, Mariposa County, Territory of Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of April, 1877, an assessment (No. 2) of two cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, 507 Montgomery Street, San Francisco, Cal.

Any stock on which this assessment shall remain unpaid, on the thirtieth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fourth day of June, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors. T. E. JEWELL, Secretary. Office, 507 Montgomery Street, San Francisco, California.

Dolores Consolidated Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.

There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Blasdel, H. G., Trustee.	16	10,000	\$1,000 00
Blasdel, H. G., Trustee.	17	5,000	500 00
Blasdel, H. G., Trustee.	18	5,000	500 00
Blasdel, H. G., Trustee.	19	5,000	500 00
Drexler, L. P. & Co., Trustee.	8	25,000	2,500 00
Fry, J. D., Trustee.	7	10,000	1,000 00
Keene, J. R., Trustee.	9	10,000	1,000 00
Talbot, W. C.	3	100	10 00

And in accordance with law and an order of the Board of Directors, made on the seventh day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, p. m. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.

J. W. CLARK, Secretary.

Office, 418 California street, San Francisco, California.

Klamath Quartz Mining Company.

Iron and Machine Works.

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ROLLING MILL COMPANY,
SAN FRANCISCO, CAL.Established for the Manufacture of
RAILROAD AND OTHER IRON

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Embracing ALL SIZES of
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Axles and Frames,—ALSO—
Hammered Iron of Every Description and Size.Orders addressed to PACIFIC ROLLING MILL
COMPANY, P. O. Box 2032, San Francisco, Cal., will re-
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The highest price paid for Scrap Iron.THE RISDON
Iron and Locomotive Works,INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

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SAN FRANCISCO.Manufacturers of Steam Engines, Quartz and Flour
Mill Machinery, Steam Boilers (Marine, Locomotive and
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All kinds of light and heavy Castings at lowest prices.
Cams and Tappets, with chilled faces, guaranteed 40 per
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kinds of Machinery.N. E. corner of Tehama and Fremont streets, above
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fitted up with the improved axle and box—introduced by
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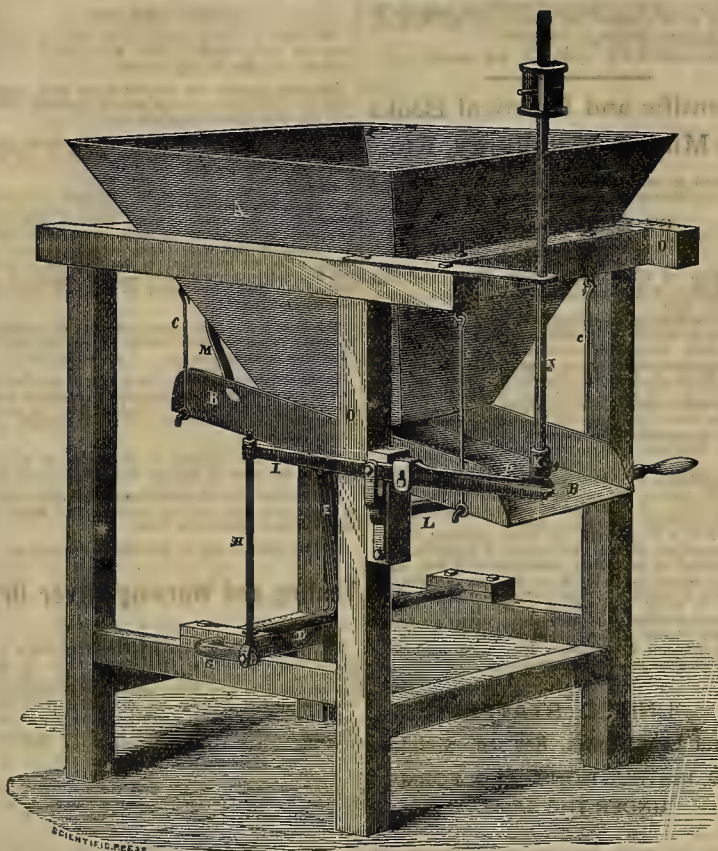
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Awarded the Centennial Medal.

The TULLOCH AUTOMATIC ORE FEEDERS have been practically tested during the last year and a half in
40 mills, of from five to 80 stamps each, and have, in every case, given perfect satisfaction. The Tulloch machine is
so constructed that the drop of the stamp feeds the ore in just such quantities as the stamps require. Each drop
regulates the supply required for the next drop, whether it be more or less, and this is the true principle of an
automatic feeder. The tray moves longitudinally, and a stationary scraper forces the material forward at each back-
ward movement of the tray, thus insuring the perfect feeding of all classes of ore, whether it be dry or wet.We append a few extracts from the many testimonials which we have received from mill men and practical
mining men, of the effectiveness and positive action of the Tulloch Feeder. We do not depend solely upon these
testimonials, as we are aware that testimonials are easily secured for almost any machine, but the high character of
the parties certifying to those herewith given, will establish their value and genuineness:Mr. Jas. G. Fair has 28 in use; says: I regard them superior to any Feeder with which I am acquainted; I con-
sider no mill perfect without them. Mr. E. R. Burke, Sumner mine, Kern county, has 16: They never get tired; no
man living can feed a battery as well; they save us in labor alone \$48 a day. Mr. Green, of the Phoenix mill (12),
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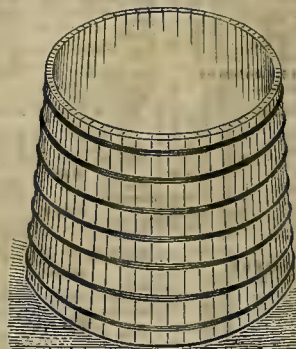
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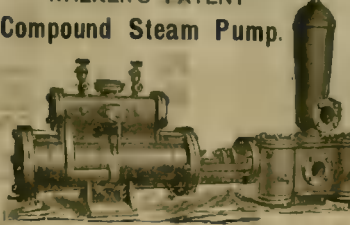


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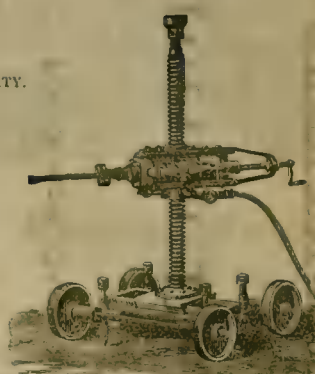
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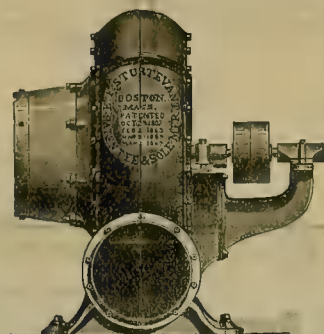
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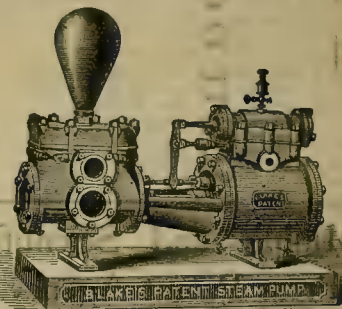
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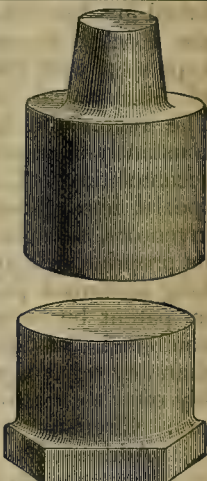
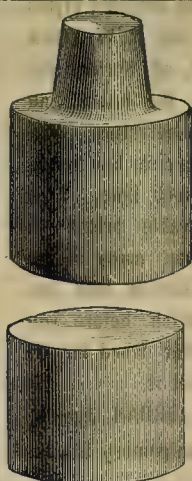
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VALLEJO FOUNDRY, October 17th, 1876.

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Gentle:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this
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far surpass for regularity of speed any Governor that I have ever seen, and I have
seen all the best kinds; I have seen the main belt fly off the pulley several times this season
while threshing, and the engineer did not discover it, so perfectly was the speed main-
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Before purchasing an American Watch, examine the different styles manufactured by the NEW YORK WATCH COMPANY, at Springfield, Mass. They are the latest and best improved manufacture. You can depend upon them for fine finish, durability and perfect time. They are sold at favorable prices—in fact, no higher than many of the inferior styles. Examine into the merits of this Watch before you buy any other. Our word for it, you will not regret it.

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A General Assortment of Engineers' Findings.

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Is The Best and Most
Durable in use. Also,
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IMPORTER OF

IRON PIPE AND MALLEABLE IRON FITTINGS.

ALL KINDS OF

WORK AND COMPOSITION NAILS,
AT LOWEST RATES.

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Manufacturer of ARTIFICIAL LIMBS,

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office, room 2, fronting on Market, opposite the head of
Third street.

Gold and Silver Sulphurets Purchased

At the highest prices; also, treated on Commission at
low rates.

DEETKEN & KRUSE'S Reduction Works,

GRASS VALLEY, NEVADA CO., CAL.

We can recommend the New
York watch, of Springfield, Mass.,
as A 1.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, APRIL 14, 1877.

VOLUME XXXIV.
Number 15.

Compliance with Mining Laws.

The loose and careless manner in which mining locations are made, or the yearly expenditures on such locations worked out, has caused considerable confusion in the titles of a good many mining claims in different parts of the coast. This is partly due to carelessness and partly to ignorance of the law on the part of the miners, but could be avoided by plain, explicit local laws, which do not conflict with those of the General Government, but would, at the same time, be plain enough so that any miner would understand them. It has been the custom almost everywhere, in locating a claim, to throw together a few loose rocks, and write out a notice claiming so many feet in such a direction, without attempting to give any explicit description of the boundaries of the claim or its locality. In such cases, should the claim turn out to be a rich one, and a patent be desired, there is apt to be litigation concerning it. The boundaries should be well defined, and a clear description of the location be recorded, with necessary names, dates, etc. In working out the assessments called for by law even more care should be exercised, and the work done should be made a matter of record with the proper official of the district. Some miners have kept their claims by starting work on the last day of the year and stopping on the 1st or 2d of January—after that letting the claim lie idle. This sort of thing would, of course, not stand good in any court of law, and might cause endless dispute in case of anything rich turning up. If the district laws were more imperative on these subjects than they usually are, the miners would be saved considerable trouble in the end, and the lawyers have less business to do.

We noticed, some little time since, that the mining district laws of Cerro Gordo, Inyo county, had been changed in a manner to overcome the difficulties enumerated above, and it seems they are working well there. A correspondent of the *Coso News*, writing from there, says:

"We provided for these cases in our newly-amended by-laws, thinking that a vein which is not worth the trouble, in locating, to measure out the proper boundaries, or to do a certain amount of labor upon it, showing the *bona fide* intention of the locator, is not worth having. Since the 20th of last February, then, on which these by-laws went into force, no claim shall be recorded the boundaries of which are not properly defined and marked out—a fact which may be proved by two witnesses before the Recorder. In regard to expenditures, the labor must be commenced within sixty days after the date of location in each year and performed within eleven months. A book of records of expenditures is to be kept by the Recorder, in which the yearly assessment work on each mine is to be entered, describing, at the same time, in what such labor consists. Either the Recorder or two reliable witnesses, having first inspected the work, can testify as to the amount of labor performed, when the claimholder is entitled to a certificate from the Recorder. The good effect of these provisions is already manifest, for a great deal more work has been done on locations this year than in many a year before."

"BLACK ROCK" is the name of a new district in Eureka county, Nev. The boundary lines are as follows: Commencing at the south end of Wells's hay ranch, running north ten miles, thence east ten miles, thence south ten miles, thence west ten miles to the place of beginning. H. W. Brooks is Recorder. As will be seen by our "Mining Summary," encouraging news is received from the district.

FRANK LESLIE, with his wife and several friends and a corps of artists, left New York last Tuesday for the Pacific coast.

Mining Decisions.

A recent decision by the Commissioner of the General Land Office in the case of the Woodville placer application, is as follows: Where no adverse claim was filed, and no suit begun within the period of publication, or thirty days thereafter, but a suit was afterwards instituted before a court of competent jurisdiction, wherein the plaintiff recovered judgment against the applicants for a patent for an interest in their mine, and he then filed with the Commissioner a transcript of the judgment roll as a bar to the issuance of a patent, *Held*: That the plaintiff had no standing before the Land Office, and that his remedy was in a Court of Equity, to compel the patentees to convey to him that portion of the patent for which he recovered judgment in the court of law.

The Secretary of the Interior, in the case of Poley & Thomas vs. The State of California, involving title to a school section in the Stockton land district, has decided that title to all

applicants for patent, December 1st, 1866, and that the present applicants purchased the remaining interest in said mine on the 2d day of July, 1867. The applicants allege that they and their grantors have been continuously in the possession of said mine since the original discovery thereof, and that they have in all respects complied with the requirements of the law in holding and working the same.

On the 21st of October Richard M. Keyes made final homestead entry No. 280 of said northeast quarter, section 32, and on the 20th of January, 1875, patent issued upon said entry.

No title was acquired by virtue of this patent to any known mine, for, by the positive provisions of the statute, lands are not subject to pre-emption or homestead entry "on which are situated any known mines or miners." (Sections 2258 and 2289, Revised Statutes.) Title to mineral land can only be acquired by parties who show compliance with the terms of the Act regulating the disposal of mineral lands.

A "known mine" did exist upon the land in

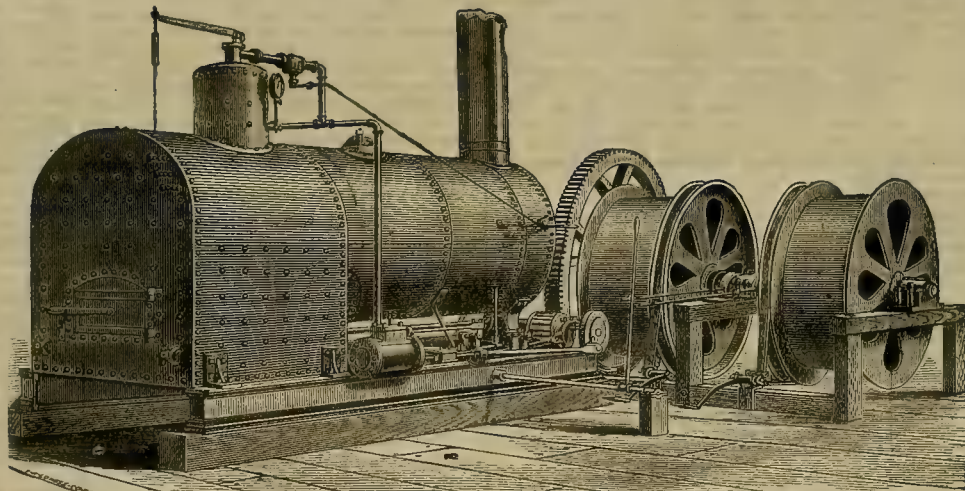
Commissioner Williamson, of the General Land Office, rendered an interesting decision in the case of Buel & Bateman, applicants for patents for certain coal lands, in conflict with the application of the town of Coalville, Utah, for a patent for its town site. The Commissioner directs that a patent shall issue to the town for its site, reserving the coal rights to the coal land claimants, and reserving the rights of the town site to the town site claimants. In effect, the surface will be patented as a town site, and the underlying coal deposits will be patented to other parties.

New Hoisting Engine.

The accompanying cut represents a new mining hoisting engine, lately introduced on the Comstock and other mines by Berry & Place, of this city. The engraving shows a temporary frame for the reels. The framework used is much more substantial, and is usually built by the parties purchasing.

These engines are built from plans and specifications suggested by several of the leading engineers of the Comstock lode. They are built by Messrs. Cook, Rymes & Co., of Massachusetts, whose hoisting engines have long been known on this coast. They have locomotive boilers, fixed to a heavy iron bed, with two cylinders, one on each side, reverse or link motions, and two heavy iron drums. Three sizes of drums are built—two and a half feet, four feet, and five feet—suited for either hemp or wire rope. Each drum is provided with a brake or clutch, so that one or both drums may be used. The brake levers, reverse lever, and clutch and throttle levers are all so arranged as to be right at hand and under perfect control of the engineer without his moving from his position.

The engines are built either twenty-five, thirty, forty or fifty horse power, and are calculated for sinking shafts from 500 to 1,600 feet. Parties interested can see them by calling on the builders' agents, Berry & Place, corner of Market and Front streets, S. F.



BERRY & PLACE'S MINING HOISTING ENGINE.

of the 16th and 36th sections of unoccupied public lands in California vests in the State at the date of the survey, if at that time they are not known to be mineral, or are not treated as such by the State. The important general principle announced has never before been authoritatively established. The section in controversy was not discovered to be mineral until four years after the date of survey; but, according to this decision, the State title would have been firmly attached to the section, if minerals had been discovered upon it the next day.

The following is the full text of an important ruling by the Commissioner of the General Land Office, which decides a question of great interest to miners:

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE, WASHINGTON, D. C.
March 26th, 1877.

Register and Receiver, Stockton, California—Gentlemen: On the 17th of October, 1876, Horace Bellows, H. C. Badger and Augustus Walker presented their application for patent for one thousand linear feet of the Champion mine, with surface ground six hundred feet in width, said premises being designated by the Surveyor-General as lot 37, township 11 south, range 23 east, Mount Diablo meridian.

You refused to receive and file said application, as it includes and embraces a portion of the northeast quarter section 23 in said township, which was entered by Richard M. Keyes, October 21st, 1874.

The papers submitted in the case and the records of this office show that R. M. Keyes and two others located one thousand feet of the Champion mine on the 21st day of May, 1866, and that such location was recorded in the Recorder's office of Fresno County, California, on the same day at the request of R. M. Keyes; that Keyes on the 21st of June, 1866, purchased the interest of one of his co-locators and conveyed his entire interest to the present

question at the date Keyes made his entry, a mine located by himself and others, and sold by them to the present applicants.

It appears by a copy of the decree of the court of the Thirteenth Judicial District of California, rendered on the 18th of November, 1876, in the case H. Bellows et al. vs. R. M. Keyes et al., that it was decreed by said court that "the plaintiffs have had ever since the 27th day of May, 1867, and still have the possession and exclusive right to the possession of their said mining claim and premises, and are and have been for years past entitled to apply for and receive a patent from the government of the United States, under the laws of Congress, and in conformity thereto, of and to and for said mining claim and premises. That the said patent to said R. M. Keyes conveys and grants to him or to his assigns no right or title or interest in or to the land embraced within the said northeast quarter of said section 32, covered by this mining claim and premises of the plaintiff."

That the said patent and the said conveyance thereunder made, be, and the same are hereby set aside and declared null and void, and the defendant and each and every one of them are forever estopped, and hereby precluded from claiming any right or interest in title to or ownership of said mining claim and premises or any part thereof.

And the right of possession of plaintiffs of and to their said mining claim and premises is hereby affirmed and declared valid, legal and just."

As the Government has not yet divested itself of the title to said mine, you will receive the applications of said H. Bellows, et al., for patent therefor, upon compliance with the law and instructions.

Be pleased to inform all parties in interest and acknowledge the receipt hereof. Very respectfully, your obedient servant,

J. A. WILLIAMSON, Commissioner.

PROFESSOR THUREAU, of Victoria, Australia, is at present visiting the mines near Grass Valley. The *Union* says he comes commissioned by the government at Victoria to examine all the machinery used in any kind of mining in this country, and to purchase such as he may think will suit in the mines of Australia. He will thoroughly inspect the modes and methods of the miners here, and even the way in which they live. After looking at the principal mines of California, Nevada and other places on the coast, Prof. Thureau will return to his country and make a report. He has been given every facility in Grass Valley for making his observations. In a few days he will go up to the northern part of the county, where the big gravel mines are at work.

SCIENTIFIC EXPEDITION.—Professor Taylor, of Chicago, has left Victoria, B. C., for Sitka, to make a survey of the famous snow peak, Mt. St. Elias, and ascertain the altitude of the mountain. The peak is situated 350 miles north of Sitka, and has never been ascended yet, and its height has not been determined. Professor Taylor is accompanied by Lieutenant Wood, U. S. A., and all the instruments, apparatus, etc., for scientific experiments. The result of the exploration will be reported by the Departments at Washington.

THE *Elko Independent* is informed by Sam Linkton, Superintendent of the Grand Prize mine, that the company has closed a contract with Messrs. White & Allen for the construction of a twenty-stamp mill, as soon as practicable, near the mine.

A LARGE number of factory operatives in New Jersey are on a strike against a reduction of wages.

CORRESPONDENCE.

Mines and Machinery of Ward, Nevada.

[From our Traveling Correspondent.]

EDITORS PRESS:—The district is comparatively new, lying 100 miles south-east of Eureka and by far the liveliest of any in White Pine county. The principal facts in regard to the mines were written up by Mr. Robt. Briggs, who has charge of the Paymaster, Defiance and other mines of the district, and as they were fully confirmed by personal observation as to the most important, they are submitted almost verbatim as furnished. An explanation may be necessary in reference to one kind of country rock found here, usually styled a granite. As it is probably as much of a porphyry as a granite, the phrase granitic porphyry has been substituted; in some cases, for the sake of brevity, the term in ordinary use being retained without qualification.

The Geological Formation

Is of a peculiar character and such as nowhere else, to my knowledge, exists in eastern Nevada. For nearly a mile in width, and running diagonally along the side of the main mountain range, is a scope of country alternating with belts of granitic porphyry and limestone. These belts of separate formation vary but very little in width, being generally from 75 to 100 feet wide, and bearing almost invariably, with one or two notable exceptions, a uniform course, that is north 58° west. Along the contact of these formations is located the principal mines of the district. The main company operating here at present is the

Martin White Mining Company,

Of San Francisco, L. G. Clement, General Superintendent of mines, mill and furnace. This company own some 20 different and distinct mines, to six of which United States patents have been obtained, and all are more or less developed and present as good a showing for permanency and constant yield of high grade ores as any series of mines in the State.

The first in importance of this company's mines, because it is the most developed, is

The Paymaster.

This mine is located on the mountain side, about one mile above the company's reduction works and at an altitude of 1,500 feet above the general level of the valley. The mine is opened by a series of tunnels, Nos. 1, 2 and 3, and by a main working shaft. Tunnel No. 1 enters cover a few hundred feet below the discovery shaft and follows the vein for about 800 feet, and at its present face is about 180 feet below the surface. Along this tunnel is found some immense chambers of high grade ore. At one point the vein is fully 24 feet in width and has yielded an immense amount of rich ore. One car-load of 10 tons, shipped to San Francisco in April last, yielded a net profit of over \$8,000. The course of the vein is the same as the separate belts of formation above referred to and its incline is about 45° to the south. The limestone forms the foot-wall and the granitic porphyry forms the hanging-wall. Tunnel No. 2 is 100 feet below No. 1 and as was commenced further down the hill is now 1,200 feet in length. Along this tunnel, until we reach a point within 100 feet of its present face, is encountered the same geological features and characteristics as are found in No. 1. At the point above referred to, and which is 1,100 feet from the mouth of the tunnel and 280 feet below the surface, the vein widens out into an immense chamber of fine ore, fully 30 feet. Here a peculiar feature occurs. The contact changes its incline, dipping to the north, as is demonstrated by a winze which is sunk 100 feet, and thus reversing walls, the so called granite being the foot-wall and lime overhanging. A portion of this large ore body follows down this contact but is not of so high grade as the ore above, while a much larger portion of the body of ore leaves the contact and lime entirely and strikes out and down through the other formation. The extent of this portion of the vein is not yet known, as it has in no place been cross-cut. A drift has been run on it for a distance of 80 feet, which demonstrates that its course (horizontal) varies 54° from the direction of the main contact. The average assay value of this body of ore is \$300 per ton and it is very easily mined, requiring little or no blasting.

The Defiance

Is the next mine of importance belonging to this company, and is located one-half mile from the Paymaster, and at an altitude of about 1,200 feet above it. This mine produces exclusively lead ores, (carbonates and sulphates of lead,) which is used as a flux for smelting ore from the Paymaster, but is of a much lower grade in silver. The course of this varies from that of the Paymaster and other mines of the district, and is almost due north and south, having its dip or incline to the east. This is also a contact vein, having the granite for its hanging-wall and limestone for the foot-wall. Here we have between these walls a vein of decomposed quartz, hematite and manganese full 60 feet wide. Throughout this vein matter occurs irregular chambers of fine carbonate

of lead ore; these chambers of ore are generally stronger nearer the lime-stone than they are toward the granitic porphyry. During the past eight months this mine has produced over 5,000 tons of ore, all of which has been consumed at the company's furnaces. The mine is now worked through a tunnel, which taps the vein 140 feet below the surface; from this tunnel two winzes have been sunk 60 feet deep. A main working shaft with two compartments securely cribbed with three-inch plank is now being sunk on the mine and is down 140 feet.

The Mountain Pride

Mine, belonging to the same company, lies east of and adjoins the Paymaster, and is opened by means of a tunnel. This mine produces ore similar in character to that of the Paymaster, but it does not occur in such large bodies as in the latter. The Mammoth and Ben Lomond lie immediately south of the Defiance, and are an extension of the same, as the croppings are identical and ore readily traced the whole distance of the three locations. The Mammoth is being opened by means of a tunnel which will tap the vein 140 feet below the surface. A few feet more will bring the tunnel into the vein, when it is expected a large body of ore will be developed.

The Carolina

Is located east of the Mammoth, and shows an immense outcrop some 60 or 70 feet wide. A shaft has been sunk on this vein to a depth of 60 feet, which has yielded some very high grade ore. The Young America adjoins the Paymaster on the south and west, and has been opened with a shaft 100 feet deep, which shows a continuous body of ore all the way from the surface down.

The limits of this article will not allow, at this time, a description of the remaining mines of this company.

The Steptoe Consolidated

Mining company is the next of importance in the district, and is superintended by Mr. Robert Briggs. This corporation owns a series of mines consisting of the Ready Cash, Emily, Light, Cow, Old Ned, Profit and Fourth of July. The Ready Cash, like the Defiance, is a contact vein, lying between granitic porphyry and lime, and produces the same character of ore—carbonate of lead, and assaying high in silver. This mine is opened by a shaft 100 feet deep, from which levels have been run each way along the course of the vein for a considerable distance. The granite here presents an even and uniform wall, while the limestone apparently gives way at places, forming large chambers of ore. The location is most favorable, being on the south side of the mountain and is surrounded on all sides by the most important mines of the district.

The Emily

Is also a contact vein, yielding a chloride ore. The contact here does not seem to be so regular as in some of the other mines, but, as it is located lower down on the mountain, the irregularity is produced probably by some disturbance of the earth's surface, and when a sufficient depth is attained there is no doubt but that it will assume the same regularity as that which characterizes many other mines in the same locality. The ore obtained from this mine is such as to give great hopes for its future. The Cow presents about the same characteristics as the Emily, and is located but a short distance from it.

The Light

Adjoins the Paymaster ground, and though but little work has been done, the developments are of a most favorable character. We find here the same character of vein matter lying along the contact (manganese and decomposed lime) as that which led to the rich bodies of ore in the Paymaster. Interspersed through this vein matter is found occasional bunches of high grade ore, thus indicating that a strong body of rich ore exists at no very great distance below. The Profit, Old Ned and Fourth of July are located low down on the mountain, and are exclusively in limestone formation. The ore produced from each of these mines is of the same character (a chloride) and assays very high in silver, but as the formation is hard, they are somewhat expensive to work.

The Pleiades Mine,

Owned by Weaver, McKinzie & Co., is located a few hundred feet north of the Paymaster and yields a similar character of ore. A shaft is down on this mine 140 feet, and shows a continuous body of ore all the way down from the surface. Several hundred tons of good ore is now piled on the dumps. This company also owns the Atlantic Cable and several other mines in the district.

The Governor Con. M. Co.

Is a recent corporation formed in San Francisco for the purpose of working the Governor, the Grampus and other mines in the district. The Governor is yielding some very high grade ore, some of which assays as high as \$6,000 per ton.

The Latima, owned and worked by Mitten & O'Brien, is a contact vein, and is producing some good ore. These gentlemen evidently have a good thing and are buoyant with hope.

The Ward Con. M. Co.

Own two lodes, the Shark, a contact vein between the granitic porphyry and the limestone; shaft 150 feet and drift 90 feet from the 100-foot level. The fissure is very large, with from two and a half to four feet of excellent free-milling ore, giving assays from \$100 to \$1,000,

choice samples going as high as \$10,000 per ton; no working test as yet made.

The San Mateo, 200 feet from the Shark, and a parallel vein, has been cut by the tunnel, running for their other lodes. It lies in limestone, but near the granite (so-called) and is fully 15 feet in width, containing a carbonate and smelting ore. The same company are also running a tunnel to tap the I X L at the depth of 200 feet from the surface. In the absence of Mr. Gleason, the Superintendent, the desired information was promptly furnished by Mr. J. McCarty, foreman in charge.

The Martin White M. Co. Smelting Works.

So much space has already been taken up with the mines, that many interesting details are necessarily omitted, in regard both to mill and furnace, room being left for only a few of the most striking points. Suffice it to say, that both are fully equipped with all the usual appurtenances of the best appointed establishments of the kind. The furnace consists of two stacks, each with a water jacket and a quick-silver gauge to indicate the pressure of the blast per square inch.

Perhaps the most novel and interesting feature about the works is

The Condensing Chamber,

Which is apparently of too much consequence to be dispatched with a line. It surrounds the stack something like the drum of a stove-pipe, midway from top to bottom. It is provided in the interior with an umbrella-shaped dome with an apron below it, 14 inches in width and of a diameter 28 inches greater than that of the stack, by which all the heavier particles are thrown back into the outside apartment of the chamber, which last has a diameter proportionately larger than that of the apron. The exhaust steam from the engine is conducted to a point a little above the dome, condensing the remaining finer dust that passes upwards, which in turn falls back upon the sides of the dome, whence it slides into an incline and discharges itself on the feed floor between the doors of the furnaces. So effective is the arrangement that not a single case of lead poisoning is known to have originated either in the village or at the works from the commencement of operations.

Mr. F. F. Thomas, the Superintendent, puts the average of the ore from the Paymaster mine at present smelted, at \$350 per ton, from six to seven per cent. of this gold. Of the lower grades at furnace there are 1,000 tons that will run from \$80 to \$90, 150 worth \$130 and 50 tons of \$200 ore, besides 25 tons that will work as high as \$400 per ton. The ore just now worked at the mill is fourth class or the lowest grade, averaging about \$35 per ton, and some 700 tons still on hand.

As it is now pretty generally known that

The Lixiviation Process,

Introduced here at the mill of the Martin White company, did not at first and perhaps has not yet come fully up to what was expected from it, particular inquiries were made of Mr. E. W. Wagner, the present Superintendent, as to the difficulties encountered, the proposed modes of remedy, together with those already tried and found effectual, which will now be presented as concisely as possible.

For its successful working, three conditions are considered absolutely necessary:

1st. A suitable ore, or one capable of being chloridized to a high percentage.

2d. A sufficiency of water.

3d. A well appointed mill, where the ore can be handled with dispatch.

The greatest difficulty from the outset, now being gradually overcome, arose from the character of the ore not containing a sufficient quantity of sulphur to chloridize well. The Paymaster mine is now supplying a class of ore with more of the requisite ingredient and much better suited for the process. The second great drawback was the lack of water, now being supplied in larger quantity, and, in the last place, owing to the newness of the process on the coast, many changes had necessarily to be made in the arrangements around the mill, with the view of reaching the required dispatch in handling the ore to produce the desired results.

It is thought the ore can be leached up to 95% of the chlorination. The gold is here alloyed with silver and is saved in part also by the process, probably in like ratio with that of the silver. The mill is of 20 stamps, dry crushing, provided with crusher, drier and a White rotary furnace, and as it is the first to try it in the State or to any extent perhaps on the coast,

Their Leaching Process, in its Details,

Will be read by some with pleasure, if not with profit. After the pulp has been roasted and thoroughly cooled, it is dumped into 15 leaching tanks, of one and a half tons capacity each, to be subjected to a washing with warm water—the hotter the better—from two and a half to four hours, owing entirely to time required for leaching off the salt and base chlorides. It is next leached by a solution of hyposulphite of lime from 14 to 16 hours, which dissolves the chloride of silver, the only chemical combination of the metal at all affected by the preparation. The leached solution is now turned into five receiving tanks, capable of holding 500 gallons each, connected by three-inch gas-pipes, and thence drawn from the center tank to the precipitating tank on the floor below. Sulphide of calcium is added in sufficient quantity to precipitate the silver as a sulphide. This, in turn, having been dried in the reverberatory oven and subjected to a roasting for dispelling the

sulphur, finally results in an oxide of silver, to be melted down and molded into bars.

A Dollar Saved.

The sulphide of calcium and the hyposulphite of lime are both manufactured in the mill at a mere nominal expense, crude sulphur and burnt lime found near at hand being the only chemicals required—the former by boiling sulphur and lime together with water long enough to cause them to unite, forming a strong, yellowish-hued liquor. From this the hyposulphite of lime is now made by injecting through it a stream of cold sulphurous acid, thereby precipitating the sulphate of lime and leaving the liquor clear as water. It is scarcely necessary to state that the solution gains strength by use, and can be employed over and over again.

The report of mines at Pioche, intended to form a part of present letter, must be deferred to another issue.

A. C. K.

Persevering Work.

If there is any class of men, says the Salt Lake Tribune, whose toil deserves to be rewarded by all that the toiler hopes for, it is the hard-handed, large-hearted and free-minded miners who make up the camps of this Territory. As an example of these men—and they are every inch men—it is gratifying to point to Maurice McGrath (Winnamuck) and his five partners, who have undertaken one of the most difficult mining operations in Bingham.

It is estimated that the sum of \$2,000,000 in gold dust has been taken out of this canyon, which amount has been obtained in gophering around in the side hills above the bed of the creek and in bars. It has been found impossible to go down to bedrock in the bottom of the gulch by means of shafts, on account of the water which rushes into the works in quantities that would require the heaviest pumping machinery to lift out. Hence the bedrock in Bingham has never yet been reached, below the bed of the creek, although several companies representing considerable money have been organized for the purpose, but had all abandoned the enterprise, when Winnamuck and his partners, on the 20th of September, 1875, took hold of it in earnest.

Near the old Winnamuck smelter they started in a tunnel, running up the canyon under the present bed of the creek. They have labored constantly, some of the six laying off occasionally to work in the mines for the money to keep up the living expenses of the other members of the company. In this way they pushed the tunnel in over 1,400 feet, and have attained a depth of only about 50 feet below the surface. This tunnel has been worked through shafts about 150 feet apart, the waste being hauled up to the surface in a bucket by means of a rope and windlass. The material through which the tunnel has been driven is chiefly loose rock, so loose that it has been found necessary to timber as closely as possible every foot of the way, as the water rushes down from both sides and the roof in torrents. In some of the shafts which have been sunk near the creek it was necessary to timber in the same manner. Indeed, their last shaft they were compelled to dig from the tunnel out to the surface like gophers.

The boys think they are near the bedrock, where, of course, they expect to strike it rich, which expectation we would like to see completely realized, for such energy, industry and patience are virtues that ought to be rewarded to the tune of a million dollars.

Mining Prospects of Eastern Oregon.

The doubts that have so long hung dark and gloomy over the prospects of eastern Oregon are rapidly disappearing, and the sky of prosperity is gradually becoming bright and clear. Our farmers are beginning to realize that they are becoming comfortable and wealthy, and that they have the means within their reach to still further improve their condition morally and socially, as well as in a worldly point. There is now a strong probability that they will find a good and profitable market for their surplus stock, as they have heretofore found for their farm products. This gives them encouragement and the lining of the skies for the future looks bright for them. Stock of all kind is on the upward tendency.

The prospects for our rich and extensive quartz mines are brightening and capitalists are now seeking investment with us. They have had, and now have, experts examining our mines, and from the reports made they have already invested, and we have no doubt but that the reports to be made by the experts, now testing other mines, will be the means of bringing other capitalists among us, who, with those who have already invested, will immediately go to work systematically to working the rich and valuable mines of eastern Oregon, which, in a great measure, have heretofore lain idle for the want of capital to work them. That they will pay a large dividend to those who will properly work them, no one who has a correct knowledge has any doubt. In a great measure we are indebted to the capitalists of Portland, represented by Mr. S. G. Reed, for the bright prospects for the mines of Baker and Grant counties. The working of our mines will make a good home market for our farmers, and this again overspreads their faces with gladsome smiles, in anticipation of their own as well as our whole people's future prosperity. The one great consideration now necessary to make us all happy, is the building of a railroad to connect us with the outside world. Necessity will soon force its construction.—Bedrock Democrat.

MECHANICAL PROGRESS.

The Strength of Riveted Joints.

It has been suspected for a long time by persons who have investigated the strength of riveted joints that the ordinarily received data relating thereto cannot be relied upon implicitly, and that for some reason, not clearly explained or understood, such joints would often break at much less strains than calculation would indicate to be their ultimate strength. The basis, says the *Railroad Gazette*, on which the data employed in such calculations rested was the experiments of Fairbairn, which were in some respects very unsatisfactory. These showed that the strength of a single riveted joint was equal to about 56 of the solid plate, and a double-riveted joint from 70 to 72. Nevertheless joints failed at times when Fairbairn's deductions showed they ought not to fail, and boilers from time immemorial have blown up which apparently had no sufficient logical or mathematical reason to justify their conduct. Such an explosion took place in Blackburn in England in 1874, and excited a keen interest and led to hot disputes among engineers afterwards. In order to set some of these disputed points at rest, Mr. R. B. Longridge, engineer to the Steam Boiler Insurance Company, instituted a series of experiments on the strength of riveted joints, which have been carried out by the celebrated Mr. D. Kirkaldy, whose investigations of the strength of materials have now become so noted, and the results and accuracy of whose investigations will not be questioned.

The details of these experiments have not yet been fully made public, but in his last report to the Steam Boiler Insurance Company, Mr. Longridge gives some of the results of these experiments. These, in a condensed form, apparently, are published in a recent number of the *Engineer* (Feb. 23d, 1877). The conclusions deduced therefrom may be briefly stated to be, that boiler seams are not nearly as strong as Mr. Fairbairn thought and many of us believed they were. In 28 experiments with single-riveted lap joints, the average of the strength of the riveted seams, compared with that of the plate, was only 42.2, the lowest being 38.9, and the highest 50.6. The average of 20 experiments with double-riveted lap joints was 60.2 of the solid plate, the highest being 66.1, and the lowest 53.2. The average of 16 experiments with single-riveted butt joints was 57.5, the highest 66.1, and the lowest 51.5. With double-riveted butt joints the average of 20 experiments was 66, the highest 67.2, and the lowest 61.6.

Experiments were also made with "diagonal joints," that is, joints which instead of being at right angles with the sides of the test piece were placed inclined at an angle of 45°. A single-riveted lap joint of this kind gave a strength of 60.1 of the solid plate, and a double-riveted lap joint of this kind a strength of 69.2. The strongest of all the rivets was one which is described as a "double-riveted butt joint, breaking joint 7 holes or 14 in." What is meant thereby is not apparent, but this joint gave a strength of 74.7 of the solid plate.

The plates varied in thickness from one-fourth to one-half inches, and the rivets from one-half inch to 15-16 inches in diameter.

One noteworthy fact was developed by the experiments. Some of the plates in which the rivet holes were punched were annealed and others unannealed when tested. Whether the annealing was done after or before the rivet holes were punched is not stated, but the great increase in strength is very apparent all through. Thus in the first experiment given the strength of the seam of the plates which were not annealed was 38.9 of the solid plate, whereas those which were annealed gave a percentage of 45.7 of the solid plate. In these two cases the plates were broken, but, what is very singular, in those experiments in which the rivets were sheared, the resistance of the latter seemed to be increased by annealing the plates, which is owing, probably, to the fact that the increased ductility due to the process of annealing permitted the rivets to "come to a bearing" more perfectly than was possible when the plates were less ductile.

None of the plates in which the holes were drilled were annealed, so that it is impossible to say whether their strength would have been increased by the same process. But whether the plates were annealed or not, in no case was the strength of a single-riveted joint as high as that given by Fairbairn, that is, 56% of the solid plate.

LOSS IN METAL WORKING.—Last summer we had some articles on the loss of precious metals by vaporization. The same loss is guarded against by Eastern manufacturing establishments. We read in the *Hartford Times* that on the recent closing up of the Smith & Rogers silver plating concern in New Haven, on its removal to Meriden, the floor of the plating-room was taken up, burned, and the ashes analyzed, with the result of procuring pure silver to the amount of \$981. This result is not so strange as appears at first sight. The precious metals are capable of extreme volatilization under heat, becoming mere vapors, which may be condensed, resulting in the production of the metal in a pure form. But even without heat the particles of gold and silver are made so exceedingly fine in the processes of the manufacture of

gold and silver goods, whether solid or plated, that no devices for saving the material abraded or thrown off in the various manipulations are entirely effectual. Even in the Government assay offices the soot deposited in the chimneys from the melting of the crude metal is valuable; and in most manufactories of articles of gold and silver the proprietors do not allow the workmen to retain their work clothes when worn out but pay for them a price generally sufficient to procure new garments—an old tattered vest belonging to a bench workman sometimes being valued by his employers, even when worn to rags, at \$20.

MORE ABOUT THE KEELEY.—The *Western Manufacturer* says: An exchange informs us that the Keeley motor still lives. The old difficulty of finding something strong enough to hold the wonderful power developed from a few drops of cold water, seems still to be the most serious thing in the way of Mr. Keeley's success. He is now having made, at Chester, Pa., two immense hollow globes of steel, the larger of which weighs 58,000 pounds, is 36 inches in diameter on the outside, and 18 inches on the inside, making the metal inside of the globe nine inches thick, solid steel. This is intended to withstand a pressure of 25,000 pounds to the square inch. The other ball or globe is about half the size of the larger one and will withstand a pressure of half as much. A sphere of this description, manufactured at the same place a few months since, and which was warranted to stand a pressure of 60,000 pounds, burst when 50,000 pounds pressure was put upon it. We shall look with no small degree of interest for the account of the bursting of this immense sphere, for we have no idea that it will stand the test of the wonderful strain to which it is to be subjected. What this sanguine gentleman is going to do with his invention when it is perfected remains to be seen; but it is to be hoped that he will blow nobody up fatally.

ANTIQUITY OF IRON.—The oldest pieces of iron (wrought iron) now known are probably the sickle-blade found by Belzoni under the base of a sphinx in Karnak, near Thebes; the blade found by Colonel Vyse, imbedded in the masonry of the Great Pyramid; the portion of a cross-cut saw exhumed at Nimrod by Mr. Layard—all of which are now in the British museum. A wrought bar of Damascus steel was presented by King Porus to Alexander the Great; and the razor-steel of China for many centuries has surpassed all European steel in temper and durability of edge. The Hindoos appear to have made wrought iron directly from the ore, without passing it through the furnace, from time immemorial, and elaborately wrought masses of iron are still found in India which date from the early centuries of the Christian era.

PRESERVATION OF BELTING.—In order that belting of cotton or linen should have both strength and flexibility, together with adhesive power, they should be thoroughly soaked in linseed oil varnish. If the belting be new, the varnish may be supplied with a brush, until no more will be taken up, whereupon it may immediately be used without any preparatory drying. After having been in use for some weeks, a second application of the varnish should be put on. Cotton or linen belting thus prepared will neither contract nor stretch, and will always be pliable and unaffected by change of temperature. The adhesion of the belt to the pulley is likewise increased by the varnish, while steam and acid fumes have no effect upon the belting at all.—*Maschinen-Constructeur*.

STEAM FOR LUMBERING.—The superiority of steam for general transportation purposes is continually asserting itself. An extensive lumbering firm, owning a tract of land in Michigan some seven miles from their mill, on the Muskegon river, have recently built a railway for the purpose of hauling logs, and find great economy over the use of teams. The iron used is a T rail 25 pounds to the yard, and the engine and cars are light, the latter weighing 1,700 pounds. About 215,000 feet of logs can be hauled in 12 hours, with four train men—about ten times as much as the same number of men and teams could carry.

A NEW APPLICATION OF PHOTOGRAPHY.—An English exchange states that the Landore Steel Company use photography to illustrate the character of the metal manufactured by them. A plate of wrought iron is placed on a hollow anvil and a small gun-cotton cartridge is exploded on its upper surface, the result being an indentation and fissures all over the surface. A plate of steel is treated in a similar manner, and when photographs are taken of the two plates the quality of the two metals can be estimated by purchasers in all parts of the world as easily as if they had witnessed the experiments.

WARMING RAILWAY CARRIAGES FROM THE LOCOMOTIVE.—We read that all classes of carriages on the Alsace-Lorraine lines are now warmed, the supply of heat being from the boiler of the locomotive. Metallic standpipes are placed in each carriage beneath the seats, connecting with a main running the length of the carriage. Each of these is connected with the next by india-rubber tubing, the whole forming a continuous supply, which the passenger can regulate for themselves, by moving a lever placed on a sector bearing the words *cold, warm, hot*.

SCIENTIFIC PROGRESS.

The Popular Estimate of Chemical Science.

If we turn to chemistry, we shall see that while its importance is almost universally recognized, while the number of those who devote themselves to its study is increasing every year, while immense sums of money are yearly spent for the building and support of palatial laboratories, while the press, recognizing the popular appreciation of the science, furnishes, in its own peculiar way, brief records of its advance—still we can point to very little connected with chemistry which, for its elevating influence upon mankind, can be compared with the great physical truths above referred to. That which is caught at and served up for the public is taken from the lower portions of the science, while the higher portions pass on, scarcely if ever coming in contact with the populace. The public knows when a new dye is discovered, it knows when the poison has been found in some strange stomach, it knows when a new milk for babes has been concocted, it knows when precious metals have been detected in the depths of the earth, it knows all these things because it is promptly informed in regard to them, and it is right and good that the information should be given and that these things should be known. It is plain, however, that a thousand dyes might be discovered, that a thousand murderers might be brought to justice through the aid of the chemist, that varieties innumerable of milk for babes might be concocted, or that mines upon mines of gold might be unearthed without the slightest ennobling or elevating influence being exerted upon the mass of mankind. All these things would be valuable, undoubtedly, but their value would be of a very material kind. It is certain that this material value is that which is most easily recognized, which appeals most directly to the public, and hence plainly, in the public mind, the importance of chemistry is measured by the standards of this value. The reputations of chemists, too, depend upon the greater or less extent to which they devote themselves to practical questions. He who is frequently on the stand to testify in regard to cases of poisoning, he who succeeds in presenting to the world some new compound which can be used practically, he who detects impurities in our food or tells us of poisons where their presence must be of importance to us—this man is, to the public, the chemist. Ask 99 men out of 100 what a chemist is, and they will give a definition of one who practices the art of chemistry, rather than one who is devoted to the science of chemistry.—*Prof. Remsen, in Popular Science Monthly*.

Country Laboratory Apparatus.

Some of the grandest discoveries in chemistry and other sciences were made with the rudest home-made apparatus. Although the sciences have now reached such a state of elaboration that few facts perhaps lie near the surface, still there may be much advantage in setting at work a large class of earnest students who are unable to possess themselves of all the contrivances of a well-appointed laboratory. As a hint in this direction we take the following from the *Chemical News*, written by E. T. Hardman, a practical chemist:

The following short description of an extremely effective, cheap and cleanly substitute for crucible jackets, etc., may be useful, especially to those who, like myself, have occasion to shift their quarters often, and are obliged to work with a necessarily limited laboratory accommodation.

The ordinary crucible jacket being made of sheet iron has in reality but one use—to protect the flame from currents of air. The small concentration of heat which it affords may be regarded as nearly nil, since from the nature of the material and its thinness, radiation takes place very freely.

Another drawback it has is that it soon becomes rusty or coated with scale. It is not only dirty to handle, therefore, but also presents the inconvenience of dropping some of its scale into the crucible if not carefully manipulated. Then it is an awkward thing to pack, taking up a good deal of space, rusting everything it comes in contact with, and behaving generally in a disagreeable manner; while, as it is not to be obtained in country towns, it may not be left behind.

Now an ordinary earthenware flower-pot answers the purpose in every respect. It is the proper shape, and being of a non-conducting material, it in a great measure prevents loss of heat from the burner. It is extremely cleanly to use, and last, but not least, it can be procured in every town or village at the small cost of one halfpenny or so; and there is no necessity to cumber oneself with it when moving.

The bottom of the flower-pot has a circular hole. This serves for the introduction of the Bunsen burner. As the supply of air would be insufficient otherwise it will be necessary to enlarge the opening. This can be easily done with a knife and I find it best to cut the aperture nearly in the form of a cross, and not too large. One or two trials will give the happy medium. A current of air is then obtained which not only steadies the flame, but acts in some degree as a blast. The flower-pot may be

supported in the ring of a retort stand in the usual way. The chimney is a second flower-pot inverted. To support it the handiest way will be to make three S hooks of stout wire, and having passed the narrow end of the pot upward through the ring, fix the rim within the hooks caught on the ring. It will be found convenient to devote a small retort stand permanently to the purpose.

This will be very handy, as the upper part can be raised to any desired height, regulating the heat and draft; or can be shifted from side to side, whenever it is desirable to inspect the progress of the operation going on.

The apparatus acts admirably as a small gas furnace for crucible operations, such as the fusion of silicates with carbonate of soda—as in the analysis of rocks; while for simple ignition of precipitates it renders the flame of a common glass spirit lamp most effective. The size of the flower-pot required will, of course, depend on that of the crucible and of the burner used. I find the smallest size, three and one-half inches high and about eight inches in diameter at top (internal) most generally useful.

The support for the crucible may be either a triangle of wire covered with pipe shank, the end of the wire being bent upwards and formed into hooks so as to hang on the edge of the flower-pot, or three pipe-covered wires suspended in the position of the ribs of a crucible jacket. The former is necessary for small crucibles.

The flower-pot also makes an excellent lamp-screen, for steadying and concentrating the flame under evaporating basins, etc.; of course a sufficient interval must be kept between the pot and the basin else the light will be extinguished.

A small flower-pot with wire gauze tied over the top is a very effective low temperature lamp when the gas is lighted below the gauze. If the gas is lighted above the gauze we have a capital argand lamp, giving a large, clear blue flame. In the latter case a common burner can be used, a consideration when Bunsen's are all temporarily occupied or not available. After a time the pots become cracked from the heat, but as they are easily replaced this does not matter, and even when cracked they will often hold out for a considerable time. Fireclay flower-pots made rather thick would, however, afford a really good and cheap portable furnace.

It has just occurred to me that by placing the flower-pot inside another just large enough to encase it, loss of heat by radiation would be effectually checked.

Solid Water.

Prof. Guthrie, F.R.S., gave a lecture recently at the Royal Institution on "Solid Water." Iron says: He began with the remark that those things which are in their nature most abundant, are, in fact, the most exceptional. After a few other illustrations, he pointed out that water, which is so very common, is unusual, and shows egregiously in its properties. Cast radiant heat on it, it arrests that heat; apply heat and it not only conducts it, but is pre-eminent among compound elements as a conductor. Drops of water are the largest of drops of any fluids, and hold together longest. It reflects light least. Water may be solid from the abstraction of heat, and in association with other bodies it may become solid. In the latter case it is only conventionally called solid, and it might be better to call it fixed. It was especially the "fixing" of water in compounds of water and salts that formed the subject of the lecture. About two years ago Prof. Guthrie proposed the term cryohydrates for the hydrates of those crystalline bodies which can exist solid only at a temperature below the freezing point of water. The study of the cryohydrates opens up a wide field of research of which we are but yet on the threshold. A number of experiments were shown and tables of results so far obtained in working with different compounds were exhibited. The actual production of the cryohydrates of bichromate of potash and sulphate of copper was shown on a small scale between sheets of glass in front of a lantern, the gradual growth being watched on the screen on which the images were projected. We can hardly yet tell to what practical uses these studies may lead, but this is already seen, that while the cryohydrate of common salts used as a freezing mixture maintains a temperature of 22° C., there are other cryohydrates that maintain a lower temperature. Speaking of the palaeocrystic sea, Prof. Guthrie said he ventured to predict the proportions of the salts there will be found different from what they are in other oceans. One fact not accounted for before that these studies have explained is that at 37° C. a mixture of four molecules of water and one of alcohol become solid, but that a mixture either stronger or weaker will not solidify. This explains why the rum of some whaling ships will freeze, and of others it will not. It depends on its strength. In conclusion, Prof. Guthrie spoke of the importance of a careful study of the effects caused by slight differences even in common objects.

A SINKING ISLAND.—The island of Heligoland, situated in the German ocean, and belonging to Great Britain, is reported to be gradually disappearing. It is now less than a mile in superficial extent; but in 1649 it was four miles in circumference; in 1300 it measured 45 miles, and in 800, 120 miles. The encroachment of the sea is effected almost entirely from the north-east, owing to the currents and the direction of the prevailing winds.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 22.	Week Ending Mar. 29.	Week Ending Apr. 5.	Week Ending Apr. 12.
Alpha.	172 1/2	151 1/4	151 1/4	121 1/2
Alta.	2 1/2	1 1/2	1 1/2	1 1/2
Andes.	1.20	90c	80c	75c
Baltimore Con.	14 9/16	1.10	80c	45c
Belcher.	72 1/2	54 1/2	54 1/2	61 1/2
Belmont.	31 1/2	1 1/2	2 1/2	20 1/2
Best & Belcher.	31 1/2	2 1/2	2 1/2	20 1/2
Bullion.	163 1/2	131 1/2	131 1/2	104 1/2
Caledonia.	8 1/2	7 1/2	6 1/2	5 1/2
California.	454 1/2	424 1/2	424 1/2	44 1/2
Challenge.	2 1/2	1 1/2	1 1/2	1 1/2
Chollar.	60 1/2	56 1/2	56 1/2	45 1/2
Confidence.	72 1/2	64 1/2	7 1/2	1 1/2
Con Imperial.	1.60	1.05	1.40	1.25
Con Virginia.	434 1/2	424 1/2	384 1/2	44 1/2
Crown Point.	8 1/2	8 1/2	8 1/2	6 1/2
Coso Con.	15c	10c	10c	10c
Dayton.	55c	45c	50c	25c
Eureka Con.	172 1/2	164 1/2	164 1/2	17 1/2
Exchequer.	61 1/2	44 1/2	51 1/2	41 1/2
Genet & Bertrand.	30c	25c	30c	25c
Gen Thomas.	30c	25c	30c	25c
Grand Prize.	44 1/2	44 1/2	44 1/2	44 1/2
Gla.	60c	50c	50c	45c
Golden Chariot.	31 1/2	2 1/2	2 1/2	2 1/2
Gould & Curry.	124 1/2	103 1/2	103 1/2	101 1/2
Hale & Norcross.	54 1/2	4 1/2	4 1/2	4 1/2
Hussey.	4 1/2	4 1/2	4 1/2	4 1/2
Julia.	4 1/2	4 1/2	4 1/2	4 1/2
Justice.	124 1/2	103 1/2	103 1/2	10 1/2
K. K. Con.	64 1/2	54 1/2	64 1/2	54 1/2
Knickerbocker.	25c	20c	25c	20c
Kosuth.	50c	40c	50c	25c
Lady Bryan.	20c	50c	50c	25c
Lady Wash.	2 1/2	2 1/2	2 1/2	2 1/2
Leopard.	4 1/2	4 1/2	4 1/2	4 1/2
Leviathan.	50c	40c	50c	45c
Leeds.	3 1/2	3 1/2	3 1/2	2 1/2
Modoc.	24 1/2	15 1/2	3 1/2	3 1/2
Manhattan.	64 1/2	74 1/2	74 1/2	54 1/2
Meadow Valley.	40c	10c	10c	45c
Mexican.	174 1/2	134 1/2	134 1/2	124 1/2
North Con Virginia.	60c	50c	50c	30c
New York.	20c	20c	20c	20c
Niagara.	25c	25c	25c	21c
Northern Belle.	6 1/2	4 1/2	4 1/2	4 1/2
New Coso.	1 1/2	1 1/2	1 1/2	1 1/2
Occidental.	24 1/2	20c	19c	17 1/2
Ophir.	72 1/2	66 1/2	66 1/2	46 1/2
Overman.	72 1/2	66 1/2	66 1/2	46 1/2
Pacific.	94 1/2	84 1/2	84 1/2	74 1/2
Phil Sheridan.	50c	45c	60c	45c
Pioneer.	10c	50c	50c	20c
Prospect.	25c	20c	20c	15c
Raymond & Ely.	5 1/2	4 1/2	4 1/2	4 1/2
Rock Island.	45c	40c	40c	45c
Sage.	74 1/2	64 1/2	64 1/2	49 1/2
Sierra Nevada.	64 1/2	54 1/2	64 1/2	44 1/2
Silver Hill.	6 1/2	4 1/2	4 1/2	3 1/2
South Chariot.	80c	70c	80c	50c
Succor.	1.30	90c	55c	50c
Trojan.	84 1/2	64 1/2	64 1/2	13 1/2
Union Con.	184 1/2	154 1/2	154 1/2	104 1/2
Utah.	184 1/2	154 1/2	154 1/2	104 1/2
Yellow Jacket.	60c	55c	50c	40c

Sales at S. F. Stock Exchange.

FRIDAY, A. M., APR. 6.	50 Lady Wash.	2
320 Alpha.	104 1/2	2
605 Best & Belcher.	234 1/2	2
150 Belcher.	54 1/2	2
270 Bullion.	131 1/2	2
270 Baltimore Con.	40 1/2	2
1005 Con Imperial.	1.01	2
20 Crown Point.	8 1/2	2
815 California.	454 1/2	2
1705 Con Virginia.	434 1/2	2
450 Chollar.	45 1/2	2
1280 Caledonia.	44 1/2	2
1450 Dayton.	30 1/2	2
830 Exchequer.	3.70	2
580 Gould & Curry.	124 1/2	2
400 Hale & Norcross.	54 1/2	2
310 Justice.	124 1/2	2
2255 Julia.	4 1/2	2
830 Mexican.	21 1/2	2
1555 Ophir.	164 1/2	2
630 Overman.	72 1/2	2
665 Savage.	44 1/2	2
820 Sierra Nevada.	64 1/2	2
350 Silver Hill.	6 1/2	2
1005 Succor.	234 1/2	2
350 Utah.	114 1/2	2
785 Union Con.	184 1/2	2
2005 Yellow Jacket.	60 1/2	2
AFTERNOON SESSION.	50 Lady Wash.	2
150 Alpha.	112 1/2	2
200 Alta.	12 1/2	2
200 American Flat.	30c	2
225 Andes.	80c	2
368 Best & Belcher.	234 1/2	2
1375 Bullion.	131 1/2	2
1075 Caledonia.	44 1/2	2
210 Chollar.	45 1/2	2
685 Con Virginia.	434 1/2	2
585 California.	454 1/2	2
330 Crown Point.	8 1/2	2
860 Eureka Con.	184 1/2	2
1355 Exchequer.	3.70	2
100 Gen Thomas.	30c	2
1140 Grand Prize.	44 1/2	2
600 Golden Chariot.	31 1/2	2
635 Gould & Curry.	124 1/2	2
415 Hale & Norcross.	54 1/2	2
500 Jackson.	72 1/2	2
730 Julia.	4 1/2	2
275 Justice.	124 1/2	2
900 Kosuth.	50c	2
635 Lady Wash.	2 1/2	2
970 Leopard.	24 1/2	2
330 Leeds.	12 1/2	2
1380 Modoc.	2.80	2
4200 Con Imperial.	1.01	2
175 Northern Belle.	6 1/2	2
50 New Coso.	1 1/2	2
25 North Con Virginia.	60c	2
720 Overman.	72 1/2	2
200 Prospect.	25c	2
200 Rock Island.	45c	2
100 Rye Patch.	5 1/2	2
500 Savage.	44 1/2	2
200 Trojan.	84 1/2	2
210 Union Con.	184 1/2	2
20 Utah.	184 1/2	2
175 Woodville.	60c	2
580 Yellow Jacket.	60 1/2	2
SATURDAY, A. M., APR. 7.	50 Lady Wash.	2
35 Alpha.	112 1/2	2
120 Andes.	80c	2
50 Alta.	12 1/2	2
520 Best & Belcher.	234 1/2	2
455 Belcher.	54 1/2	2
120 Bullion.	131 1/2	2
725 Baltimore Con.	40 1/2	2
1025 California.	454 1/2	2
340 Crown Point.	8 1/2	2
320 Chollar.	45 1/2	2
4200 Con Imperial.	1.01	2
815 Caledonia.	44 1/2	2
10 Challenge.	14 1/2	2
300 Con Virginia.	434 1/2	2
580 Exchequer.	3.70	2
200 Eureka Con.	184 1/2	2
100 Empire Id.	75c	2
500 Gould & Curry.	124 1/2	2
990 Hale & Norcross.	54 1/2	2
990 Justice.	124 1/2	2

1250 Bullion.	80 1/2
1455 Caledonia.	3.95
4755 Con Virginia.	36 1/2
2670 Con Imperial.	1.10
1280 California.	39 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
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1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
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1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
1390 Exchequer.	3.90
1175 Gould & Curry.	124 1/2
1220 Hale & Norcross.	54 1/2
625 Chollar.	35 1/2
1050 Crown Point.	51 1/2
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MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

THE ADVANCE.—*Alpine Chronicle*, April 7: The west drift is being pushed vigorously, with favorable indications. The working force has this week been increased, both in the mine and on the surface. Grading is going on for an extension of the mine buildings. This mine has been worked economically and energetically, and success is deserved, and we trust the day is not far distant when their pay ore will be reached.

NEW CABLE.—The new cable for the Exchequer holding works will arrive to-morrow and be placed in working order at once. The new cable will enable the company to sink their shaft 1,000 feet. It cost \$2,400 in San Francisco. The steel rope now in use at the Exchequer mine will be transferred to the I. X. L. holding works.

I. X. L.—The contractors for sinking the shaft 200 feet deeper will commence work about Tuesday next.

AMADOR.

MECHANIC MINER.—*Amador Ledger*, April 7: The rock now being taken out is of higher grade, and there is plenty of it. The attachment suits have been dissolved. **BOYANZA.**—The new holding works are in running order. The mill will be started up on rock from the sinking of the shaft.

CROWN POINT.—At a large outlay they have fitted up excellent holding machinery, and a No. 1 10-stamp mill. The body of ore operated upon has been of sufficient size to keep the mill going constantly, but the unwelcome truth has forced itself upon them, that the quartz was below the paying standard. Lately they have taken to sinking, and the cheering intelligence reaches us that last week a marked improvement in the quality of the ore was observable.

COMET.—This property, lately bonded by H. Rees and others, has again changed hands. John A. Hall, the well known mining man, has taken hold of the claim and intends to go right after the ore. It is not known whether a mine exists in the locality, but the spot is considered a likely one for quartz.

MINER BONDED.—H. I. Bostwick informs us that he has bonded a mine, situated a mile from Jackson on the road to Mokelumne Hill, to Horace Adams for the sum of \$3,000.

CENTENNIAL.—Reports from this mine, located on Dry creek, continue favorable. The shaft is down 60 feet, the ore body holding out both in size and richness. Appearances favor the conclusion that the Centennial is destined to become one of the solid mines of the county. The Italian owners are happy over the outlook. The opening up of this mine is invested with additional importance from the fact that it is situated in a stretch of country along the mother lode scarcely touched by the prospector, but supposed to be as rich in precious metal as any portion of the belt.

BECK.—The new company for operating the Beck mine consists of Captain Beck, W. A. Nevilles, J. H. Zuercher and John Clements; W. Clements, Secretary and Treasurer. The volunteer mill is being taken down, the contractors agreeing to have it erected near the mine for the reception of ore inside of five weeks. The ground embraced in the company's claim covers 5.22 acres, and the main lode—an extensive and fertile territory—efficient to keep down mammoth mines in full blast for a century. All the owners are practical men and mean business.

DAY WEATHER.—*Amador Dispatch*, April 7: It is now thought that several of the quartz mills in this county, which are being run by water power, will have to be closed down by the first of June unless the owners adopt the use of steam. This will doubtless have a depressing effect on the northern part of the county. It is not likely that those mills which get their water from the Amador canal will experience much inconvenience in getting water to keep them going during the entire year.

BUTTE.

BIO BAR.—*Oroville Mercury*, April 6: Some two weeks ago the Big Bar company held its annual meeting for the election of officers. From the report of the Superintendent it was deemed best to get some 500 feet of new pipe, a new chief of the latest size and open up in a new place, as there was an abundance of water for the present. We learn that everything has been put in place and the water turned on. The company now have two chiefs at work, with plenty of water to run them until the first of August. It will be recollected that this claim was purchased from the Cramp boys the first of January for \$10,000, and has been fitted up since at a cost of some \$5,000. It is expected that the company will clean up a few of the upper boxes in a few days, and then will be known something of the value of the ground. Many good miners claim that it is a rich district and one that will last for years to come.

MINING MACHINERY.—We visited the "mining machine" last week. It was working well at the time going into the river, filling up with water, earth and rock, and raising them above the surface and discharging them into the sluice to be washed away, leaving the gold behind. Does it work? We have been asked a number of times. Yes, it does work, and works well, too, and in places where nothing else in the world will work. It pays, too. From the gravel taken out of the river during these experiments it has taken up gold enough to pay very well. In five hours' run the other day it took out \$30. While watching it work last Tuesday we took out our watch and timed it. It makes a revolution in a little over two minutes. That is, from the time it discharges one load of earth till it discharges the next, was a little over two minutes. Everything about it works like a clock. The machinery is made of these boats will be at work on the river, and then all can see how well they do their work. At present everything looks well.

CAVALERAS.

NUCKET.—*Calaveras Chronicle*, April 7: A nugget of pure gold weighing over seven ounces was found in a tunnel claim a few miles from town recently. The claim in which the *chipsa* was found was worked and abandoned years ago because it wouldn't pay. The relocators are making the ground pay handsomely, finding a good deal of coarse gold. And there are acres upon acres of ground abandoned in former years, in this vicinity, that would pay well for working. The ledge is little more industry connected with the pick and shovel fraternity.

BLAST.—Friday of last week a blast was exploded in Veith's hydraulic, one of the objects being to test a new kind of powder, designed expressly for bank blasting, manufactured by the Giant Powder Company. Four hundred and fifty pounds of the explosive were burned, as the society papers say, with happy effect.

ITEMS FROM COPPERHILLS.—Two companies of San Francisco capitalists are endeavoring to purchase the Honey Brothers gravel claims on Bowery hill, below Reynolds' Ferry, near the Stanislaus river, but they are not anxious to sell unless they can get their price. It has been pronounced by hydraulic experts the richest claim in the county, if not in the State, as the gold is well distributed through the gravel from top down to bedrock. Their calculation is that it will clean up by hydraulic process \$20,000 per month for five years.

UPPER COUNTRY ITEMS.—The Granite mine at West Point, owned by White & Co., has been bonded to a San Francisco company and preparations are being made for the immediate erection of a mill. Good rock has been struck in the Buckhorn mine, owned by the Enterprise Con. mining company. The ledge is of the best and prospects extremely favorable. The new mill on the Zacator is approaching completion. Excellent rock is being taken from the mine. Champion, still stopping and crushing. At Mosquito, Garland's mill is running on rock from Gass & Co.'s mine. All the mines at Railroad flat and Independence are looking well.

INYO.

MOORE BULLION.—*Calaveras Chronicle*, April 7: The total value of bullion shipped by Moore mining company for March, up to the 30th, was \$73,373.

NEW COSO.—Nos. 1 and 2 of the New Coso furnaces have been running steadily during the week, but with what success we are not informed. No. 3 has not yet been started.

RUMORED STRIKE.—There are rumors of a huge strike having been made over in the Lookout, it being a new discovery. It is said the ore assays up into the "several thousands."

SANTA RITA.—We made another visit to the furnace of the Santa Rita mining and smelting company last Wednesday. There remains very little more to complete the machinery and pipe connections, and in two or three days we shall see the black smoke ascending from the furnace. Mr. Fortune was on the furnace dump receiving and weighing ore, but he was unable to take a full count of the work. We were shown through the assay office, at a convenient distance from the furnace, and some excellent buttons were exhibited, obtained from assays made by Mr. Fortune, going all the way from \$40 to \$190 per ton in silver. The Hidalgo mine produces the ore and it carries 20% to 55% lead, there also being sufficient iron ore combined with the silver and lead ores to make all easy to smelt.

CERRO GORDO.—Cerro Gordo has been for some years and is yet a dull place, not at all comparable to the good old times of yore. Only one furnace is in operation, and as no great number of men are employed to provide ore for it, while nothing at all is going on in the camp outside of the operations of the Union company, it is easy to see that these dull times will be complained of as long as no new developments shall be made or another expedition come into camp. Work in the new shaft is progressing steadily and it is confidently hoped that a good deposit of ore will be found shortly. A drift, for the purpose of cutting the Omega, has been commenced at a depth of 700 feet, and is being pushed rapidly, while at the same time the sinking of the shaft is continued. The calculations, I believe, are that the shaft will cut the Union vein at a depth of about 1,000 feet, while the 700-ft. level will cut the Omega within about 150 feet and the Union within about 350 feet. Christ Crohn is still pushing on his prospecting in the San Lucas canyon. Having expended already so much money on the claim he does not like to abandon it, and the ledge at the same time shows in such a manner that a person would expect to make a good strike every day. At the Belmont, the mines of Dr. Heller and K. C. Johnson are leased to a party of Mexicans, who are taking out considerable high grade ore. The ledge in the shaft of the Oceola shows very well, carrying over a foot of rich ore, with finely developed walls, with every prospect of being permanent. They will sink about 50 or 60 feet deeper and then run levels, when they hope to take out a good deal of ore or endeavor to sell the claims.

NEVADA.

KENTUCKY RIDGE.—*Grass Valley Union*, April 5: Work at the Kentucky Ridge mine is being prosecuted with all due diligence, under the efficient supervision of Mr. Jos. Snyder. Work in the upper tunnel is being prosecuted night and day. This tunnel has been driven westerly 125 feet on the course of the vein and easterly for 60 feet. Free gold in good quantities is shown wherever the ledge is exposed. Panings from any part of the mine and from the croppings of any part of the ledge give large results in free gold. The ledge is all the way from 18 inches to two feet in thickness, well defined and has splendid walls. Numbers of our miners and business men have visited the Kentucky Ridge, and all agree as to the fine appearance of the property. A mill is wanted on the ground, as there is already enough ore on the surface to last a 10-stamp mill for two years. Some of the stock is being sold in order to raise a fund with which to erect a mill. This stock is being generally taken by Great Valley people who have visited the mine. As soon as the mill is erected two Ingersoll drills will be put into the lower tunnel. The compressor for the drills will be run by the same machinery which will drive the mill. Water power will be used, of which there is an abundance for all purposes.

BULLION MINER.—Work on the Bullion mine is about being commenced in earnest, under the direction and superintendence of Mr. Dodsworth. Steam machinery is about being put on the ground, and then regular and systematic work will go forward. The Bullion has heretofore given out fine ore, and the present owners of the property have every confidence that there is plenty more of it remaining in the ledge.

PLACER.

STRUCK IT RICH.—*Placer Herald*, April 7: A. T. Molin, a very estimable gentleman, who has been prospecting for quartz more or less in this part of the country for the past year or two, showed us some specimens about a week ago, which he had taken from a ledge about two miles north of Auburn, and within only a few hundred feet of the old Calf Pasture mine, that were, to say the least, extremely rich, the free gold showing plainly all over them. The ledge is well defined and indications are that this rich lead will prove extensive. Many who saw the rock pronounce it the richest that has been taken out in this part of the country since the memorable strike made by W. G. Green some years ago. We understand that one piece of rock taken out by Mr. Molin this last week is estimated to contain at least \$500 worth of gold.

MINING ITEMS.—*Dutch Flat Forum*, April 5: The Southern Cross and Polar Star claims, belonging to A. Hayward, are running steadily, using about 1,800 inches of water, which is alternated from one to the other in such a manner as to wash to the best possible advantage. A powder drift is being run in the latter, on the bedrock, in which 250 lbs of powder will be exploded in a few days. The Elmore Hill claim, belonging to a San Francisco company, is being worked in a very economical manner, and is sending out a large quantity of ore. The Franklin claim, owned by a San Francisco company, is being opened on the right principle, and is now in condition to work to advantage, but cannot expect large pay until the pit is advanced nearer to the channel. The Baker claim, owned by the Cedar Creek company, is the most important enterprise in this district, for on its results, more than any other property, depends the future prosperity of the county. We understand that the claim is being managed and every effort exerted to make it a success. It is being opened in the most scientific and practical manner. The pit was commenced on the rim and has been extended back into the hill, in the shape of an A, till the point has reached the shaft, down which the gravel drops into the Yankee tunnel, 90 feet below. On the outer side of the opening powder, blasts are being prepared, additional to the one mentioned last week, which will be exploded in a few days, after which the claim will be in condition to wash almost continuously, piping on one side while the work of removing boulders is progressing on the other, with room in the center for the derrick, and ample area of clear bedrock in its rear to pile back all of the large rocks. This claim is using 1,600 inches of water and is running the dredge continuously. The claim will permit. Up to this date, however, it has only been enabled to use water about six hours out of the 24. We are informed that even with the extra expense of opening and consequent disadvantages under which the work has been done, and notwithstanding the fact that the bank washed to this date had been drifted, the claim is showing a good deal of working expenses, which being the case, having now passed the drifted ground, the Cedar Creek company may be assured that it has a bonanza ahead. The Star and Union, belonging to the same company, being one of the Yankee series of claims, is still washing nights and removing boulders during the day time. This has turned out to be quite a profitable claim. The Summer-sett, Pacific and Illinois continue washing. At Gold Run, where Bonanza and Ford continuously continue working. The Gold Run claim is about exhausted on the present level; only a few days' washing remains, when it will be numbered among the things of the past until such time as a deep bedrock tunnel is run, so as to tap the bottom, which will probably not be for years to come. The Cement mill is doing well and is an example of persever-

ance and economy. Our ditches are running full of water and our claims are doing well.

LOWELL HILL.—The Swamp Angel company have completed the furnishing of their mine with four-inch air pipe. The work of breasting out, extending the main tunnel and opening up new drifts is now progressing under favorable circumstances.

REASONER HILL.—Ground sluicing is the only work now progressing in the Rhode Island mine, as there is not sufficient water for hydraulizing. The Wide West company are making good progress in advancing both tunnels. The gravel has been finally lapped in the tunnel No. 1, and is said to be equally as rich as that found in tunnel No. 2, thus showing it to be very extensive as well as rich.

BET MINER.—The Walooopa and Neece & West claims have made one general clean-up during the season and are now washing. The water having given out, the Red Dog has shut down. The Nevada mining company are washing with three streams.

SIERRA.

IOWA.—*Mountain Messenger*, April 7: The Iowa company have struck excellent gravel, and are now following the bedrock to determine the extent of the claim.

The Michigan company, at Gibsonville, have every reason to think they have a very valuable property.

GERMANIA.—The Germania company have their shaft down 60 feet. Work has been discontinued for the present. The best plan for developing their ground is said to be by means of a tunnel, 70 feet in length, aided by a double shaft, with a regular windlass.

An extra dividend of \$1.25 per share was paid Saturday by the Empire mining company.

NOT DISCLOSED.—The report that the Bald Mountain company had discharged about 60 men proves to be untrue. None have been yet and will not be until water fails.

TIMBER CONTRACT.—Jake Winans was awarded the contract for furnishing the Bald Mountain mine with timbers for the coming year. It is about a \$10,000 job.

INDEPENDENCE.—The Independence mine having fallen into the hands of the Sierra Buttes company, preparations are being made to pump up the water and take out quartz. To this end machinery is being made at the foundry. New Labor.—Joseph Middlemiss, with others, has commenced opening the Ante-Up, formerly known as the Sierra ledge, this side of the Mountain house. It is four feet in width and of the finest quartz formation in this section of the country. Machinery can be run by water power. About \$20,000 has been taken out here in years past.

TRINITY.

A GOOD LEDGE.—*Trinity Journal*, April 7: Recent work by the Lyder Bros., at the Bullychoop quartz ledge, would indicate that this is the richest one of the richest ledges in the State. From the last two weeks' crushing, about 10 tons of rock being worked, \$1,340 was cleaned up, which was brought in by B. S. Gupitill, last Wednesday, and sold to M. F. Griffin. This is rich rock, probably selected. We are informed that about three feet of the ledge will pay an average of \$100 per ton, while the whole ledge will yield \$10 to \$20 per ton for crushing.

EXPOSURE QUARTZ LEDGE.—In accordance with advertised notice, a meeting of parties interested in the above ledge was held at Junction City last Saturday afternoon. A company was organized and a conditional agreement entered into to purchase the ledge from Mr. Engel for \$10,000 after prospecting, 12 months time being allowed for the purpose.

TRINITY CENTER.—*Cor. Yreka Union*, April 5: The mining interests here are well cared for, and the prospects for a profitable assay are better than for years past. The hydraulicers are joyous with much water, and the placer miners are working for dear life while the moisture lasts. Bloss & McElroy, who have been working very rich ground for years, with insufficient dump and fall, now begin to see their way clear—that is, they are pushing farther up into the hill near town, and are able to raise the head of their tunnel the more water is level. Another season will enable them to carry tailings clear to the river without obstruction, when the expense of clearing the dump will be obviated; and that has been as great as the cost of cutting down the bank. George Allison has struck it rich where no one thought there was any pay at all.

TUOLUMNE.

NEW DRIFT.—*Tuolumne Independent*, April 7: Geo. F. Sharp, Esq., of San Francisco, has secured a water right and has located 5,000 inches of the Main fork of the Stanislaus river, to be taken from a certain point and conveyed in ditch, flume and pipe to the Philadelphia mining district and Colusa vicinity, to be used for mining, milling, manufacturing and irrigating purposes. From the starting point (the dam erected by the Miners' ditch company) the water is to be taken down the left bank of the stream to a connection with the Miners' ditch, thence on the same grade to the Old Tunnel, at which point a branch ditch will be run to the head of Rose's creek, to a connection with the Philadelphia mining company's ditch. From the tunnel the water will run into the South fork to a point, thence by ditch and flume to Colusa and vicinity, the flume and ditch to be nine feet on the bottom.

Nevada.

CON. VIRGINIA.—*Gold Hill News*, April 11: Daily yield, 350 tons of ore, keeping the mill running at capacity, their full capacities. The ore extracted from the slopes on the 1850-ft level is rich, while that taken from the southwest slopes on the 1550-ft level is of the uniformly high grade. On both levels the slopes are showing well at every point. The main south drift on the 1650-ft level has penetrated a distance of 133 feet from the north line, the entire distance being through rich ore. This drift has run out 85 feet yet to run to reach the corner with the deep winze. The yield of bullion to this date, taken along with the prospects for the remainder of the month, warrant the assertion that a payment of the old dividend of \$2 per share, aggregating \$1,080,000, will be resumed in May next. On the 1200 and 1300-ft levels the connecting drifts and air passages are being enlarged and put in working condition preparatory to extracting the lower grade of ore left in the drift. It is confidently expected that many thousands of tons of this low grade ore which can be worked very advantageously and made to pay well whenever it is desirable to do it.

CALIFORNIA.—Daily yield, 400 tons of ore. The ore slopes are looking well and yielding rich ore in every part. The mills are kept steadily crushing ore, and the future prospects of the mine are far in advance of what they are at the time of the declaration of the first dividend one year ago. There is now more ore in sight than there was at that time, and the developments since made on the lower levels show the width and richness of the ore vein to yet continue downward to undetermined depths. The run of the mills to the present date in this month has had no interruption, and the yield of bullion is fully up to the usual standard. It is confidently expected that a depth sufficient for the opening of the 1700-ft level station will be attained by the first of May next.

LADY WASHINGTON.—The east drift from the bottom of the winze on the 950-ft level is in 46 feet, the face this morning just having cut a heavy clay slip and entered what appears to be not only a fine ledge formation, but which carries with it every character pertaining to the opening of a rich ore vein. This vein has a direct tendency to the northwest and southeast, which would carry it directly in the course of the ledge now being opened upon by the east drifts from the Overman shaft on the 1300 and 1400-ft levels. This new discovery is coming at a most opportune time.

OVERMAN.—The main east drift on the 1400-ft level is steadily advancing, as fast as the flow of water and the blading will permit. On the 1200-ft level a cross-cut has penetrated the ore vein 100 feet south of the shaft, disclosing 23 feet of low grade ore, very regular in its formation and interspersed with spots and streaks of ore that will assay richly in both gold and silver.

JUSTICE.—Daily yield, 400 tons of ore. The ore slopes

at all points on the 400 and 700-ft levels are showing well. The mills are all kept steadily crushing ore from the mine, and the addition of the Eureka mill with a crushing capacity of 200 tons per day has been added to the reducing force during the week. On the 1000-ft level the south drift is opening up splendid ore, and the prospects now are that the 1000-ft level will prove the best of any in the mine.

YELLOW JACKET.—The new shaft is down 622 feet; the flow of water is about the same as heretofore reported, and sinking is making good progress.

BULLION.—The north drift on the 1500-ft level is making steady progress, the face in quartz and ledge matter. The east drift on the 1600-ft level is still slowly advancing, the flow of water being quite strong in the face. This water is still intensely hot, and the drift can only be advanced by the most careful and judicious management.

MEXICAN.—The west cross-cut on the 1700-ft level is still in favorable ledge-matter. The north drift on the 1405 level is steadily advancing to the northeast, following the east wall of the ore-vein. An upraise has just been started on the ore recently opened up on this level.

BELCHER.—Sinking the main incline is making good progress. Sinking the combination drift shaft is making excellent headway. Driving the prospecting cross-drifts on the 1800-ft level of the drain shaft is also making excellent headway.

ALTA.—Sinking the shaft is being pushed forward with all the vigor possible, the bottom being in soft porphyry mixed with streaks of quartz which begins to look as if the ore vein might not be very far away.

ATLANTIC CONSOLIDATED.—The ledge in the face of the tunnel is steadily increasing in size as the drift advances. The ore in the face assays richly in silver.

HOMESTRAD.—Sinking the shaft has been temporarily suspended to make necessary surface improvements.

OPHIR.—The flow of water at the bottom of the main incline is gradually abating, and sinking the shaft has been going steadily forward. Preparations for lowering the pumps to the 1800-ft level station is going steadily forward.

SAVAGE.—The water has several times been rapidly lowered during the week and then again allowed to rise. It now stands in the shaft at just about the same point that it did at this time last week.

SOUTH COMSTOCK.—The sinking of the shaft deeper, for the 500-ft level, is actively going forward at a very good rate of progress, and is to-day 148 feet below the 300-ft station, with the bottom in very promising vein-matter.

SILVER HILL.—The north and south drifts on the 550-ft level are each being steadily driven ahead. The face of the south drift is in very encouraging quartz, with excellent ore prospects.

LEVATHAN.—The main drifts north, at the 600 and 650-ft level, are both being pushed ahead at the usual good rate of progress.

EMST & BELCHER.—Cross-cut No. 1 is in very favorable porphyry, with streaks of quartz. Cross-cut No. 2, near the centre of the claim, is in hard porphyry. Cross-cut No. 3 is in soft, favorable ground.

CROWN POINT.—The east drift on the 2000-ft level is steadily advancing, the face is in much softer ground, and evident indications of soon reaching the main ore vein.

CALEDONIA.—The east cross-cutting on the 1200-ft level is going steadily forward. Sinking the shaft has been somewhat retarded for the past two days by a very strong flow of water.

SOLID SILVER.—Main drift north, and cross-cuts both east and west from it, all showing finely in very promising vein matter, with good streaks of ore of both high and low grade coming in, especially in the east cross-cut.

BALTIMORE & AMERICAN FLAT.—The northeast drift on the 400-ft level is steadily advancing, and the ore vein to drain the water encountered in the bottom of the winze below the 1050-ft level.

SUTRO TUNNEL.—Total length of tunnel to-day, 16,547 feet. The face of the header is in ledge porphyry, with streaks of quartz and clay. This material is easily excavated, but requires careful management and good substantial timbering.

THE EAST DRIFT ON THE 400-FT LEVEL IS IN soft, favorable matter, carrying every evidence of a steady and near approach to the ore vein. The character of the rock penetrated is encouraging.

CHOLLAR-POTOMI.—Daily yield, 110 tons of ore, the assay value of which is \$26.50 per ton. The east prospecting drift on the 1785-ft level is steadily advancing, the face in very favorable ledge formation.

THE PUMPS.—The pumps are working splendidly, and only need to run at the rate of one stroke per minute to keep down what little water is now coming in at the bottom.

JULIA.—The face of the main south drift on the 1800-ft level is still in very fine quartz and low-grade ore. The vein at this point appears to be widening, and the chances for a paying ore development are undoubtedly on the increase.

HALL & NORCORSE.—Much trouble has been experienced during the week with the small pumps below the 1000-ft level.

NORTH CON. VIRGINIA.—Sinking the shaft is making steady progress, the bottom in very favorable blasting ground.

FLORIDA.—The west prospecting drifts on the 815-ft level are steadily advancing in favorable quartz and ledge matter.

UTAH.—The west drift on the 1150-ft level is steadily advancing, the face in very hard blasting ground.

SUCCESS.—The shaft bottom is in good blasting ground, and the flow of water is still easily handled.

NEW YORK.—The enlargement of the pump shaft is going steadily forward.

BLACK ROCK DISTRICT.

ENCOURAGING.—*Eureka Sentinel*, April 4: There is quite an excitement in town over the new discoveries in the Black Rock district, some 40 miles west of Eureka, in the vicinity of Roberts creek, and in the same range of mountains as Cortez district. Some 60 men are on the ground prospecting, taking up ledges and locating water rights, and as many more are preparing to try their fortunes in that region. Quite a large amount of rock has been brought to town, and assays range all the way from \$40 to \$100 per ton. Mr. Brooks, who has largely invested in the new discovery, informs us that the ledge has been traced a distance of 600 feet, and has an average width of five feet at the croppings, with numerous branches and spurs putting off into the outlying formation. In the rock brought to town the characteristics are much the same as the ore from the Hunter district, and antimonial or ruby silver can be plainly seen with the naked eye. There is plenty of wood and water in the immediate vicinity. It is the intention of some of those interested to sink a shaft on the ledge for the purpose of demonstrating the value of the new mine.

ELY DISTRICT.

RAYMOND & ELY.—*Pioche Record*, March 31: Nothing new to report in regard to the working of the mine. One piece of spur-wheel is still on the road, and will probably arrive during next week. The spur-wheel will be put in running order during the coming month. The Raymond & Ely 30-stamp mill started to work on Monday last, 10 stamps being kept to work crushing ore and the principal portion of the pans and settlers being devoted to the grinding of the ore. Ten cars loaded with ore were dispatched to the 30-stamp mill on Thursday last for reduction.

ALPS COMPANY.—The Alps mill having closed for repairs, the Condor mill is now running night and day on custom ore. The Alps mine is looking well, having a good prospect and some ore being extracted.

ROCK CREEK DISTRICT.

THE FALCON.—*Tuscarora Times*, April 3: There are a number of very promising claims in the Rock Creek district, distant about 15 miles from this place. The Falcon is the only one on which much work has been done, and in the opinion of experts who have examined it, it bids fair to become a valuable property. The ore of the district is immensely rich in rubies and antimony. A great vein will be built from Tuscarora this season and work will be prosecuted on a number of locations, includ-

THE ENGINEER.

Tests of the Niagara Bridge.

It has been noted in the telegrams to the daily papers that the suspension bridge across the Niagara river had been closed for the purpose of testing the condition of the supporting cables, etc. These tests were made most thorough and resulted in the complete assurance of the safety of the structure after 22 years of use. This is a great point in the history of suspension bridges, and some notes of the examination will be of interest to all engineers. We find the following in the *Buffalo Commercial*:

Out of the 14,560 wires constituting the four mammoth cables supporting the structure, less than a dozen were found seriously corroded, and these were in the first anchorage examined. In short, the removal of the masonry revealed the fact that the bridge is perfectly safe; the number of wires damaged (which will be immediately spliced and replaced) are so few compared with the whole as to be hardly worthy of mention.

After removing the preparation of Spanish brown paint, oil and cement, with which the wires had been covered for preservation, they were found to be in perfect condition, the iron in an excellent state of preservation and the grain of the metal distinctly marked and clearly traceable. To be sure, spots of rust were here and there to be seen on the surface; but, with the exception of the dozen wires already mentioned, no material damage had been done. That the metal had undergone no apparent change since it was placed in position could be readily discovered by any casual observer. This, however, was not satisfactory to Col. Paine, and he has made a series of experiments which will be likely to attract much attention in the scientific world. They show conclusively that the long use of the bridge, the jarring and straining to which the wires have been almost continually subjected for nearly a quarter of a century, have not in the least impaired the quality or tenacity of the iron.

In constructing the suspension bridge Mr. Roebling provided for the expansion and contraction of the wire by placing the bed-plates which receive the cables on top of the towers on rollers, thus permitting an easy backward and forward movement. In the first experiment, that part of the cable which was feared might be damaged was carefully measured by an instrument used for such purposes, and which is capable of marking one ten-thousandth part of an inch. A heavy freight train was then run on the bridge and the stretch of the cable noted. It is not necessary to go into details here, or give figures. It is sufficient for the purpose of this article to say that the elongation of the wire was very nearly what the formula used by engineers for ascertaining such results showed the stretch of a perfect cable constructed like this one should have been under a similar strain. This furnished conclusive evidence that the elasticity of the cable as a whole had not been in the least impaired by 22 years' service or by corroding. In the second experiment a single wire from one of the main cables was used. For this test the binding holding together the 520 wires was removed, leaving each perfect freedom of action. Three wires were then selected, a fine knife mark was drawn across them, and the middle wire cut at one of the marks. The instrument above referred to was then applied, and indicated that the severed wire had contracted within a fraction of what it should when relieved from its portion of the weight of the bridge. Here again it was demonstrated that the metal had lost none of its elastic quality. For the third experiment one of the wires was detached from the cable and subjected to a dead weight until it broke. If the nature of the metal had been altered, or the adhesiveness destroyed to any extent, the wire would have broken off like a piece of cast iron. Instead of doing so, however, it stretched out under the pressure until at the point of separation it was not one-half its original size. It would be hard to conceive of anything that would show more plainly than this that the iron had not been injured. One of the guys extending from a cable to the body of the bridge was next taken and subjected to a dead weight. The construction estimate places the maximum burden which it would ever be required to bear at 15 tons. It parted under a pressure of 33 tons.

It was also noticed that when a wire was removed from the cable it at once assumed a curved shape. If the circle was completed, it would be a little over five feet in diameter. By communicating with the man who received and prepared the wire for its place (he is now at work on the New York and Brooklyn suspension bridge), Col. Paine learned that this wire had been coiled on a drum two feet in diameter, and that it had been subjected to a straightening process which took about half the curve out of it. Here was more striking evidence that the spring of the wire had not been overcome. Other facts, all tending to show that the bridge is not impaired, could be cited, but these are sufficient.

A NUMBER of heavy Montreal capitalists have applied to Parliament for an act of incorporation preparatory to the organization of a company for the purpose of laying a cable between Canada and Ireland.

Strengthening Masonry With Iron Bars.

This subject was carefully studied by the builders of the East River bridge, and the following gives the results of their investigations. To provide against possible changes of form or accident during construction of the arches, the following precautions were taken:

At the top of the third vousoirs four heavy irons were anchored into the masonry on each side of each arch, to which three-inch iron rods spanning the arches were attached. Each rod was provided with a turn-buckle for tightening. Aside from serving to stiffen the arches, these rods served a very convenient purpose, as supports for scaffolds while removing the centers and pointing the joints.

Permanent strengthening bars were inserted in both the first and second courses over the arches, there being in all six bars, five by one and a quarter inches, over each arch, anchored well into the shafts on either side.

Experience has shown the necessity of another precaution to obviate the evil effects of the unequal distribution of pressure over the base of the masonry. By simple inspection it will be seen that the pressure per square foot at the base of the connecting walls is less than half of that at the base of the shafts. Hence there would be a tendency towards less compression and settlement under the connecting walls and a consequent bulging upward at the roadway, causing vertical cracks in the connecting walls. This actually occurred to a limited extent in the Cincinnati bridge. To obviate this tendency, bars were inserted in top of the fourth, fifth and sixth courses below the roadway, in all 16 bars, five by one and a quarter inches, long enough to anchor into the shafts. In addition, the stones of the connecting walls for several courses were clamped together by one and a half inch round iron clamps.

Three sets of two by ten-inch steel bars were inserted at each side of the pier, at the roadway, to serve as attachments for the under floor storm cables.

A set of flat iron bars were inserted at 20 feet below the roadway, as attaching points for holding down stays.

Twenty bars, five by one and a half inches, reaching entirely across the tower, were inserted in the top of the second course below the saddle-plates; and in the course below this, 16 other bars, five by one and a quarter inches. The ends of these bars serve as attaching points for a portion of the long stays to the river and land spans of the roadway.

Small irons were inserted at frequent intervals to serve as attaching points for scaffolding, stairway, etc.

On each pier, on specially prepared beds, four saddle-plates, each eight by 16 feet, and weighing 11 tons each.

All irons were thoroughly galvanized before insertion. The saddles and plates were thoroughly coated with boiled linseed oil.

Steel for Bridge Building.

The use of steel in bridge building in England, says the *Railway World*, has been delayed by the fact that the Board of Trade has never investigated the subject of its adaptation; and its regulations directly opposed the innovation. Sir John Hawkshaw had several times desired to use it in place of iron, but did not do so because he would have to stand the responsibility of possible condemnation. At the suggestion of Mr. W. H. Barlow, a committee of the British Association was appointed in 1873 to correspond with the Board of Trade on the subject. The result was the appointment of a committee by the latter body for the purpose of ascertaining the proper coefficient of steel. The committee consists of Colonel Yolland, representing the board, and Sir John Hawkshaw, the eminent civil engineer, and Mr. W. H. Barlow, on the part of the scientific public. These gentlemen have since been engaged in this difficult work, and have now completed their report. They considered only the kinds of steel subjected to actual fusion, and have investigated the subject thoroughly. If their report is adopted by the Board of Trade, the result will be that steel will hereafter largely supersede iron in bridges, as it has in rails. The advantage of steel is its comparative economy considering the quantity required for a given purpose. The chief gain is in lightness and strength. The Menai straits bridge, for instance, is composed of four iron tubular girders, weighing in the aggregate 6,000 tons. If it were an open girder of steel the weight would be less than half of that, and cost consequently very much less. Spans can safely be built of steel of a length which it would be impossible to build with iron on account of the great weight of the amount required. Holland has built many steel bridges, and the material has been used in this country in the St. Louis and the Brooklyn bridges. With steel produced at so little cost above iron, as is now the case, it would not seem improbable that it may supersede that material in bridge construction as completely as iron has supplanted wood.

SALT BORING IN CANADA.—The new Canadian salt field, the rock-salt borings in Goderich, is on the east shore of Lake Huron. The borings were originally made in 1866 for petroleum; but while they were unsuccessful in that line, springs of salt-water were found at a depth of 990 feet. From this good salt was secured by evaporation. But the idea occurred to the owner, Mr. Henry Y. Atrill, to try mining the

solid salt, as in Poland. And so with a diamond drill, under Prof. Hunt's direction, borings have been made to a depth of 1,517 feet, which, among other things, have revealed a double stratum of solid pure rock-salt, divided by a seven-foot layer of rock. This at a depth of 1,085 feet. The total impurity contained in this salt is less than one-quarter of one per cent., or only one-eighth of that contained in our other American salts. These facts have persuaded Mr. Atrill to begin mining this salt this year; and for this purpose Mr. Heinrich has been engaged. The importance of this enterprise is very great. It will much simplify and cheapen the production of salt in this country, and will supply an article of unique purity. The annual production of salt in the United States by evaporation is now about 18,000,000 bushels.

The North Sea Canal.

The new direct canal between Amsterdam and the German ocean, which brings the commercial capital of Holland within three and a half hours' journey of the sea, and of which we gave a description two months ago, is thus far a decided success. The first two months' working returns give evidence, if the proportions of tonnage are any guide, that it is more important to British than any other foreign interests. The canal was opened on November 1st, and in that month it was passed on their outward voyage by 45 steamers, two full-rigged ships, seven barques, 13 brigs, 13 schooners and three galliots, making 83 vessels, of a total burden of 27,208 tons. On their homeward passage it was used by 39 steamers, two barques, one schooner, four galliots; in all 46 vessels, of a total burden of 15,428 tons. In December 41 steamers, one full-rigged ship, seven barques, five brigs, nine schooners, one smack; in all 64 vessels, of 19,669 tons burden, passed outwards. The inward-bound vessels were, as before, naturally fewer, for the canal and its sea harbor of Ymuiden are better known at Amsterdam than to charterers in distant ports. The inward-bound vessels comprised 37 steamers, one full-rigged ship, five barques, one brig, five schooners, one galliot; together 50 vessels, of 18,864 tons joint burden. Among the vessels which passed in these two months more than half were under English colors. In November there were 23 outward-bound English vessels, of 9,665 tons in all; 31 inward-bound, of 10,130 tons. In December the outward-bound English vessels were 26; and the tonnage 8,155; the inward-bound were 30, and the tonnage 9,890. The greatest draft of water of any of the vessels which passed was 18 feet eight inches. The least draft was five feet eight inches. Dredging continues, and it is expected that in August vessels drawing 24 feet of water will be able by this canal to enter the port of Amsterdam.

Improvements in Smelting.

We often hear among the practical workers, says the *Eureka Sentinel*, a certain amount of contempt expressed for those who bring scientific training into the ordinary vocations of life, and much satisfaction is expressed when those that theorize reduce their knowledge to practice and fail temporarily in their experiments. The contempt for knowledge by those who have learned their pursuits by simply working for their daily bread and acquired their training in contact with their labors is a great drawback to advancement in their chosen professions, and when at any time there comes an improvement or step in advance, these men are left high and dry, for the reason that they are unable to comprehend anything that departs from the regular routine. Take smelting for an example. When it was found that the ores of this district could only be worked by this process, although it was by no means a new one and had been carried on for centuries in other countries, the greatest difficulty was experienced in constructing a furnace that would successfully treat the argentiferous ores. With all the advantage of the experience of other workers in the same field and the supervision of an able and scientific man, the first furnace, although it proved that the ore could be smelted, still was, financially, a dead failure. But the fact that the ores could be treated was encouragement enough for the sanguine owners, and they went on testing and experimenting until financially as well as theoretically the furnace was a success.

Looking back to what was termed a success eight years ago, one wonders at the crude work of the time. On the 30th of June, 1870, the product of seven furnaces, for a six months' run, was 959 tons of bullion, valued at \$314,000. Allowing that these seven furnaces made a steady run of 90 days during that period, and that each ton of bullion represented six tons of ore, we find that the reducing capacity of a successful smelting furnace was, eight years ago, nine tons and a fraction of ore per day, which just about equals the bullion producing capacity of the present time. A practical smelter of the present day smiles at such a showing, but those furnaces were the result of 200 years' progress. Messrs. Keys & Arents, who had charge of the Bateman furnaces, noticed that much delay was caused by the process of tapping for lead, and introduced the automatic tapping apparatus known as the lead well, which is nothing more than a pipe starting from a kettle outside the furnace to the bottom of the crucible. This simple improvement, which was the result of observation and science combined, prevented the forming of horses, lightened the work of

the smelters, permitted the running of the furnace more regularly and consequently increasing its capacity, while the bullion was much purer than that obtained by the old-fashioned process.

Progress.

We have hardly space to trace further improvements, but the reducing capacity of the furnaces was gradually increased until it is nothing uncommon now for one of them to smelt 80 or 90 tons of ore, and produce from 10 to 15 tons of base bullion.

Nor is this the only direction in which improvements have been made. Repeated experiments by Guido Kuestel, in the latter part of 1870, showed that the loss in the slag and iron and volatilization reached an average of 35 per cent. of the silver and 43 per cent. of lead, contained in the ore. This loss was enormous. No wonder the old dumps assayed as high as \$80 in silver and gold. At the present time the slag runs with a mere trace of gold and silver, and the iron rarely exceeds \$20 per ton, and oftener averages from \$12 to \$15, while the loss by volatilization has been reduced to a low figure. An experiment in this connection—an interesting experiment—has come under our observation. One of our progressive superintendents, not satisfied with the returns of a furnace, introduced a system of competition, placing two practical smelters at work alongside of each other. Both being on their mettle, the utmost care and attention was bestowed on all the details of the work, extending to the minutest matters, and, roused out of the usual routine that had prevailed, this rivalry was productive of the most satisfactory results. The furnaces, responding to the care bestowed upon them, run through a greater quantity of ore, and, still better, the percentage of loss decreased in a corresponding ratio, showing at once that all that was needed was an application of brains as well as manual labor. The superintendent, having demonstrated by his shrewdness what could be done where there was an incentive, will in the future tolerate no step backward, and the company profits by his intelligence communicated to the employees.

Charcoal Consumption.

In the item of coal consumption the same percentage of gain has been made; formerly from 45 to 50 bushels to a ton of ore was not an extravagant average, but at the present time under 30 bushels is the amount used. In drawing these few comparisons, our only object is to show that if we rest contented with the present condition of things we will find that other localities will soon be sneering at us as being old-fashioned. Many imagine that we have reached the acme of smelting and that no further progress is necessary. To these loiterers, by the way, we will say that as long as any loss exists there is plenty of room for improvement, and to those who will bring brains as well as their manual labor to bear on the problem the reward is almost certain. There is a field for the employment of it in studying the combinations of the ore and the different fluxes necessary to its successful reduction, also a certain appreciation of any mechanical device that will lessen the labor and facilitate the working, and a chance for inventive talent in concentrating low grade ores and reducing the loss on high grade ores to a minimum. Intelligent labor is as highly appreciated in this locality as any other and will meet with due encouragement.

California Iron.

An effort is being made by a number of enterprising gentlemen to open up the vast iron deposits lying in this county, a few miles above Auburn, on the line of the Central Pacific railroad. Whether it will succeed remains to be seen. If it does there is little doubt but it will lead to a business second in extent and pecuniary benefit to no other on the coast. The subject has long ago been thoroughly analyzed, the costs and profits fairly computed and the question of remuneration comparatively set at rest; but all this, seemingly the only essential matter, is not sufficient to insure a prosecution of the enterprise. Counter agencies known to be very powerful are in such cases always at work, and these are they whose trade would be impaired by the opening here of such works. California at present is a growing and remunerative market for iron, which both foreign and Eastern dealers know, and it is to their interest to do all they can to retain our trade, which they could not do should we go into the manufacture of the material ourselves. Hence, we say it is fair to presume that they have their agent laboring to destroy our enterprise in this direction. England and France long endeavored to destroy the production and manufacturing enterprise in the Eastern States that they might retain the trade of America, and though we have no positive assurance for our surmises in this particular case, we give it as not improbable that the Eastern States are now exercising similar influences on the productive and manufacturing enterprises of this coast. However, we hope our citizens will not allow themselves to be balked. The outsider's plea that he can furnish goods as cheap, is no argument. As a point of economy the question is, where does the money go to? We use iron and pay vast sums of money for it, and not one dollar of that money remains to enrich the country that produced it; whereby if expended for a home manufacture home gets the benefit and the country grows rich. —*Pleaser Herald*.

The Divining Rod.

A writer in the *Engineering and Mining Journal* gives the following reasoning concerning the working of divining rods, which we give for what it is worth: An acquaintance, an expert with the rod, measures the richness and value of the veins "indicated" by the force exerted on the rod as compared with the force exerted at a mine he visited, where the ore was of known quality and quantity.

I can understand, from my own experience, that equal attractive power might be exhibited in many places, under a great diversity of conditions. The different forms of chemical action among the different kinds of rocks and along their lines of contact, are such as to cause galvanic currents of considerable intensity. These will cause the rod to act, whatever may be the cause.

The well known property of pyrites and pyritous rocks to decompose on a large scale in presence of favorable aqueous and atmospheric conditions, give rise to an amount of galvanic action which is highly favorable to the action of the rod. To this I refer by the greater number of "indications" of this instrument.

Along lines where a rust or clay strata occurs on the wall of a vein formation, the rod usually gives signs of attraction, but I have yet to see any proof that this attraction is affected any more by presence of ores than by the presence of any other undecomposed rock. I have personally opened out two places where the rod experts, exploring on their own account probably, had reported "nothing there." In both cases I found perfectly defined veins, but without much decomposed rock. One of these was quite rich in ore, while the other showed no ore for 60 feet of depth.

I have personally investigated the workings at several other places where the rod gave negative results, and found surface and wall decomposition slight but ore, in some cases, quite abundant. I have never known, personally, of any discoveries of good ore deposits which were first pointed out by the rod.

A highly intelligent gentleman, with whom I have held some conversation regarding the rod, stated to me that with it he had discovered "hundreds of rich mineral veins" in a certain portion of the country. However, in answer to an inquiry as to the richness of the ores, etc., he stated that he "had not opened any of them yet."

Now his expression above shows the status of the so-called discoveries of the "divining rod." There remains no doubt in my mind but that galvanic-electric action along lines of contact, or in presence of decomposing mineral matters or rocks, or even in some cases vegetable matter, is capable of exerting an influence through the human body, whereby the currents concentrating in the arms and thence to a connecting link (the rod) show no attraction towards the source of energy. The fact that mineral veins and deposits are, from their very nature and position, frequently localities of the greatest galvanic action, allows a possibility of ore being found by the rod, in which case the one success consigns to oblivion the memory of thousands of failures.

The effect of "unconscious cerebration" of the operator, on the motion of the rod, is surprising, and some of its developments would give an impression of fraud, but I am of the opinion that the action is in most cases involuntary.

For instance, a rod was stated by the operator to only indicate certain metals and ores. Samples of these metals and ores were provided, together with others to which the instrument was not sensitive, and the rod, on trials, bent down to the samples it was said to be sensitive to, and to no others. In so doing, it bent in such a manner as could not possibly have been caused by the operator. He was then blindfolded, and the position of the samples changed without his knowledge. The rod would point to any specimen, but in no case so decidedly as when the operator could see.

Again, one of the samples to which the rod was most sensitive was placed under a glass cover (as a non-conductor), and the rod would give no sign of attraction, the operator not being blindfolded.

He was then blindfolded, and caused to believe that the sample was uncovered (when it really was covered with the glass), and a decided attractive force showed itself.

I attribute these results simply to the will-power of the operator, used, it may be, unconsciously, which, while it cannot entirely prevent the passage of exterior galvanic force through the body, can greatly intensify or diminish it, and also to some extent control its action, even outside of the person.

Hence we see that in any continued investigation of the powers of the "divining rod," the investigator should be, to an eminent degree, unprejudiced. In scientific investigation generally, the importance of this is fully recognized; but here we have a subject leading to a new and most interesting field to which prejudice has long barred investigation, and which is, from its very nature, more open to effects from personal bias than any other subject.

I think much useful and most interesting knowledge regarding phenomena of terrestrial electricity and magnetism, and also perhaps physiology and psychology, might be developed by a careful and unprejudiced study of the operations and powers of this "divining rod," so called, which seems to be simply a galvanometer with the human body as one of its constituent parts.

USEFUL INFORMATION.

Turning Electric Light to Practical Uses.

Rapid progress is making in developing electricity as a means of lighting workshops, streets and dwellings. The experiments, says the *Age of Steel*, have been numerous. The most important are in Paris, St. Petersburg, New York city and Cornell University, showing that the principle may be cheaply applied, and to any extent. The Russian experimenter gives the process he has successfully employed. A small tube of glass not more than six inches in length, filled with a pencil of charcoal, the air exhausted and the tube hermetically sealed. A moderate current of electricity is then passed through the charcoal from an ordinary electric-magnetic machine, causing it to glow with a very brilliant, but at the same time soft light. It is said that charcoal does not apparently suffer consumption, but lasts for an indefinite period, and that the strength of the current required is so small that 200 of these lights, at a considerable distance apart, can be easily maintained by a single machine. The inventor claims that he can light the whole city of St. Petersburg, both street lamps, stores, and private residences, by a single 15-horse power machine, with no greater cost than that of running the machine.

Prof. W. A. Anthony of Cornell University, Ithaca, N. Y., gives the result of his experiments. To the electro-magnetic machine, which was driven by a Brayton petroleum engine of five-horse power, wires were connected for conveying the electricity produced to a room some 300 feet distant, from which daylight could be excluded, for photometric experiments. In this room the wires were connected with a Foucault regulator for the electric light, the light being produced by the passage of the electric curve between two carbon points. The electric light being too brilliant for direct comparison with a tallow candle, a common coal oil lamp was used, having a flat wick one inch wide. The electric light was found to be equal to what would have been produced by 234 such lamps. But 234 such lamps would have consumed nearly 16 pounds of oil per hour, while the engine whose power developed the electric light consumed but six and three-quarter pounds of oil in the same time.

This light is in use in Paris and other parts of France and England, and shows that its cost is a mere trifle, while the capacity is only limited by the size and power of the machinery and appliances. The Northern Railway station at Paris was recently lighted by the agency of electricity, and arrangements are in progress to employ such means of illumination permanently. Last year, it appears, there were but two instances of the electric light being in ordinary use, viz.: at the Ducommun foundry in Muhlhausen, and Gramme's factory in Paris; now four other workshops in the French capital have followed suit, and are nightly lighted by the same brilliant medium. In England the light has been put into the workshops of two important establishments, with the highest degree of success.

Making Soap.

Most people in the country prefer home-made soap. They have the fat necessary in the shape of refuse lard, tallow, bacon, skins, etc., and the potash of soda can now be easily obtained for use with much less labor than was formerly required when the potash had to be extracted from the pile of wood-ashes at home. Where wood is used for fuel this is yet done.

If one has no home-made lye, buy caustic soda—you can get it at any apothecary's if nowhere else—and use it in this way: For hard soap take one pound of caustic soda, three pounds of fat, or five or six pounds of ordinary soap fat, and three gallons of water; put all together in a kettle over the fire and boil, adding three or four handfuls of salt before the boiling is quite finished; from two to three hours' boiling will be necessary. The experienced soap-boiler will know by its appearance when it has boiled enough. The novice will soon learn.

Where caustic soda cannot be obtained get common washing or sal-soda, and by the addition of lime make it caustic, after the following plan, which is the one generally in use at the present, and which makes an excellent soap: Take six pounds of washing soda and three pounds of fresh, unslacked lime; place together in any water-tight vessel—an iron kettle is best—and pour on two gallons of boiling water; stir occasionally until the lime is slacked and the soda dissolved, then allow it to settle. Take the clean lye from the top and pour it on the fat—of which three pounds common scrapings are to be taken—and commence boiling; then add another gallon of water to the settlings of the soda and lime, stirring as before. This lye is then to be added to the other while boiling; also throw in about six single handfuls of salt about half an hour before it is done boiling. Boil two hours.

Without the salt either of these methods will make a semi-soft soap; but for a real soft soap potash must be used. This you can buy for the purpose; or, if you prefer, extract from wood-ashes by simply mixing a little fresh lime with them and pouring on water. An old barrel or tub will do to hold them, if there is a hole in the bottom for the liquid to drain out. The ash-hoppers formerly used for this purpose are

yet standing alongside of some outhouses on many farms, but seldom used now.

For toilet purposes a soap made with a vegetable oil is to be preferred—castile, palm, or cocoa—rather than those highly perfumed, but which are sometimes made from the most impure materials. If perfumed soap is wanted the common soap above can be melted, and perfume of any desired kind can be added; but it will be rather strong for delicate skins, and castile is much to be preferred.

Soap-making need no longer be dreaded by the women to whose lot it falls, as, by the methods we have given, as well as other similar ones, all the soap needed in a family for six months can be easily made in a single day.

It is sometimes said that home-made soap costs more than it could be bought for. Perhaps it does, but then you have the satisfaction of knowing from what it is made.

A SUBSTITUTE FOR BLACKBOARDS.—For use in technical and other schools, Prof. Marx, of Stuttgart, recommends black paper and chalk. He orders from a paper-hanging manufactory a long strip of black paper one meter broad, and cuts off a portion as required. The piece is then attached to the wall, and the writing or drawing produced on it with white or colored chalk. The chalk is fixed on the paper by means of a spray-producing apparatus. With this a dilute solution of shellac is blown for a quarter of an hour against the chalk, which then apparently vanishes, but reappears after drying. The liquid is prepared by solution of 50 grammes bleached shellac in one liter ordinary alcohol. The paper, when dry, can be rolled up without the chalk being obliterated. For ten years Prof. Marx has used tables and drawings prepared thus; they generally stand rolled up in a corner, and when they have to be used they are opened and fixed with pins on the wall.

ADULTERATION OF COTTON GOODS.—The *Poly. Zeitung* complains of the adulteration of shirtings and other cotton goods sent from England. It appears that the raw material is given to the weavers to weave into fabrics which are to have the same aggregate weight as the raw material supplied. These weavers greatly augment their earnings by being able to add from 15% to 45% to its original weight by means of the finishing stuffs employed. This adulteration is easily detected by soaking the fabric in water, which dissolves the finishing stuff. The Chinese first discovered the imposition, and will now only purchase washed fabric, i. e., according to "gewaschenes gewicht." The American and German shirtings are quoted as losing from 5% to 10%, and are therefore much preferred to the English material.

KEROSENE LAMPS.—A merchant returned home about two o'clock at night and found his wife lying on the bed groaning heavily and unconscious. She was waiting his return and at last, tired out, laid herself on the bed, after turning down the wick of a lighted kerosene lamp as low as possible without extinguishing it. In this position of the wick, if the oil is bad, a vapor mixed with an innumerable quantity of specks of soot diffuses itself through the apartment, and so covers the eyes, nose and respiratory organs, that on falling asleep one runs a risk of suffocation. It is always advisable, therefore, in the use of kerosene lamps, to allow the wick to burn brightly or to extinguish it entirely.—*Wiener Medicinische Presse.*

GOOD HEALTH.

Sprains.

Hall's Journal of Health gives a chapter on sprains, which may contain useful hints to sufferers from them: Sprains or strains of the joints are very painful, and more tedious of recovery than a broken bone. What we call flesh is muscle; every muscle tapers down to a kind of string, which we call cord or sinew. The muscle is above the joint, and the sinewy part is below it, or vice versa, and the action is much like that of a string over a pulley. When the ankle, for example, is "sprained," the cord, tendon, or ligament (all mean the same thing) if torn in parts or whole, either in its body, or from its attachment to the bone, and inflammation—that is a rush of blood to the spot—takes place as instantly as in case of a cut on the finger. Why? For two reasons. Some blood vessels are ruptured, and very naturally pour out their contents; and second, by an infallible physiological law, an additional supply of blood is sent to the part, to repair the damages, to glue, to make grow together, the torn parts. From this double supply of blood, the parts are overflowed, as it were, and push out, causing what we call "swelling"—an accumulation of dead blood, so to speak. But dead blood cannot repair an injury. Two things, then, are to be done: to get rid of it, and to allow the parts to grow together. But if the finger be cut, it will never heal as long as the wound is pressed apart every half hour, nor will a torn tendon grow together if it is stretched upon by the ceaseless movement of a joint, therefore, the first and indispensable step, in every case of sprain, is perfect quietude of the part; a single bend of the joint will retard what Nature has been hours in mending. It is in this way that persons with sprained ankles are many months in getting well. In

cases of sprain, then, children who cannot be kept still should be kept in bed, and so with many grown persons.

The "swelling" can be got rid of in several ways; by bandage, which in all cases of sprain should be applied by a skillful physician—otherwise mortification and loss of limb may result. A bandage thus applied keeps the joint still, keeps an excess of blood from coming to the part, and by its pressure causes an absorption of extra blood or other extraneous matter.

Another mode of getting rid of the swelling is, to let cold water run on the part injured for hours.

Health and Marriage.

The Sanitarian takes strong ground that marriage, at the proper time, is favorable to health and long life. By the statistics of M. Bertelon and others, in a discussion of the subject before the French Academy of Medicine in 1871, from 25 to 30 years of age married men die at the rate of 6; the unmarried 10; and widowers at 22 per 1,000 annually. From 30 to 35 years, the deaths among the same classes respectively are 7, 11 and 19; from 35 to 40, 7, 13 and 17; per 1,000, and the same favorable conditions to the married continue at greater ages. But married men aged from 18 to 20 die as fast as men from 65 to 70.

Among women marriage is not quite so favorable as among men. From 30 to 35, wives die at the rate of 9 and spinsters 11 per 1,000. Under 25 the mortality of wives is a little greater than among single women. After 40 years of age, the longevity of married women is much greater than that of the unmarried.

The probabilities of life in this connection are—a man at 25 who marries has an expectation of 40 years' married life; if he does not marry, his expectation at that age is only 35. A woman who marries at 25 may expect to live until she is 65; if she remains single, to 56 years of age. Widowers and widows are nearly as badly off as those who do not marry.

NERVOUSNESS AND NERVINES.—Nervousness is one of the prices we have to pay for civilization; the nervous savage is a being unheard of. For this disorder, which is partly of mental and partly of bodily nature, relief is sought in various ways, and among these we may place the employment of narcotics. The temporary relief afforded by these drugs is very apt to lead those who suffer from nervous sensations to put too much trust in and resort too frequently to them. In the long run they prove most destructive to health. Their use has of late become so frequent as to threaten society with a serious evil. It has been boldly contended that chloral is to be found in the work-boxes and baskets of nearly every lady in the west end of the metropolis, "to calm her nerves." No doubt this is an exaggeration, but it is a fact that New York chloral punch had become an institution scarcely a year after the introduction of chloral in medical practice, and now it turns out that Germany—"sober, orderly, paternally-ruled Germany"—has such a thing as morphia disease spreading among its population. The symptoms are not unlike those of opium eating. Experience suggests that persons suffering from this disease should at once be deprived of the drug. Their willfulness and liability to relapse, however, are so great, that it is said that only about 25% have been seen to recover in a large series of cases.—*Cassell's Magazine.*

PAINLESS DEATH.—In a lecture at the Royal Institution, Prof. Tyndall, speaking of the painless death by electricity, remarked that Franklin was twice struck senseless by the shock. He afterward sent the discharge of two large jars through six robust men, who fell to the ground and got up again without knowing what had happened, neither feeling nor hearing the discharge; and Priestly, too, who made many valuable contributions to electricity, received the charge of two jars, but did not find it painful. Prof. Tyndall said that this experience agreed with his own; that in the theater of the Royal Institution, and in the presence of an audience, he once received the discharge of a battery of 15 Leyden jars. Unlike Franklin's six men, he did not fall, but, like them, he felt nothing; he was simply extinguished for a sensible interval. This may be regarded as an experimental proof that people killed by lightning suffer no pain. Now, the measured velocity of electricity is many thousand times greater than the measured velocity of sensation in the nerves. Hence, the electrical concussion reaches the center of life without any possible announcement by eye or ear or sense of feeling. There is abundant evidence that death by a rifle ball traversing the brain is for the same reason entirely without consciousness or pain. A rifle ball, however, is a tortoise compared with the electric flash.

POISON IN RED CARPET.—E. Reichardt shows that the red coloring matter of carpets sometimes contains arsenic. It is well known that green coloring matter often contains arsenic, and now it appears that the red vegetable coloring matter of carpets is often contaminated with the same substance. The material formerly known in commerce as Vienna lac has been found to contain from two per cent. to two and one-half per cent. of arsenious acid.



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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, April 14, 1877.

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NEW ADVERTISEMENTS.

Pacific Machinery Depot, H. P. Gregory, S. F.; The New York Watch Company, Dewey & Jordan, S. F.; Fret Work Drill, Colman Smith New Haven, Conn.

Coast Railroad Items.

The increase in earnings for March last of the Central Pacific railroad over March, 1876, was \$57,318. The increase for three months of the present year over the earnings for the same time of the previous year was \$121,775.

Mr. Harris, Superintendent of Construction of the Southern Pacific railroad, arrived at the Colorado river with his party on the 6th, and returned soon to the end of the track. The force was divided and graders placed on the Mesa three miles from the river, on Monday. This advance party will enable them to reach the Colorado river by the 20th. The road will stop on reaching the Colorado river until the bridge is completed, which will take about 10 months. The work of construction will then be continued on through Arizona.

The track on the bay shore railroad from Oakland pier has been laid up as far as Point Conchal. There are some 700 or 800 graders employed on the work. The engineer has located the depot, side-tracks, etc., in Martinez and it will not be long before the road will be in operation to that point.

The Winters Advocate says that the rails have been laid and the construction car running half the distance to Madison. The track is graded within three miles of Madison. When the necessary bridging is completed, an extra force will be employed and the road rapidly extended to its terminus at Madison.

In the Third District Court, The People, etc., on the petition of the Commissioners of Transportation, bring suit against the Stockton and Visalia and Stockton and Copperopolis Railroad Company and the California Pacific Railroad Company, to compel an accounting of receipts and expenditures.

A Telluride of Mercury.

We were shown this week by Mr. Kustel a new mineral—a telluride of mercury—discovered by Prof. Genth, who has named it "Coloradoite," from the State in which it is found. There are great many varieties of tellurides found in Colorado, but this is the latest discovery; it came from Boulder county. It resembles somewhat in color "copper-nickel," except that it is a little lighter. It is a very pretty mineral, and is very rich in gold—native—intermixed with the ore.

There is a considerable quantity of the mineral in the locality mentioned, and it is quite rich in quicksilver, being a combination of tellurium and quicksilver. We do not know of any previous discoveries of quicksilver in Colorado, or of its being found there in any other form. This mineral has never been found in this State, where deposits of mercury abound. The ore is full of fine specks of gold, both in the quartz and also in the Coloradoite. It is "free" in both instances. It is somewhat singular that these tellurium combinations have been so rare heretofore, and now they are found in many forms and in considerable quantities in Boulder county, Colorado. Outside of that locality they are very rare. The only localities we know of in California where any tellurides are found are at the Carson Hill or Stanislaus mines in Calaveras county, and one place in Mariposa county. In Nevada tellurium associated with gold has been found at the Jefferson mine, near Belmont.

In Boulder county, Colorado, they find native tellurium, and find it associated with gold, silver, lead and now with mercury. All of these combinations are interesting to the mineralogist from their variety; and to the miner because they are generally very rich. From Carson hill the tellurides themselves contain 24% in gold and 34% in silver. Prof. Genth, of the University of Pennsylvania, is now engaged in making an analysis of this new mineral.

Calaverite, which is found at the Carson hill mines, is also found in Colorado in larger quantities than here. Melonite (from the Melones mine, Carson hill, Calaveras county,) is a nickel telluride and occurs with other tellurium minerals at the mine mentioned. Sylvanite, another telluride of gold, found in Calaveras county, is also found in Hungary. Some very fine specimens of it have lately been found in Colorado.

Pacific Coast Engineering.

It cannot be gainsaid that the Pacific coast has contributed to the world, besides its enormous amounts of gold and silver, a material addition, in several important particulars, to its previous acquirements in the arts of mining and civil engineering and in metallurgy. Gold and silver are the veritable components of that lever with which Archimedes proposed to move the world; with them it does not seem even necessary to have a place to stand upon. To build the Pacific railroad over the lofty and snowy Sierra Nevada was no great matter at all to the practical engineering mind of Californians; yet it is the most meritorious work of the kind that the world has seen.

Hydraulic mining engineering is, to Eastern and European miners, engineers and geologists, an unrealized fact; or if presented to them in tangible heights, distances and quantities, a myth, so far removed from them and their practice and surroundings, that it matters not to them whether it be true or false. That the gravel miners of California are digging away miles of hills to a depth of 200 feet or more and depositing them miles away after having bereft the soil of its precious contents, can be best believed when seen. Gold is there and the mountains must come down if it takes a hundred years to sweep them away to the bedrock. The elements themselves do it and man controls the elements, as is his privilege.

In connection with these gravel mining operations some hydraulic engineering feats have been accomplished by private companies, which would be flattering to a government in some of the older countries of the world. Water has been brought from great distances over a country so mountainous and rugged that such a thing would have been deemed impossible anywhere else; difficulties have been surmounted and obstacles overcome, which, if standing in the way of any other purpose than that of gold mining, would have been considered so serious as to put a stop to the undertaking at its inception. Some of the long bedrock tunnels run in this State to open up supposed deposits of auriferous gravel, are undertakings which, elsewhere, considering the nature of the schemes, would be thought foolhardy enterprises; while among us it is nothing uncommon to see such enterprises commenced when the owners themselves know it will cost thousands of dollars and consume years of time before completion; and even then in some cases the result is only a question.

In quartz mining we have undertaken schemes costing such amounts of money as to astonish people not familiar with the business. Shafts of great depth are sunk and machinery costing hundreds of thousands of dollars are placed upon them. The civil and mining, as well as the mechanical engineers, have been called

upon in this country to exercise their skill to the utmost in their different branches, and to this is due, in a great measure, the boldness of some of the undertakings. Altogether we consider that the engineers of the old world would find many matters in their line which would be a surprise to them on this coast and that they would be compelled to award high praise to the persons carrying out the enterprises which have been successfully completed here.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective superintendents on file at the offices in this city:

No ore is being taken from the Eureka Consolidated mine.

They struck a fresh body of water in the shaft of the Comanche mine this week.

About 80 feet south of the present end of the 73-foot drift north of the incline of the De Fries, a ledge bearing north 30°, east with a dip of 36° from vertical, intersected the main ledge.

The water in the Savage and Hale & Norcross remains about the same, and although the pumps are kept as steadily at work as possible, they do not get ahead of it much.

Chollar turned out 626 tons of ore last week, of an average value of \$25 per ton.

The northeast drift on the 1450-ft level of the Baltimore Consolidated looks very encouraging.

In the Jefferson they have opened up a fine ledge of quartz on the 700-foot level, carrying about 10 inches of fine ore.

At the Golden Chariot (Idaho) there are 700 tons of high-grade ore at the mine awaiting condition of the road that will admit of transportation to the mill.

The water and heat give unusual trouble in the Overman.

Sinking has been resumed on the C. & C. shaft.

The March product of the Idaho mine, at Grass Valley, was \$42,982. The usual dividend of \$7.50 per share, amounting to \$23,250, was paid.

The last clean-up of the Eureka (G. V.) was 345 ounces of amalgam.

The Empire (G. V.) mine shipped \$16,599 in bullion in March.

The improvements in ventilation have enabled them to make excellent progress in the crosscuts on the 1700-ft level of the Best & Belcher.

As soon as the south drift—1700-ft level—of the Gould and Curry is connected with the Savage joint winze (which will be in about six weeks) it is the intention to commence crosscutting on the south line. These three drifts running east will thoroughly prospect the south two-thirds of the mine, while Best & Belcher cross-cut near north line will determine the chances in that direction.

The March product of the Leeds mine was \$33,000, against \$32,000 in February.

In the Manhattan, for the month of March, 405½ tons were reduced; assay value, \$87,359.83. The different stopes continue to yield about the usual amount of ore.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Comanche, April 3d, \$7,135.36; Northern Belle, 3d, \$9,189.38; Tybo Con., March 31st, \$17,406.86—total to date, \$106,274.36; Empire (Grass Valley)—total for March, \$16,599; Modoc, April 5th, \$9,524—total to date, \$19,475; Northern Belle, 6th, \$9,367.33; Tybo Con., 5th, \$13,435; Grand Prize, 2d, \$5,515; Indian Queen, \$7,483; Modoc, 7th, \$5,053; Con. Virginia, 7th, \$64,764—first shipment for April; California, 7th, \$307,353—first shipment for April; Grand Prize, 7th, \$4,917; Leeds, 6th, \$4,200.

WRECK OF THE "FRANK JONES."—In the window of Heuston & Hastings, on Montgomery street, we noticed this week a water-color painting of the wreck of the ship *Frank Jones*, that broke her hawser and drifted on the rocks near Port Point last week while being towed to sea. The sketch was made on the spot soon after the disaster and shows the vessel amid the rocks with the surf breaking around her. The picture was made by Mr. Joseph S. Bayless, a draftsman in this office, and is spirited and truthful in drawing, and soft and pleasing in color.

ONLY AN ADVERTISEMENT.—Although set in advertising type and columns, a subscriber has taken the advertisement of the "Union Silver Plating Company" as that of the publishers of this paper. We have nothing to do with the "spoon business," but accepted the advertisement at our regular rates believing that no one would be injured. We would say the same of the Western Gun Company's and like advertisements. If anybody doesn't get the worth of their money please report.

IRON AND STEEL.—The board to test iron and steel has suspended its operations, owing to the refusal of Congress to make the necessary appropriation therefor. The testing machine which the board has constructed will be erected at the Watertown (New York) arsenal, and used by the Ordnance Department in testing metal to the extent which the means will allow.

The *Pall Mall Gazette* says: Unless Turkey yields to all or nearly all that Russia demands, there will be war before many days.

Foundry Notes.

Business at the foundries and machine shops continues quite dull, most of the work being limited to small jobs.

At the Golden State iron works they are making a Golden State blower to act as a suction fan for the condensers of the New Idria quicksilver mine. Are also making cast iron pipes to take the place of the worn-out wrought iron pipes in the furnaces at the Oceanic mine.

At the Wilcox pump works they are making new and improved patterns of mining pumps for very heavy work, which we shall shortly describe in detail. They are just setting up at the Redwood City water works a pump to supply 20,000 gallons of water per hour. It will be in operation in about ten days.

Joshua Hendy is quite busy making "\$1,000 Challenge ore feeders." He is just now making two dozen of them. Four of these feeders are being shipped now to the Black Hills, and several have been put in the Briggs Brothers' mill, at Black Hawk, Colorado. Two were recently shipped to the Black Warrior mill, in Arizona, and two are being built for a new mill near the McCracken lode, Arizona. Four are being shipped to Bodie, district. Two were shipped recently to the Eclipse mine, Inyo county, and Mr. Hendy expects to send six more there soon. All of those in use are very strongly recommended, and the fact that so many are being made speaks well in their favor.

We noticed in the alley-way running between the Aetna and Fulton iron works back to Hawkins & Cantrell's shop, a form of drilling machine which is just being introduced to the notice of the mining community. The drill is light and is set in a light wrought iron frame, which is capable of being arranged so as to point the drill in any desired direction. Motion is imparted to the drill by hand power, a crank and fly wheel being placed on each side. On the crank shaft are two cams which, as it is revolved, raise up the drill-stem and at the same time compress two powerful coiled springs. As the cam passes the springs force the drill down with a quick, strong blow. A lug on the shoulder of the cam serves to rotate the drill so that the drill point has the best cutting effect. The drill points are peculiar in shape and it is claimed that they do very effective work. Two men can operate the machine with ease and do much quicker work than by hand. It can be seen at work on rock in the place designated above. We shall probably give a more extended notice of this device on another occasion.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

IMPROVEMENT IN CLOTHING.—Adolph Pack-scher, S. F. This invention consists in inserting in the waistbands of pants, drawers and vests, and in the lower part of the legs of men's drawers, one or more gores of elastic material, either permanent or temporary, so that the bands of said articles of clothing will be elastic and provide a better and easier fit than the ordinary strap fastenings and buckles. The elastic gores can either be sewed permanently in place or they can be inserted so that they can be removed in case it should be desired to do so before the article of clothing is washed. This arrangement does away with the usual straps and buckles used to tighten the waistband, and the strings and buttons used on the bottoms of drawer legs.

CIGAR HOLDER.—F. H. W. Von Tiedemann, S. F. This is a novel device for holding cigars while they are being smoked, and which may also be converted into a pipe if desired. The device consists of a tube with a mouthpiece and a perforated tube adapted to be thrust into the side of the cigar, together with a steadying arrangement to embrace the end of the cigar and steady it. A chamber is formed in the removable head so as to receive and retain any moisture which results from smoking. The device can easily be converted into a pipe.

IMPROVED SAW SET.—A. Boisset, S. F. This invention is a novel saw-setting device, which is especially adapted for setting band saws, although it can be used for setting other kinds of saws if desired. The device will set narrow blades with great speed and regularity.

The gunboat *Rocket* has returned to Victoria from her voyage of inquiry into the *G. S. Wright* mystery, bringing four Kumquilt prisoners, who were lodged in jail. Two of the prisoners are charged with scuttling a trading schooner and murdering two of the men some time ago. The others are charged with complicity in killing some of the *Wright* people, who are supposed to have reached the shore from the wreck. It is said that the cash-box of Major Walker, United States Paymaster, who was lost with the *Wright*, is in possession of the Kumquits. A piece of one of the vessel's masts was discovered.

The report of the Minister of Mines of British Columbia shows that since 1858 there has been exported from the province \$39,984,000 in gold, the product of the provincial mines. The coal and lumber interests show great expansion during the past year.

First Settlement and Early History of the "Eastern Slope"—No. 3.

Sharp Practice by the Mormon Rulers.

The dissensions between the outsiders and the Saints continuing to increase, the head men of the church, with a view to harass their opponents and discourage further immigration into the country, proceeded to dismember Carson county, issuing an order at the same time that all the public records pertaining thereto should be removed to Salt Lake, more than 600 miles away. By the adoption of these measures it was hoped that these troublesome interlopers from California, being without the means to legally secure possession to any portion of the public lands, and shut out from all chance of participating in the management of affairs, would become disheartened and withdraw from the country.

Under the statutes of Utah no one could gain possessory title to any part of the public domain without having the tract he sought to occupy surveyed by the County Surveyor and afterwards duly recorded, the whole to be fenced within one year thereafter. If, now, there were no Surveyor to do this work and no officer to make a record of it, then, reasoned these Salt Lake dignitaries, the Gentiles, being unable to gain legal possession of the land they coveted, would refrain from making any settlements, the Saints having already secured in the proper manner all they wanted.

Not only this, but the entire machinery of the law being removed, no debt could be collected or other act of justice enforced; no record of any kind could be made or paper officially filed; not even an oath could be administered, the whole community being left without any security for person or property. To this condition were the inhabitants of Western Utah reduced by the action of these perverse and crafty rulers at Salt Lake.

Movement of the Seceders—A Delegate Sent to Washington.

Being thus virtually without any local government the disaffected portion of the people began at last to move actively in the matter of erecting this section of Utah into a separate Territory, certain measures looking to that end having been taken the year before. Judge James M. Crane, a well known California journalist, who had removed to this region in 1857, had that year been chosen by the Gentile portion of the population to visit Washington and lay the condition of affairs before Congress and ask for the enactment of a law effecting the desired severance from Mormonism. Crane executed his mission intelligently and faithfully but without accomplishing its object; wherefore his constituents, despairing of relief from that quarter, determined that they would sever their political connection with Utah and form for themselves a sort of

Provisional Government.

Trusting the chances of its being afterwards recognized by Congress; for which course of procedure they found partial warrant in the case of Oregon, where in 1843 recourse was had to this make-shift style of government with the subsequent approval of that body.

In accordance with this programme a mass meeting was called on the 6th day of June, 1859, at Carson City, whereat it was resolved that a convention of delegates, to be chosen by the people in all parts of western Utah, should be held at Genoa on the 18th of the following month, for the purpose of conferring together on the evil state of affairs and the adoption of some plan for correcting them.

They Frame a Constitution.

As this call had failed to point out definitely what the people desired should be done, the convention was much divided on this point when they came together, the major part of the members being of the opinion that it was intended they should frame a constitution prescribing the rights and duties of the people under a Territorial form of government, having preceded that instrument by a declaration setting forth their reasons for desiring a political separation from Utah Territory, the whole to be submitted to the people for their consideration: A minority of the members took, on the other hand, the view that they had been chosen to merely provide for the calling and proper construction of a constitutional convention, the members of which were to be afterwards elected by the people.

It Is Adopted.

The view taken by the majority prevailing, a constitution, modeled very closely after that of California, was drafted, and, having been submitted to the people on the 7th day of September, 1859, was adopted by a large majority of the votes cast; the vote being, however, a light one for the number of people that had by this time arrived in the country, the advance guard of the silver-seekers having already put in an appearance. Of the old settlers some voted against the adoption of the new constitution, while others absented themselves from the polls altogether, both of these classes believing the movement premature and some of them looking upon it as revolutionary and unlawful.

They go for Much Territory.

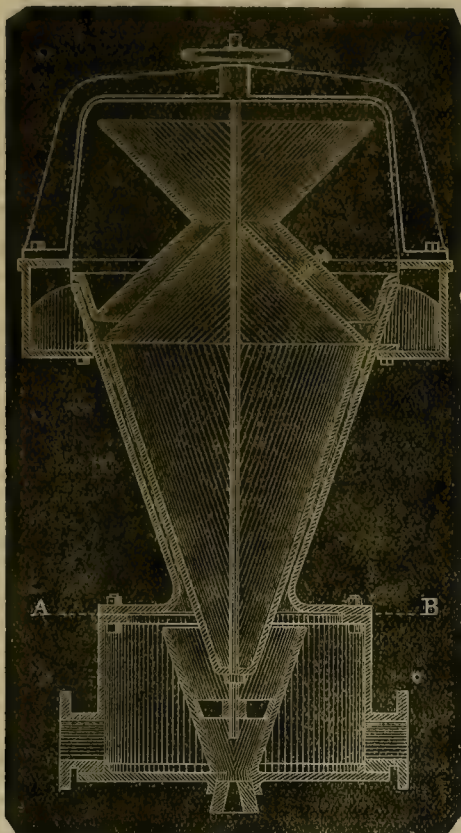
In fixing the boundaries of the new Territory, which they had designated Nevada, a liberal slice had been taken from California, and a considerable chunk from Arizona—a provision that alone would have led to the rejection of this constitution, had it ever been submitted to Congress for their approval. The appropriation by these sagebrushers of our constitution was all

well enough, but this attempt at filching some fifteen or twenty thousand acres of our territory was a thing not likely to be tolerated.

A List of their Grievances.

In the declaration mentioned these representatives of the Gentile population of Western Utah set forth, among other wrongs by them suffered at the hands of the Mormons, the following, viz: That the latter have grossly and in many ways violated the organic act creating the Territory of Utah; that they have shown themselves opposed to the government and institutions of the United States, and declared war against the same; that they have refused to submit to the laws of the country, while claiming their protection; that they have so legisla-

events. Nevertheless, the success of the independent movement was destined to be postponed yet a couple of years longer, the stirring events incident to the great mineral discovery having so absorbed the attention of both Gentile and Saint that little heed was for some time after given to questions of either political, social or legal significance. A few of the more ardent seceders, however, in the hope that they might be able to keep the new government they had helped to set up still on its legs, or rather, perhaps, not willing to seem indifferent to the cause they had so heartily espoused, attended the election fixed to come off in the fall and chose a governor and members of the Legislature, as provided for in the new constitution.



SECTIONAL VIEW OF STREAM CONCENTRATOR.

ted as to favor their own people and discriminate against outsiders, protecting criminals and violators of the law when they were Mormons; that they have conferred such powers upon local officers as to neutralize the authority of the United States Marshals; and, by selecting juries wholly from among the adherents of the church, render the laws of Congress practically of no effect, enacting, at the same time, laws in defiance thereof; that they have robbed and murdered our citizens while crossing the conti-

Isaac Roop having been elected to the office of Chief Executive. On December 15th, 1859, this body met at Genoa, and having received the first annual message of the Governor, proceeded to pass sundry resolutions, and having appointed a committee to draft a memorial to Congress asking recognition of the new provisional government, found their labors at an end, the Governor having sent them a message, which, after vindicating the action thus far taken, proceeded to recount the altered circum-



PLAN THROUGH A TO B.

ment, and incited the Indians to hostilities against them. Against these and other outrages and wrongs equally atrocious the complainants have sought protection and redress, sometimes applying to California for assistance, and again invoking Congress for a separate Territorial government, but all in vain; wherefore, smarting under a sense of neglect and wrong, they have felt impelled to now declare their entire and unconditional separation from Eastern Utah, and to adopt for themselves a constitution and Territorial government, which they confidently expect will meet with public approval and Congressional recognition.

The New Government Stands Feebly on its Pins and the Discovery of the Comstock Lode Knocks the Breath Incontinently Out of it.

That the charges here preferred against the Mormons were not without foundation we have good reason to suppose, some of them having been fully and fearfully verified by subsequent

stances under which they now found themselves, adjourned the legislature until the first Monday in January, it being understood that this adjournment would be final, as proved to be the case.

Judge Crane, who at the June election had again been chosen delegate to Congress, having died suddenly when on eve of taking his departure for Washington, John J. Musser was elected to fill his place. Proceeding to Washington Musser urged upon Congress the necessity of some measures being adopted for the relief of his constituents, without being able to effect anything definite.

Cut Loose at Last.

Meantime, John Cradlebaugh, who had been appointed one of the United States District Judges for Utah, arrived at Carson City, having been assigned to this district. Early in the summer of 1860 he proceeded to open his Court, appointing the few officers warranted by

his judicial functions. As the statutes of Utah were still in force, compelling the Court in all things to conform to their requirements, not much civil business was done. Still, the people, beginning to feel the need of some sort of organization whereby the more simple processes of business, such as acquiring, holding and transferring property, might be performed, determined upon the rehabilitation of Carson county, to which end an election was held in the month of August, and a full set of officers chosen. Nevertheless, things failed to work smoothly and almost everybody having misgivings as the legality of what was done, great was the satisfaction felt by all when the bill providing for the organization of Nevada Territory received the Executive approval on the 2nd day of March, 1861.

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Mechanical Ore Concentration and Separation—No. 29

[Written for the PRESS by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.]

Stream Concentrators.

The description of important contrivances for separation of fine-sized material would not be complete without proper attention being given to the stream concentrator, of one of the most perfect forms of which we give a design.

This apparatus has a capacity of 500 pounds per hour, and requires no other motive power than from six to twelve cubic feet of water per minute. The pulp is fed from above and the clean water through the pipes at the bottom, with a pressure sufficient for an overflow in the middle. The concentrated heavy material escapes through the funnel at the bottom, and the light waste material overflows from the central rim into the circumferential gutter, and thence escapes by an outlet. Previous explanation of its principles makes the action intelligible without further specification.

X. General Shape of Mineral Dressing Works; Their Cost of Construction and Operation.

To establish a standard shape for mineral dressing works would be an attempt productive of damage and failure. The nature of the ore, the quantity to be treated, the locality of the mine and water, the climate of the country, the building material to be used, are so many items influencing the proper selection of arrangement and shape, and not only do mistakes with regard to any of these points influence the efficacy of the works, but also the running cost of their operation, and it is always well in such construction to consult an experienced engineer and have all the plans drawn up by him before moving a piece of timber or a rock. Good plans accompanied by good specifications usually enable the mine owner to realize the adaptability of such plans for his special case and to judge of his ability to complete the works as planned. It will not do to build in part and to leave part unconstructed, as the works must form an entire system, with proportionate equal capacity of all the parts, or they will occasion unnecessary cost in construction and will do costly work.

It is not advisable to construct works of a smaller capacity than one ton per hour, and such an establishment will on the Western slope cost from \$16,000 to \$24,000, freight added from railroad terminus. For works of greater capacity the cost of construction does not increase in arithmetical proportion, as a capacity of four tons per hour can be attained for an outlay of only double the amount for one ton per hour. These are figures based on experiment and represent the actual cost.

For treating ore in mineral dressing works in this country the cost varies largely, and is influenced not only by the price of labor and motive power, but largely by the shape of the works. Works situated on the slope of a hill, near the water, where re-elevation of material is dispensed with entirely or nearly so, do their work most cheaply. The author constructed and run such works for three successive years at a running expense of only 80 cents per ton treated.

Works constructed so as to receive the ore direct from the mine pit, prolonged above ground so as to deliver the ore at an elevation sufficient to avoid re-elevation of the ore, are also worked at small expense. Where the ore is delivered on the ground floor, and where the building is of such limited height as to render frequent re-elevation of the material necessary, the expense of running is higher. Re-elevation of dry ore is comparatively a simple matter, but to re-elevate ore pulp and water therewith has always proved a difficult task for cup elevators as well as for mud pumps, and the contrivance as yet best adapted for the purpose is Hall's pulsometer—if the balls and ball sites are made interchangeable and of a material resisting the friction. Nevertheless, where re-elevation can be avoided, the running will not be subject to interruption, and at lower average expense, which under unfavorable circumstances will augment to three, four and five times the amount stated above.

One of the important points in arranging the respective location of machinery is the proper incline of gutters and spouts for conveying the ore. Seven degrees from horizontal will carry ore submerged in water, but for dry grains and coarse sands 42° are the least admissible, and for fine sands and dust 45° are not always sufficient, but 60° will carry them. The proper selection of these angles is of such great importance that a single mistake will necessitate reconstruction or occasion irregularity of run and consequent greater running cost.

A Great Mining Enterprise.

The Chollar-Norcross-Savage Shaft Company.

The Comstock lode, as is well known, says the *Gold Hill News*, has a regular dip or inclination of about 45° to the eastward. The first prospecting and ore extraction was begun on the croppings of the ledge at the surface, and has extended downward with the inclination of the vein to a perpendicular depth of 2,400 feet. As the dip and inclination of the fissure was determined, the machinery, buildings and surface works of the several mining companies were gradually removed to the eastward and new shafts sunk. Those of the Gould & Curry, Savage, Hale & Norcross and Chollar-Potosi mines were located nearly on a north and south line with each other, at a distance of about 1,000 feet east of the outcroppings of the ledge. These shafts were sunk perpendicularly until the foot or west wall of the vein was encountered, and then inclined with the course or dip of the lode. This inclination soon carried the operations of the miners on the lower levels several hundred feet to the eastward of the works on the surface. To apply the ordinary character of machinery to the prosecution of the work in that way, placed it at a great disadvantage, and required nearly if not quite double the power necessary in a direct prosecution of the work through a perpendicular shaft. In addition to this it added immensely to the cost.

Two years and a half ago the Chollar-Potosi, Hale & Norcross and Savage mining companies entered into a combination to sink a perpendicular shaft for the purpose of prospecting the lode at depths hitherto deemed impossible. This enterprise assumed the name of the Chollar-Norcross-Savage shaft company. In this company the Chollar-Potosi hold an interest of 1,400 shares, the Hale & Norcross 400 and Savage 800 shares. To superintend the construction of these great works and the prosecution of the shaft, Isaac L. Regua, for many years Superintendent of the Chollar-Potosi mine, was selected. The site chosen was on a steep hillside to the eastward of Virginia City, 300 feet south of the line of the Sutro tunnel, and about 3,300 feet east of the croppings of the Chollar and Hale & Norcross mines. The first step taken was to construct a side-track from the Virginia & Truckee railroad to the site selected. This track is 2,276 feet in length, and being built along a steep hillside, with many deep cuts and fills, was, considering its length, a very expensive undertaking. The foundations for the machinery and buildings were blasted out of the bedrock. The steepness of the hillside permitted the erection of the main building 50 feet above the mouth of the shaft on a plane leveled for the purpose. This places the hoisting and pumping machinery all on a level with the sheaves of the hoisting frame, and entirely hides the mouth of the shaft from the engineers.

The main building is 60x100 feet in size, the wall 20 feet in height, and is roomy and commodious in every respect. The shaft-house, extending west of and adjoining the main building, is 40x60 feet, with walls 50 feet in height. The blacksmith and machine shop is 40x60 feet, with 20-foot walls. The boiler-room on the north is 40x50, with 25-foot walls. The carpenter shop is 100x50 feet in size, with walls 18 feet high. These measurements will serve to explain and show the huge preparations being made for the carrying on of the great undertaking. The pumping engine is one of the most powerful of the kind ever constructed. It is a compound, condensing, direct-acting beam engine, with a 32-inch initial cylinder, 10-foot stroke, and a 65-inch expansion cylinder, and 8-foot stroke; capable, under an ordinary pressure of steam, of exerting a force of 700-horse power. The motion is controlled by the Davy differential valve gear. A double line of 12-inch pumps are to be placed in the shaft. The lift pumps in the shaft will be 200 feet apart. Both lines of pumps can easily be run at a fair rate of speed on an 8-foot stroke. The pump rods are of the best Oregon pine, are 15 inches square, and are each 100 feet in length, strapped together with the toughest and best of iron. The water when brought to the surface will be conducted to a huge reservoir erected several hundred feet from the works, where it will cool and settle, and then be returned to the works for condensing purposes. This engine and pumping machinery was manufactured by Prescott, Scott & Co., of the Union Iron Works, San Francisco.

The hoisting engine has a 20-inch cylinder, 36-inch stroke, and is capable of sinking the shaft to a depth of 2,000 feet. The machinery is so arranged that another hoisting engine of the same power can be added whenever it is needed. The hoisting sheaves, which are on a level with the engine, are 20 feet in diameter, and rest on the solid bedrock at a height of 50 feet above the mouth of the shaft. Each sheave is lined with wood to prevent and save the usual friction and wear of the steel cables. Placed at a convenient distance from the pump shaft is a huge geared steam winch, capable of handling with ease a weight of 40 tons. This winch is to be used in hoisting, lowering, and placing the pumps and columns in the shaft. The cables for hoisting in the shaft are of the best steel wire, six inches wide by half an inch thick and 2,800 feet long. The cable for use in the pump shaft is of the same material, seven inches wide and three-fourths of an inch thick. The boilers for supplying the steam are four in number, in sets of two each, are 16 feet in length and 54 inches in diameter. Ample room

and foundations for the insertion of double the number when needed has been provided. The hoisting machinery was manufactured by Moore & Co., of the Risdon Iron Works of San Francisco. The entire machinery in the carpenter, machine, and blacksmith shops is run by attachments to the hoisting engines, thus making a great saving of cost and labor.

The shaft has four compartments, three of which are five by six feet in the clear for the hoisting, and one six by seven feet in the clear for pumps. To construct this shaft and make room for the necessary timbers, an excavation 10 feet in width by 30 feet in length is required. It is timbered from the surface downward with 14-inch square spruce pine timbers; experience having demonstrated that to be the best timber for such work. The most efficient arrangement of all, however, is that for hoisting rock or ore. It is an original invention, gotten up by the Superintendent of the works, and is something different in its mode of operation from any other hoisting rig in any portion of the old or new world. It is called a "skeet," and takes the place of an ordinary cage and cars for all hoisting or lowering purposes. It is simply a strong square box, tapering from the top down, manufactured of the best of heavy boiler iron, is water-tight and is capable of holding four and one-half tons, or eight ordinary car-loads of rock or ore at a trip. This box is suspended in an iron frame or sash, with the usual gibbs and safety attachments. The box is pivoted at the bottom of the sash, and when hoisted to the surface, is, by a suitable device, turned bottom up and its contents dumped without any touch or aid of man. When emptied it rights itself and is firmly secured by a simple contrivance in its place and is ready to descend. It is equally available in hoisting rocks or water, and in hoisting and lowering men.

The weight of one of these hoisting tanks does not differ much from that of a cage and empty car. The cables are so arranged that one of the tanks descends while the other ascends, making a perfect balance of weight, when empty. Tests have been made which prove that with this arrangement 2,400 tons of rock can be hoisted from a depth of 2,000 feet with ease every 24 hours.

It is, beyond a doubt, the most economical and labor-saving device of that character yet introduced on the Comstock. It does entirely away with the services of from eight to 12 men usually employed around a shaft. The dump, into which the skeet empties, has a drain at the bottom to carry off the water; will hold 40 tons of rock, and can be emptied from either side as fast as it is filled.

Ground was broken for the commencement of the side railroad track on the 9th day of January, 1875; sinking the shaft commenced on the 1st day of June of the same year. It is now down a little over 1,200 feet, and is calculated to strike the Comstock ledge at a depth of 3,500 feet. The first 800 feet of the shaft was sunk with a large steam winch. Fifty-three days' time was lost while putting the hoisting engine in place of the winch and in making necessary changes of machinery. This would give an average rate of 65 feet per month, without allowing for any of the ordinary delays in sinking; which, considering the immense size of the shaft, and the heavy timbers, which in all soft ground encountered are placed only four feet apart, is unprecedented in even the fast mining operations of the Comstock. About 50 men are employed at the works, and an average of three cords of wood is consumed every 24 hours. So far no use has been found for the pumps whatever. A light flow of water was struck while sinking, which was caught up in tanks and is hoisted to the surface in the skeet. This flow averages about 20,000 gallons of water daily. The shaft is now within 450 feet of the Sutro tunnel level, and will reach that depth long before the tunnel is likely to reach the ledge. This shaft is calculated to prospect the lode to a depth of 4,000 feet or 2,300 feet below the level of the Sutro tunnel, and is beyond question one of the mightiest mining enterprises ever undertaken in any part of the world.

Leeds District.

A Few Words of Caution.

A correspondent of the *Salt Lake Tribune* writes the following sensible letter: Having noticed several letters in your paper from this place giving wonderful accounts of its richness, and although I think with the writers it is one of the most promising camps in Utah, still I think that correspondents writing from a new place like this cannot be too careful in their description of its prosperity, for fear of inducing poor men to do what they may be very sorry for afterwards. I have seen the rise and fall of a good many mining camps to the discomfiture of hundreds who had been deceived by letters which they had read in the newspapers. Unfortunately there are thousands of working men on this coast who are too ready to leave fair wages and start off many weary miles on foot for some new El Dorado which they know nothing about, and find too late that they had better have stayed where they were.

A Puzzle.

Now, this camp is a puzzle to the wisest. There never has been silver found in such a formation before in this country, although I believe there is something similar in Mexico. There seems to be a great quantity of the precious metal here, but as to the permanence of the mines no one knows. Some small and very rich veins have been found near the surface, and

samples of ore sent from here have created some excitement abroad and been the means of men coming here, to their sorrow. Many come, expecting to locate a mine, and find that every foot of ground that is worth building a monument on has already been taken up, and most of it by two or three different parties, who are at loggerheads as to who has the best right. Then their only chance is to try for work, which they seldom find. There are more men here than can find employment at present.

What the Camp Needs

Is capital. We want to see some one with money and courage enough to put up a custom mill and give the poor fellows a chance to find out whether they have got a mine or not.

There is less money in sight here just now than in any other town of the same size in Utah. Those who have good claims can do nothing with them, for it costs \$30 per ton to send the ore to Pioche, besides the cost of milling, and the ore being taken out now will not average \$50 per ton. Some of the claims are looking well, and we hear of several sales being made to San Francisco parties. And we hear of two mills on the road to Leeds; but even allowing the mills to be a fixed fact, it will be at least three months before they are grinding the silver out of the sand.

The Town of Silver City

Is growing rapidly—perhaps a little overdone. We have plenty of stores, saloons, restaurants, etc., but there is so little of the circulating medium that most all business is done on jaw-bone, and it is really beautiful to see the confidence that folks have in the people.

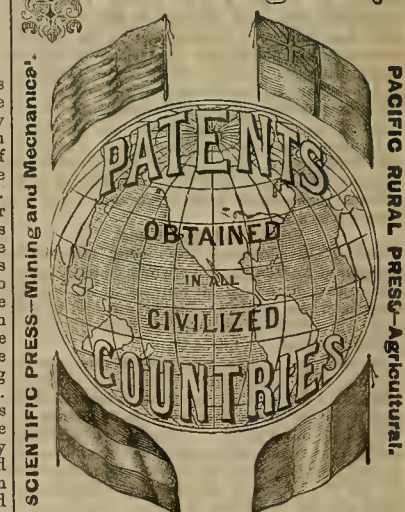
I don't want to discourage any man who has made up his mind to come here, but I think he ought to know before he leaves home that the streets of Leeds are not paved with silver, nor the houses papered with greenbacks; and that after arriving here, if he should not get work, he has the deserts of Arizona before him, or else the road back to where he came from. To a man with money enough to prospect with, this country offers some inducements, but to a man without means to keep himself for a month or two, it offers little just at present. Any one content to live on climate and expectations can fatten here, for our climate is beautiful and our expectations enormous. In a few months there may be some more substantial diet, that is if the Gentile prayer availeth anything.

Life at the Smelting Furnaces.

The working hours at smelting furnaces, says the *Eureka Sentinel*, are divided into the same periods as at the mines—eight hours—and they change their hours every two weeks. Each furnace employs a force of 15 men (exclusive of ore and charcoal men), of whom there are three smelters, six feeders and six slag-wheelers. The wheelers are employed on the second or feeding floor of the works; their labor consists of charging the furnaces with the requisite amount of coal and ore through the feed holes of the shaft. It requires no special training to do the work, but the men are exposed to the ascending fumes, and it is generally looked upon as the most unhealthy part of the work. The slag-wheelers are kept busy hauling away the melted debris, iron and bullion, and assisting the smelter whenever occasion may require. The work is very laborious, and eight hours is sufficient to exhaust the physical powers of the strongest men. The smelters' duty lies entirely in front of the furnace, and it is to his care and attention that its success is due. Green men will not answer for this part of the work and their ranks are recruited from the slag wheelers, whose ambition leads them to aspire to the position. Their work consists of watching and assisting the flow of slag that floats on the surface of the metals, which consists of liquid silica, limestone and the impurities of the ore, tapping and drawing off the iron when it accumulates to a certain height in the crucible, ladling out the base bullion from the lead well into molds, regulating the blast and testing the iron and slag to see that no lead is escaping from the spouts. One hour after commencing their work the blast is shut off and the whole force congregate in front of the furnace preparatory to "barring out." This, however, is only the rule in the shaft furnace, the hydrocicles dispensing with this operation. It is a vexed question as to whether anything is gained in the water-jackets by this improvement, but we will not discuss the arguments pro or con. There is no doubt that, in the shaft furnace, the operation more than compensates for the time lost in performing it. We have described the work at some length before, and will not now attempt a description of it in detail. It consists in removing the chilled slag and iron that has cooled outside the hearth, breaking down the old and putting in a new clay front, and stirring up the inside so that it is loose and free from horses, thus facilitating the smelting of the ore. It generally consumes from a half to three-quarters of an hour, and on its completion the blast is turned on and the work proceeds without interruption during the remainder of the shift. The work varies in laboriousness, and depends greatly on the quality of the ore. Ores with a large percentage of lead, as a matter of course, form greater quantities of bullion, while other ores will run to slag and iron. The greater the quantity of slag, the more work for the wheelers and feeders, and vice versa. The wages received are fair, the smelters getting five and the others four dollars per day for their services. Notwithstanding the prevailing impression that the work is very unhealthy, there are always a

surplus of applicants for vacancies, and no trouble is experienced in procuring help. Some men are more susceptible to the influence of the fumes, and soon succumb to its poisonous effects, while others work around the furnaces for years without experiencing any deleterious symptoms. It is noticeable that the men who pay the most attention to cleanliness and dissipate the least are those who escape. There have been great improvements made in the way of ventilation, and this has caused a marked decrease of the unhealthiness of the work. As a class the men employed are intelligent and industrious, and there are many who have followed the occupation ever since smelting was inaugurated in Eureka.

MARBLE QUARRY.—It may not be generally known that inexhaustible quantities of marble exist in Amador county. Messrs. Tubbs & Co., of San Francisco, are now working a quarry about two and a half miles beyond Plymouth, toward Fiddletown. Four or five men are employed in breaking the stone. The engine lately used for hoisting purposes at the Volunteer mine has been removed to this quarry. Last year 20 car-loads were shipped in the course of three months, but this season a much larger quantity will be sent away. The marble cannot be said to be of a first-class quality. It is of a grayish color, with dark streaks running through it. Although not capable of a very high degree of polish, it is nevertheless found useful for a variety of purposes. For bases of monuments, coping, window sills and similar uses, it is extensively used. There is a steadily increasing demand for the article; indeed, at present, the demand far exceeds the facilities for quarrying. Up to this time the shipments have been confined almost exclusively to Oakland, for bases for monuments and tombstones. The proprietors of the Stockton Marble Works are also sending their orders. With proper attention this branch of industry may be greatly extended.—*Amador Ledger*.

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Dewey & Jordan have been at 433 Montgomery street, S. F., for 13 years. They are reliable—like the "New York watches" they sell.

WOODLAND, CAL., Aug. 8th, 1876.
Messrs. DEWEY & Co.—Gents: Your letter containing the patent for my Centennial churn has come duly to hand, and you will please accept my many thanks for the prompt manner in which you attended to the business entrusted to your care, and I will take great pleasure in recommending you to any one having anything to attend to in your line. I am having a number of the churns put up, which will be ready for sale in a few weeks.
Yours truly,
JAMES ROOT.

Continued from page 229.

ing the Scorpion, which is an extension of the Falcon. We shall have good reports from Rock Creek before the summer is over.

TUSCARORA DISTRICT.

THE MINES.—Tuscarora Times, April 3: The Tuscarora Consolidated company are sinking. They have about 50 tons of good ore on the dump. Parker & Smith have struck it rich in the Maryland. Edwards & Co., owners of the Diana, are sinking on their ledge. The Ventura company are running a tunnel to tap the ledge. They are in about 70 feet. The Silver Vault mine has a 60-foot perpendicular shaft and a 75-foot incline on the ledge in good ore. The First Eastern extension of the Grand Prize is improving every day—taking out rock in which horn silver can plainly be seen. They have commenced sinking a new shaft on the Navajo ledge. In the bottom of the shaft they have a four-foot ledge of very rich horn silver ore. The Western extension of the Grand Prize has a perpendicular shaft 90 feet deep. A drift has been run from the bottom of the shaft a distance of 30 feet in a northerly direction, cutting through the ledge, which looks well.

Arizona.

GLOBE DISTRICT.—Arizona Enterprise, March 31: The Richmond vein outcrops 2,000 feet. The gangue is porphyry in a formation of gneiss and syenite. There are two shafts sunk upon the mine, one of which is down 20 feet and the other 35 feet, both of the shafts showing good walls and having rich ore at the bottom. We asked Mr. Hubbard about the silver placers belonging to Chilson & Co. He says that the placers are in Richmond Basin, and that they are the overflow of the Richmond vein. The silver, in the form of horn silver and copper silver glance, is found lying on the bedrock. Mr. Hubbard has a better opinion of Globe district than of Pioneer district, in which the celebrated Silver King mine is situated. He says, however, that there is a force of 41 men at work in the mine and 19 on the dump at Silver King, and that there is \$400,000 worth of ore in sight.

In the Peck district, on the Peck mine, the shaft is down 300 feet. There is a tunnel run north along the vein, striking the main shaft at a distance of 250 feet, at a depth of 233 feet, thence north 350 feet, making the tunnel 600 feet long. Another tunnel is run below from the north and run south, being in 100 feet. The lower level is 45 feet below the south tunnel, and runs 120 feet north and 20 feet south of the main shaft. This level is connected with the tunnel from the south by winzes Nos. 1 and 2, which are sunk to a depth of 45 feet. The hanging wall of the Peck is quartzite and the foot-wall slate. The ore gives, by milling process, an average of between \$500 and \$600 per ton, and is free milling ore. The ore is assayed at the mine, sacked and carried on pack-animals to the Azlan mill, at which about three tons are worked per day. The wood for the mine is hauled three miles upon a good road recently made by the company, and water is plentiful.

In Bradshaw district, Luke & Co. have a force of 13 men at work building a road from Minnehaha Flat to the mill-site on Pine Flat, in Bradshaw Basin. It will be completed by about the first of April, at a cost of about \$5,000, and will be used for hauling in the Constanica mill, which is to be put up on the mill-site. The mill is now on the road from its former location, near Ehrenberg, and will be brought by Sam Miller's teams to Walnut Grove, he having contracted to bring it that far. The Thurman and Gretna mines and the mill, as soon as the present preparations are completed, will employ about 60 men. This mill will be a great advantage to Bradshaw district, where a great deal of good ore has accumulated for the lack of milling facilities.

In Mohave county, Barry & Williscraft have their steam arastra running on ore from the Cerbat mine, which is about half a mile north of the town of Cerbat. There are several thousand tons of ore in sight. This ore goes \$100 per ton in gold and \$50 in silver. The silver is left in the tailings. Messrs. Barry and Williscraft have a barrel and settler almost completed, and expect to have them running in a few days. They have run out quite a nice lot of bullion.

The Lone Juniper, in Peck district, belonging to John Goodwin and R. McKinnon, is another mine of promise. The shaft is down 35 feet. This mine was bonded yesterday to A. J. Holmes, of San Francisco, for \$15,000.

Colorado.

ANOTHER STRIKE.—Colorado Miner, March 31: We understand that the Surprise lode has been cut in the Braganza tunnel, on Leavenworth, showing from three to five inches of ore running from 250 to 500 ozs.

ANOTHER GREAT RUN.—The last mill run, had this week, of ore from the S. J. Tilden lode, the property of the Marshall silver mining company on Leavenworth, gave the following result: 4,500 pounds—nearly two and a half tons—without sorting, ran 1,007 ozs. silver per ton, yielding \$2,491.25.

NEW YORK MINING AGENT.—The New York Stock Mining Board has recently taken up Colorado property, and has appointed an agent in each mining district, whose duty it is to make a report of the actual state of the mine, and its probable value. He is employed to go to the mine and say what it is worth. He does this in the interest of the parties proposing to purchase.

SPECIE PAYMENT.—A fifteen stamp quartz mill is being erected in Idaho Springs for the purpose of crushing ore from the Specie Payment, located near the head of Virginia canyon. The mill is being built with a view to increasing its capacity, should the supply of ore justify.

PLACER MINING.—There is a fair prospect that the product of our placer mines will be fully up to the average; and we would not be surprised to see it largely increased the coming season. The companies now at work, or about to begin, number about fifteen, between the foot of Floyd Hill and Fall River. From two to fifteen men are employed by each, and as the season advances the number will be increased. At Fall River another effort will be made to reach the bottom of the deep channel, but likely in another place than that tried last year.

At Idaho, Dunn, Morris, Gibson & Co., have secured a claim of 5,000 feet on Idaho Bar and are sinking a shaft near the Stage Bar. They hope to strike bed rock in the deep channel and find that long sought rich pay streak, which all old gulch miners so firmly believe in.

At the mouth of Chicago creek, John Edwards is going to put in a Little Giant hydraulic—a California machine, which has proved very successful in Summit county. If it should prove equally good here he will at once order another one to be put in his mine at the lower end of Grass Valley Bay, where he is now at work with a horse power engine to keep the water out. Others will also introduce the Little Giant if it proves to be the right kind of a machine for these diggings. A good many of the miners working further down the creek have been at work all the winter, allowing their pay dirt to accumulate, which they are now sluicing. The miners are very reticent concerning the results of their labors, but it is pretty well understood that they get good wages. Half as good results in a new district would create a stampede.

Montana.

RICH STRIKE.—Helena Independent, March 29: One of the employees of the Rumley mine reached this city yesterday, and reports the striking of a very rich and immense body of ore in that mine. The strike was made in the tunnel which is being run to tap the bottom of a 200-foot shaft for the purpose of ventilating the mine. The ore body tapped is twelve feet wide, and free from extraneous substances, and richer than any heretofore found in that mine.

COPPER.—Butte Union, March 29: Operations at the various copper mines continue with but little change since our last report. On the Parrott lead, Park's mine, only a small force is engaged in taking out ore, and consequently the out-put is light. The total amount of first-class ore in the sheds will not exceed sixty tons. There is a very large amount of second grade ore at the mine which is now

being concentrated by the use of hand jigs. The operation though slow is successfully accomplished, and with the exception of the finest particles of ore, all is saved. The present season there has not been as much activity in copper mining operations as before, probably owing to the low price of copper and the failure to complete concentrators at a time when expected. The mines all show well, not only those that are being worked but a score of others which are idle.

THE BURLINGTON MILL is running very successfully and the percentage of bullion saved averages from 85 to 90. To a great extent this is due to the character of the Burlington ore, which is as free from bases as any ore in this camp.

WE FIND a large number of men at work upon the numerous claims in this vicinity upon which representation work is required. From the present indication there will be but few leads left for outside parties to re-locate.

THE CENTENNIAL MILL has been running during the week upon ore from the Mountain Boy.

A body of very rich ore has recently been struck in the Apex mine to the west of the Burlington mill. Heretofore this mine was supposed to be of very little value, but the find has caused no little excitement among its owners.

COARSE ORE is being very successfully treated at the Olin works, one ton an hour having been run through one day last week, but fine powdered ore cannot be concentrated by the process now in use. Some other method for this purpose is required, and Mr. Olin contemplates soon to obtain the necessary machinery to enable him to work not only the coarse particles but the powdered also.

CRUDE BULLION representing a coin value of \$3,000 was on Thursday last shipped to the Helena Assay Office from the Davis mill. Another shipment of a like amount will be made on the same day of this week. The working of the mill still continues very satisfactory and the wet crushing process is fast gaining popularity in this camp among the mining population. Machinery advocates are but a short time ago were ready to pronounce it a failure. The savings of the bullion contained in the ore averaged not less than 85 per cent.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued in Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING APRIL 30, 1877.

189,053. BRICK-YARD TRUCK.—E. Remillard, Oakland, Cal.
189,152. GRIPPING AND PROPELLING ATTACHMENTS FOR CARRIAGES AND LOCOMOTIVES.—J. J. Thomas, Cahto, and W. J. Anderfuren, S. F.

189,161. SHANK SUPPORTS FOR BOOTS AND SHOES.—G. W. Wells, Black Hawk, Col.

189,194. AUTOMATIC CHECK VALVE.—O. Collier, Sacramento, Cal.

189,204. CLAIMS FOR ENDLESS ROPK RAILWAYS.—W. Epelsheimer, S. F.

189,225. THILL-COUPINGS.—T. J. Hubbell, Yountville, Cal.

189,254. CLAMPS FOR BUTTON-HOLE SEWING MACHINE.—E. Moreau, S. F.

189,271. COMPOSITION FLUX.—C. F. Secor, S. F.

189,289. STEAM ENGINE GOVERNOR.—S. A. West, S. F.

4,613.—LAGER BEER.—Boca Brewing Co., S. F.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

New Mining Enterprise.

Mr. J. S. Phillips, M. E., has handed us the preliminary prospectus of the Gravel and Quartz gold mining company, to be incorporated under the laws of California, for working gold quartz veins and gravel deposits in La Plata canyon, near Parrott City, La Plata county, Colorado.

The property consists of four quartz claims, of 6,000 feet in length on the same vein, with a very extensive gravel claim of one mile in length, and two water ditches. This property has been bonded to Mr. Phillips on advantageous terms—to raise sufficient capital to erect a ten-stamp mill, and otherwise develop the claims. The original owners require no money payment, but are willing to rely on merits, by simply retaining one-half of the general stock, which shall be unassessable to them for twelve months only.

Mr. Phillips, therefore, proposes that the stock of the intended company shall be divided into 100,000 shares, and he desires subscriptions for the remaining 50,000 shares at half a dollar per share. Mr. Phillips himself, having examined the mines, will take 10,000 of the shares, give up business here, and go and superintend the mines for twelve months, as *pro rata* payment for the same. The whole of the money will be expended on the ground, as there is no privilege or perquisite to any one short of actual profit. The local advantages are excellent, for when the two ditches are completed, sufficient costless water power will be available for all purposes; mining labor is reasonably low; the country is plentifully wooded, and a sawmill is already at work in the canyon; the climate is good throughout the year, and as there is sufficient rain upon good soil, the grass is abundant, and therefore the principal foods for men and animals will be cheap.

Mr. Phillips states that there are at least 400 tons of high grade quartz now lying on the surface which he thinks, after reasonable deduction, will more than pay for the mill itself. The examination referred to above was made some 18 months since, at a depth of 30 feet, and just then the whole waste dump from the shaft yielded more than \$400 of free gold per ton, when an especially extended blast in the overlying rock still beyond the side of the shaft, and near the bottom, yielded an average of \$250, while one soft stone taken therefrom yielded \$3,900, and another stone, selected because it was hard quartz, wherein no gold could be seen, even with the assistance of the lens, produced \$79 per ton by fire assays. The shaft has since been sunk to 210 feet and at 110 feet a

drift has been run 80 feet to the southward; and it is said that the whole dump pile has been variously estimated at from \$80 to \$200 per ton. The local assayer states that the average of 300 assays, taken during drifting and sinking, was nearly \$500 per ton. Immense gravel deposits have been washed out during the formation of the canyon, where gold can invariably be found by washing the dirt in a pan from the very tops of the bars, which are, in many places, 100 feet deep. Mr. Phillips says in conclusion: "I may say that I have never seen a more interesting and apparently valuable quartz vein than this, even at that time, and after this much more extensive deeper proof, I have no doubt that it is a fine property and a rare chance, being not only very rich but lasting."

General News Items.

At the annual commencement of the New York Medical College for Women, nine ladies graduated, including Miss L. J. Kellogg of California.

DR. DIO LEWIS repeated his lecture on "Our Girls" to a good audience in Oakland, on Tuesday evening. He also recently lectured to crowded houses in San Jose and Santa Clara.

JOHN H. CARR, a son of Professor Carr, State Superintendent of Public Instruction, committed suicide at a hotel in Sacramento, on Monday last.

The Standard's dispatch from Berlin says: Bismarck will provisionally be contented with four months' leave of absence, but will not quit Berlin before the closing of the Reichstag. It is now doubted whether the question of his resignation will be settled before the reassembling of the Reichstag.

C. M. LOCKWOOD, of New York, Chief Clerk of the Patent Office, has been appointed Chief Clerk of the Interior Department vice Bell, appointed Secretary of the Interior, and F. A. Seely, of New York, Assistant Examiner, has been appointed Chief Clerk of the Patent Office vice Lockwood.

The Reading Railroad Company has given all the engineers employed on the Germantown and Norristown branch two days in which to determine whether to leave its employ or the Brotherhood of Locomotive Engineers. A Convention of representatives of the Brotherhood is to be held at once in Philadelphia, to determine on a course of action.

It appears that a conspiracy has been discovered for wholesale under-valuation of silk imported into New York. This is accomplished by the aid of manufacturers and agents in Europe, and it is believed by the connivance of the Customs officials. As nearly as can be learned, the average under-valuation is from 30 to 40 per cent. on the importation of many million dollars.

VERY extensive revenue frauds in the manufacture of tobacco in North Carolina have recently been discovered. Some thirty manufacturers in the county of Surry are charged with participation in these fraudulent transactions, and have been indicted. The frauds discovered are estimated to exceed one-third the total amount of internal revenue taxes collected in that State.

THE settlement between the heirs of Cornelius Vanderbilt has again been brought up on account of differences between William H. and Cornelius J. Vanderbilt. All the heirs with the exception of Cornelius had agreed to accept \$1,000,000, and William had agreed to a settlement on this basis. Cornelius J., however, made a claim of \$2,000,000, and his sister, Mrs. Lafatzie, refused to make any settlement until Cornelius J. was satisfied. Meanwhile the will has been admitted to probate.

ADULTERATED SULPHUR.—At a meeting of the San Francisco Microscopical Society held last week, Mr. Henry G. Hanks presented three mounted slides to illustrate the substitution of powdered sulphur for the more costly and pure sublimed sulphur. Mr. Hanks was requested by the Pharmaceutical Society to examine microscopically three samples of sulphur sold as sublimed, and obtained at three wholesale drug stores in this city, neither of which was found to be genuine. Sublimed sulphur under the microscope is seen to consist of globular particles and botryoidal and stalactitic masses, characteristic and readily recognized at a glance when known. Powdered sulphur, on the other hand, although similar in appearance to the unassisted eye, is shown by the microscope to be in the form of angular fragments of irregular size. As the pulverized crude material contains a certain percentage of foreign matter, it should be ranked among the adulterated articles when sold for the pure sublimed sulphur, as is usually the case.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

THE GRAND PACIFIC HOTEL—Such a thing as occurred at the Southern Hotel, in St. Louis, where thousands of dollars worth of property was destroyed and several lives lost, would not be apt to happen at the Grand Pacific in Chicago. The features for security against fire are exceptional. The construction is such that it will be impossible for a fire to extend beyond the small section in which it might originate. The fire electric system is adopted, furnishing instant alarm from all rooms. Four standing pipes of iron connect with the steamers at the sidewalk. By its own watchman alone the whole hotel could be flooded in a few minutes, and in all these features the hotel has been guarded carefully against fire. These, with the first-class appointments of the house, make it a favorite with the traveling public.

METALS.

WHOLESALE.]

THURSDAY, M., April 12, 1877.

IRON.—		
American Pig, ton.....	29 00	@ 32 00
Scotch Pig, ton.....	31 00	@ 32 50
White Pig, ton.....	30 00	@ —
Oregon Pig, ton.....	—	@ —
Refined Bar.....	4 00	@ 4 40
Boiler, 1.....	4 40	@ 4 40
Sheet, 13 to 20.....	7 40	@ 8 40
Sheet, 20 to 24.....	5 40	@ —
Sheet, 24 to 28.....	6 40	@ —
Sheet, 28 to 32.....	6 40	@ —
Horse Shoes, keg.....	6 00	@ 6 00
Nail Rod.....	8 40	@ 9 00
Norway, Oval.....	8 40	@ 8 40
Roller.....	7 40	@ 9 00

COPPER.—		
Copper Tinned.....	37 00	@ 40 00
Sheathing, lb.....	37 00	@ 40 00
Sheathing, Yellow.....	21 00	@ 22 00
Sheathing, Old Yellow.....	10 00	@ 11 00
Composition Nails.....	21 00	@ —
Composition Bolts.....	24 00	@ —

STEEL.—		
English Cast, lb.....	14 00	@ 25 00
Anderson & Woods, ordinary sizes.....	15 00	@ —
Drill.....	15 00	@ —
Flat Bar.....	15 00	@ 20 00
Flow Steel.....	84 00	@ 124 00
TIN PLATES.....	9 00	@ 9 50
Banca Tin.....	24 00	@ —
Australian.....	18 00	@ 184 00

ZINC.—		
By the Case.....	11 00	@ —
Zinc Sheet 7 1/2 ft. 7 to 10, lb.....	11 00	@ —
7 1/2 ft. 11 to 14.....	11 00	@ —
8 1/2 ft. 8 to 10.....	12 00	@ —
8 1/2 ft. 11 to 10.....	12 00	@ —

ASSORTED SIZES.....	3 37 1/2	@ —
QUICKSILVER.—		
By the lb.....	42 1/2	@ 45 00

LEATHER.

[WHOLESALE.]

WEDNESDAY M., April 11, 1877.

Sole Leather, heavy, lb.....	26 00	@ 29 00
Light.....	22 00	@ 24 00
Jodok & Kil, doz.....	48 00	@ 50 00
11 to 13 Kil.....	68 00	@ 79 00
14 to 19 Kil.....	82 00	@ 94 00
Second Choice, 11 to 16 Kil.....	57 00	@ 74 00
Cornellian, 11 to 16 Kil.....	57 00	@ 74 00
Females, 12 to 13 Kil.....	65 00	@ 67 00
14 to 16 Kil.....	71 00	@ 76 00
Simon Ulmo, Females, 11 to 13 Kil.....	58 00	@ 62 00
14 to 16 Kil.....	58 00	@ 70 00
16 to 17 Kil.....	72 00	@ 74 00
Simon, 11 Kil.....	61 00	@ 63 00
20 Kil.....	65 00	@ 67 00
24 Kil.....	72 00	@ 74 00
Robert Calf, 7 and 9 Kil.....	35 00	@ 40 00
Kips, French, lb.....	00 00	@ 1 35 00
Cal. doz.....	40 00	@ 60 00
French Sheep, all colors.....	8 00	@ 15 00
Eastport Calf for Backs, lb.....	1 00	@ 1 25 00
Sheep Roams for Topping, all colors, doz.....	9 00	@ 13 00
For Linings.....	5 50	@ 10 50
Cal. Russet Sheep Linings.....	1 75	@ 5 50
Book Legs, French Calf, pair.....	4 00	@ —
Good French Calf.....	4 00	@ —
Best Jodok Calf.....	5 00	@ 7 25 00
Leather, Harness, lb.....	35 00	@ 38 00
Fair Bridle, doz.....	48 00	@ 72 00
Skirting, lb.....	33 00	@ 37 00
Wool, doz.....	30 00	@ 30 00
Buff, ft.....	18 00	@ 20 00
Wax Side.....	17 00	@ 18 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

LEGAL TENDERS IN S. F., 11 A. M., 95 1/2 @ 96. SILVER, 54 1/2.	
GOLD IN NEW YORK 104 1/2.	
GOLD BARS, 880 @ 890. SILVER BARS, 10 @ 15 1/2 cent. discount.	
EXCHANGE ON New York, 50 @ 55-100 cent. premium for gold on London banks, 45 @ Commercial, 43 1/2; Paris, 46 francs @ dollar; Mexican dollars, 33 3/4.	
LONDON Consols, 95 1/2; Bonds, 102 1/2.	
QUICKSILVER IN S. F., by the flask, 1 lb, 42 @ 44 1/2.	

Mining and Scientific Press

Is the leading mining journal in America, and enjoys a large circulation among the more intelligent operators and workers in the gold fields of the world.

As a scientific and mechanical representative of the Pacific Coast, it is decidedly popular and a standard journal with the most thrifty industrial people of the Pacific States and Territories. Its authority is of the highest order, and its usefulness in its special sphere unrivaled.

Every public library, mining engineer, metallurgist, mining operator and intelligent mechanic and manufacturer will find profit by its reading.

Subscription, \$4 a year in advance. Sample copies, post paid, 10 cents.

DEWEY & CO., Publishers, S. F.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
B. W. CROWELL—Colusa, Butte, Sutter and Yuba counties.
G. W. McGREW—Santa Clara county.
A. C. KNOX—Nevada, Montana and Utah Territories.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMPEL—Sonoma and Marin counties.
A. U. STROCK—Lake, Napa and Solano counties.
W. D. WHITE—San Bernardino and Los Angeles counties.
E. G. LAERNER—Arizona Territory.
Ed. T. PLANK—Dakota Territory (Black Hills.)

WHEN so many poor watches are being sold, it is not too much for us to say that those who buy the New York Watch Company's movements will be sure of a good article at fair prices.

ROASTING OF GOLD AND SILVER ORES, and the Extraction of their Respective Metals without Quicksilver, 1870. It contains 142 pages, embracing illustrations of furnaces, implements and working apparatus. Price \$2.50 coin, or \$3 currency, postage free. Published and sold at this office.

Mining and Scientific Press Patent Agency.

THE MINING AND SCIENTIFIC PRESS PATENT AGENCY was established in 1860—the first west of the Rocky Mountains. It has kept step with the rapid march of mechanical improvements. The records in its archives, its constantly increasing library, the accumulation of information of special importance to our home inventors, and the experience of its proprietors in an extensive and long continued personal practice in patent business, affords them combined advantages greater than any other agents can possibly offer to Pacific Coast inventors. Circulars of advice, free. Address,

DEWEY & CO.,
No. 224 Sansome St., S. F.

UNITED STATES Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained posted on Claim during Time of Publication; Register's Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Change of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. **DEWEY & CO.,** Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

Our readers can see watches second to none of American make, by asking "the time o' day" when our agents call. They travel by the N. Y. watch, and are very proud of them.

Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of chloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Krichke's process, etc. Under "Pulverizing Machines" are described the amarra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel, trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improved retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's teaching apparatus, with two or three different arrangements, a small mill, sampling tallies and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners' and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., Mining and Scientific Press, 224 Sansome Street, San Francisco.

To Mining Secretaries.

An amendment to Section 330 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

California and Arizona Mining Company.—Location of principal place of business, 507 Montgomery Street, San Francisco, California. Location of works, Mohave County, Territory of Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of April, 1877, an assessment (No. 2) of two cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, 507 Montgomery Street, San Francisco, Cal.

Any stock on which this assessment shall remain unpaid, on the thirteenth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fourth day of June, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, **P. E. JEWELL, Secretary.** Office, 507 Montgomery Street, San Francisco, California.

Dolores Consolidated Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name	No. Certificate	No. Shares	Amount
Blasdel, H. G., Trustee	16	10,000	\$1,000 00
Blasdel, H. G., Trustee	17	5,000	500 00
Blasdel, H. G., Trustee	18	5,000	500 00
Blasdel, H. G., Trustee	19	5,000	500 00
Drexler, L. P. & Co., Trustee	8	25,000	2,500 00
Fry, J. D., Trustee	7	10,000	1,000 00
Keene, J. R., Trustee	9	10,000	1,000 00
Talbot, W. C.	3	100	10 00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of sale.

J. W. CLARK, Secretary. Office, 418 California street, San Francisco, California.

POSTPONEMENT. The sale of the above described certificates of stock is postponed from the 16th day of April, 1877, to the 16th day of May, 1877, and will then take place at the same hour and place as above named. By order of the Board of Directors, **J. W. CLARK, Secretary.**

Klamath Quartz Mining Company.—Notice is hereby given that the principal place of business of this company will be removed to Klamath Mill, Siskiyou County, California, from the City and County of San Francisco, California, in thirty days from the date of the first publication of this notice. **GEORGE H. FOREE, Secretary.** San Francisco, March 21, 1877.

Mariposa Land and Mining Company of California.—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of March, 1877, an assessment (No. 10) of one dollar per share was levied upon the capital stock of the corporation, payable immediately in United States currency, to the Secretary, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California, or to the Assistant Secretary, at the office, No. 9 Nassau Street, New York.

Any stock upon which the assessment shall remain unpaid on the Thirtieth day of April, 1877, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Monday the Twenty-fifth day of May, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, **LEANDER LEAVITT, Secretary.** Office, Room 33, Nevada Block, No. 309 Montgomery St., San Francisco, California.

Taylor Mill and Mining Company.—Principal place of business, City and County of San Francisco, State of California. Location of works, Garden Valley Mining District, El Dorado County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-ninth day of March, 1877, an assessment of Twenty Cents per share was levied upon the capital stock of the company, payable immediately in United States gold and silver coin, to the Secretary at his office, No. 607 Montgomery Street, in the City and County of San Francisco.

Any stock upon which this assessment shall remain unpaid on the ninth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the twenty-fifth day of May, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. **SAMUEL S. MURFEY, Secretary.** Office, No. 607 Montgomery Street, San Francisco, Cal.

Amusements.

GRAND OPERA HOUSE, Mission Street, near Third. Open every evening with first-class Dramatic Company. Box office open from 9 A. M. to 10 P. M. Doors open at half past seven. Commence at eight o'clock.

CALIFORNIA THEATER, Bush Street, above Kearny. Open every evening with the best Dramatic Company in the United States. Box office open from 9 A. M. to 10 P. M. Seats may be secured six days in advance. Doors open at half past seven.

SCIENTIFIC PRESS.—As the old year is drawing to a close and the new is rapidly approaching, all our mining friends should subscribe for this scientific journal, especially devoted to their interests. It is a California enterprise, and compares favorably with similar organs of years more experience and age in the old countries.—*Colfax Enterprise.*



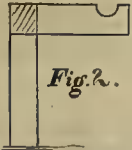
TOLLES IMPROVED CONCENTRATING TABLES.

Improved Concentrating Tables.

The illustration on this page represents an improvement in concentrating tables for ores recently patented through the MINING AND SCIENTIFIC PRESS PATENT AGENCY, by J. U. Tolles, of Virginia City, Nevada, who has been using the apparatus very successfully in several places. In the engraving, A represents a flat inclined table provided with a surfacing of cloth or other suitable material of any kind, and with the ledges b, to prevent the material from passing over the ends. B represents a peculiarly constructed feed box extending along the upper edge of the table, and provided in its front side with a row of discharge openings, c, of the form shown, each narrowing down to its lower end and of such a size as the nature of the material requires. C represents a receiving box or trough, extending along below the lower edge of the table. D represents a leaf or board hinged to the rear side of the trough or box C, in such a manner that it may be turned under the edge of the table to conduct the valuable material therefrom into the box, the refuse passing over the edge of the table and discharged upon the ground, or into the box in the rear of the box C. E represents a rotating tube or pipe suspended lengthwise above the upper edge of the table by endless belts d, passing over pulleys e, supported in the rigid frame F, or by brackets fastened to the frame and extending under the proper distance over the table, the tube rotating and carrying upon them the material as shown in Fig. 2. The tube is provided from end to end with a row of perforations, and with a hand lever, h, at one end, and is connected by a hose i, to a tank, pump or reservoir, delivering water at a pressure of from eight to 12 feet of head, as the nature of the case requires.

In operating the machine the feed box is narrowed to about one inch at its farther end, or has a strip of board set edgewise in the bottom, and running obliquely across the same from the rear to the front side, causing the material to gradually be brought to the front and discharged through the feed holes c, upon the table, thereby insuring an even distribution and steady flow of the material to be treated; a steady and copious supply of water is maintained in the box, and the ores, sands or tailings introduced therein. The water escaping through the openings, c, flows down in a thin light stream over the face of the table. The mineral particles are deposited upon and retained by cloth or other surfacing material on the face or bed of the table, while the light refuse matter is carried over the lower edge and discharged outside of the box C. After the collection of a suitable amount of metal upon the

table, the supply of water, etc., to the feed box is stopped by the gate and turned upon the other table. Clear water is now supplied to the first pipe, E, and allowed to run down over the table (for a moment,) washing off the remaining refuse sands, and at the proper time the hinged leaf D, is drawn (by the rod) under the edge of the table, the pipe being rotated or turned and the water thrown through the perforations upon the table in a row of fine jets, forming an almost continuous sheet or film. By means of the lever h (which should be fastened on the pipe at right angles to the line of perforations), the tube is turned and the sheet of water swept over the table from the top to the bottom so as to drive all adhering particles therefrom and wash them down into the box C. After this operation the jets are stopped from this tube, the leaf

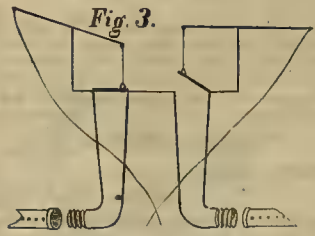


thrown back, and the gate shipped to the other feed box, the feed water coming back on to the first table, the operation being repeated as often as it is seen the tables are charged with the sulphurets or other valuable metals.

By employing the proper kind of cloth, grooves, riffles, or copper plating, or all of them combined, and giving the tables the proper grade, and properly regulating the flow of water, the inventor finds that he can effect a very rapid and thorough separation without agitating the table, and without power of any kind except the manual labor requisite to change the feed from one table to another, and washing them off by means of the water used in the pipes; he also finds by the employment of the fixed table he can separate particles which cannot be retained in machines which vibrate. By the use of the feed openings, c, of the form shown, the discharge of the sand, ore or other fine material is rendered very steady and gradual, as it will be carried through the narrower portion of the openings, while the lighter water will pass over the same through the upper large end of the openings, taking up the material very gradually and distributing it very evenly upon the table. It is obvious that the rotating tube may be sustained in any other manner, and that it may be connected in any suitable manner with the source of the water.

The object in arranging the perforated pipe so that it can rotate is to permit a gradual change in the direction of the jets, so that their point of impact upon the table can be advanced from its upper to its lower edge, and thereby every portion of the surface subjected in turn to the direct impact of the jets, in order to effectually loosen and drive forward the particles therefrom.

The flow of water can be regulated by the valves operated by the cords. The gate shown in the feed trough, G, will throw the water into either feed trough as desired.



The plugs in the ends of the pipes, E, are for the purpose of freeing them of any obstructions.

Fig. 3 represents the most convenient form of erecting the tank or reservoir which supplies the tubes with water, it usually being placed directly overhead with water shed underneath.

Mr. Tolles with this apparatus does not profess to do what many others claim to do, but he is running many of them where everything else has failed. He has been running several of these tables on the Comstock for nearly two years and is now building more. By using the proper kind of sizing apparatus in connection with the tables, the inventor is doing some very close work with them at a nominal expense of constructing, running and keeping in order. He states that any person using anything of like nature, or any portion of the same for like purposes, without first obtaining license for so doing will be prosecuted for damages for such use. Persons at a distance can build and run them by first obtaining license and instructions from the inventor, John U. Tolles, at Eureka, Humboldt county, California, or W. S. Tolles, his authorized agent at Virginia, Nevada.

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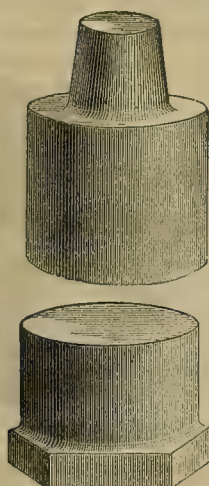
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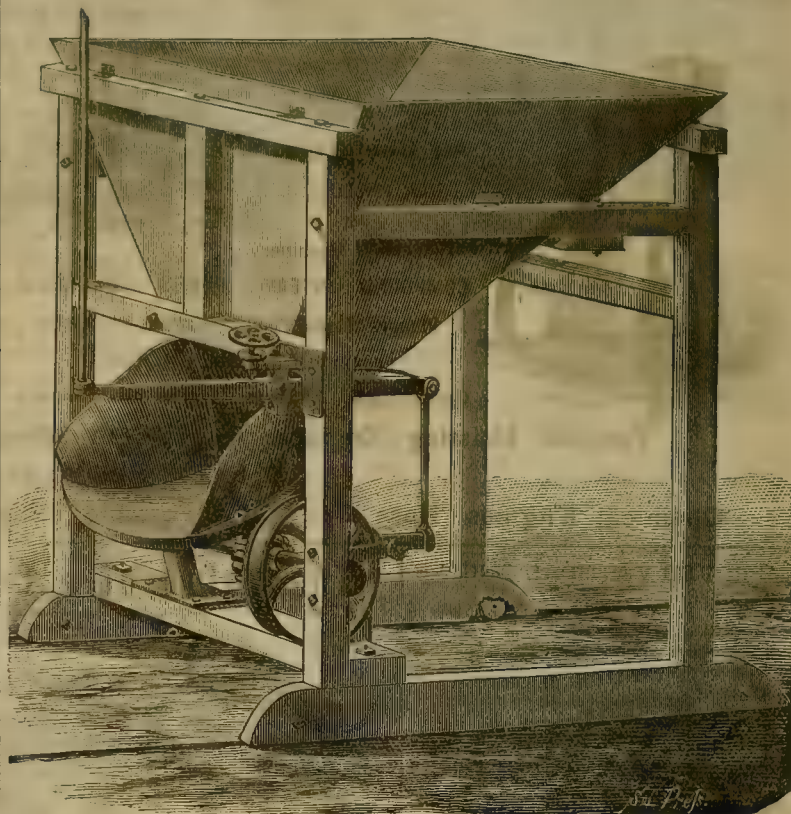
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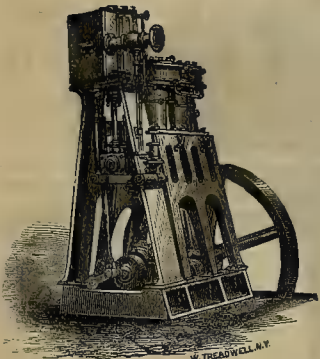
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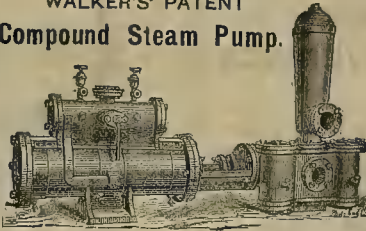
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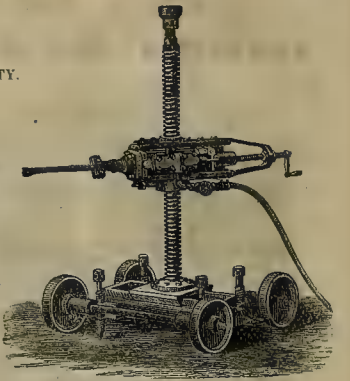
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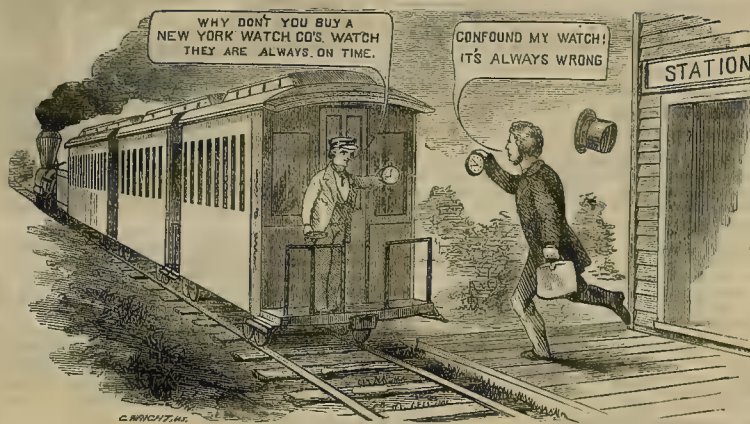
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SAN FRANCISCO, SATURDAY, APRIL 21, 1877.

VOLUME XXXIV.
Number 16.

Arizona.

We had a conversation this week with Mr. D. S. Lusk, of Sacramento, who has just returned from Arizona, bringing with him some very rich specimens of ore running from \$800 to \$22,000 per ton. He is here now for the purpose of obtaining a quartz mill, which he intends taking to the Bradshaw mountains, about 45 miles from Prescott. At this place there is plenty of wood and water for the mill, and there are over 100 paying claims near by turning out ore, which will run from \$50 to \$3,000 to the ton.

Mr. Lusk is quite enthusiastic over the mining prospects of Arizona and thinks the Bradshaw mountains the best mining country on the coast. They are well timbered and there are running streams with from 50 to 5,000 inches of water. He reports quite an extent of unprospected country in the Bradshaw mountains, and says new ledges are discovered every day; but it is no place for a poor man to go yet, as there is no labor required, there being no reduction works in which ore can be worked. Most of the new comers are going to Globe district, where the ores are very rich, but some are leaving there also, as they can get no employment and even if they find rich ledges and can get no ore worked, they are little better off, as far as immediate requirements are concerned, than if they had nothing.

In the Bradshaw mountains there are a number of prospectors at work and more are coming, but the great want of the country is reduction works. Expenses are not very heavy, but still are such as will not warrant men without means going there. In Prescott board and lodging can be procured from \$17 to \$20 per week. In that vicinity flour is from \$10 to \$12 per hundred; bacon and ham, 45 and 50 cents per pound; sugar, 28 and 30 cents; butter, one dollar per pound; eggs, one dollar per dozen, and other things in proportion. There are plenty of deer and wild turkeys and beef and mutton are cheap. A miner can live in his cabin from \$30 to \$40 per month. Labor is all the way from one dollar to four dollars per day when there is any demand for it, but there is no chance for employment at all. None of the mines are developed sufficiently to need miners, and it hardly pays to get out much ore without means of reducing it. Mr. Lusk says no man without means to live upon for a year need come there, as it will be at least that long before milling facilities are provided, for they take time and capital.

As far as the expenses of a trip to the Arizona mines are concerned they depend, of course, on the camps selected. To go to Prescott from here the fare is \$75 and meals on the way cost about \$10. It takes from five to six days to get to Prescott. Mr. Lusk made the quickest trip yet made, as it only took him four days and 17 hours. As the railroad nears the Colorado river, however, the time is materially shortened. Mr. Lusk says that there is a first-rate opening in Prescott for a "live" hotel-keeper and also a good chance for a livery stable. In the mines thereabouts, there are plenty of men taking out ore and working a little to keep along for the "good time coming," but it is no place for poor men. Our informant speaks highly of the agricultural resources of some parts of the Territory which he visited. He says the Salt River valley cannot be beaten. The soil will produce largely and grows corn, sugar-cane, cotton, fruits, alfalfa, etc. About the San Pedro river there is plenty of good land for agricultural purposes and also some very good mines.

COPPER.—The copper market in Liverpool is not very brisk, there being but a moderate business doing. Latest quotations are: Chile bars, 270 5s to 270 10s per ton for good ordinary brands; ore, 14s, and regulus 14s to 14s 3d per unit. Stocks of west coast produce on the first instant were 13,847 tons fine, against 12,980 tons on the first ultimo.

INCREASING HOURS OF LABOR.—A dispatch from Virginia, Nev., states that the Consolidated Imperial mining company has adopted the rule of making 10 hours a day's work for mining below ground, and requiring men working on top to put in 12 hours.

Changes of Level in the Earth's Surface.

EDITORS PRESS:—Without claiming exactness, the accompanying diagram is intended to represent the apparent relative altitude of the highest peak of the Butte mountain and the Coast range before and after the earthquake of 1868. The highest peaks of the Buttes appeared at all times and in all conditions of the atmosphere, when visible, to be clearly above the line of the Coast range. The second peak always appeared to be just below the line of the Coast range. The period of observation was from the autumn of 1862.

It is my impression now that the Buttes were slowly rising up to the time of the earthquake. I give it as an impression only. For some weeks before and after the earthquake the view of the mountains was obscured by the smoky state of the atmosphere. For some days, about

southwesterly direction from point of observation.

Detailed facts of this kind are to be found too numerous to mention. The soundest and firmest earth is itself in motion. Many of the observations of the earlier astronomers were vitiated by the constant oscillatory movement of the earth's crust. Such facts lead to the unavoidable conclusion that the solid crust of the earth rests upon a yielding surface. That the rock material of which the interior of the earth is composed is made yielding by heat is shown by the immense periodical flows of lava which occur. Now, the molten interior of the earth is constantly cooling, leaving the crust too large for the ever-shrinking mass it contains. The solid crust can only follow by collapsing and bending until the breaking point is reached. Then comes the earthquake or break, and a new adjustment is made and the earth is again restored to its spherical form, to be followed by another collapse and break, to be repeated as long as the earth endures, or until it is congealed to its very center.



MARYSVILLE BUTTES BEFORE AND AFTER EARTHQUAKE OF 1868.

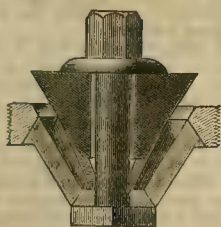
the time of the earthquake, the atmosphere was so dense as to nearly if not quite obscure the sun and render it difficult to distinguish objects but a half a mile distant. This obscurity did not arise from clouds, but as I then supposed from the smoke of a volcano in active eruption in the far north.

After the atmosphere became cleared by a fall of rain, to my surprise I was able to see a clear line of the Coast range above the highest peak of the Buttes, and it was the same in all conditions of the atmosphere when the mountains were visible. I called the attention of many others to the fact. I had to go down the hill at least 300 feet lower than my dwelling to bring the Buttes up to the height they appeared before the earthquake. Before the earthquake

It seems remarkable that no more has been done by geologists towards a systematic observation and calculation from such phenomena. It might lead to such knowledge as would enable us to tell with the most unerring certainty when the period for a destructive earthquake was at hand in any given locality. Certainly we are presented with a most favorable opportunity for such observation in the undulatory movements of the Butte mountains. These movements must be caused by the lateral pressure in the earth's crust, and might be observed up to the breaking point.

The phenomena which I have recorded was unlooked for, and consequently I was unprepared for making accurate observations. I can say, to the best of my recollection, however, that the lower point of the mountain, in the illustration, was up so as to leave but barely a line of the coast mountain visible above just prior to the earthquake.

F. A. HERRING.



The Wilcox Conical Valve.

I went up the hill at least 200 feet and could not bring the highest peak of the Buttes down on a level with the line of the Coast range against the horizon.

Since the earthquake the buttes have been slowly rising until now they are apparently nearly up to the position they seemed before.

In the illustration, *a* is a profile line of the Coast range; *b*, highest apparent altitude of the Marysville buttes prior to the earthquake of October 21st, 1868; *c*, apparent altitude after the earthquake. The point of observation is located on the western slope of the Sierra Nevada, at an altitude of about 2,500 feet, near Forbestown, about 30 miles from and in a north-easterly direction from Marysville, California. The Butte mountains are located in the Sacramento valley, about 30 miles from point of observation. The summit line of the Coast range is about 60 or 70 miles beyond the Buttes in a

[Copyrighted.]

Mechanical Ore Concentration and Separation—No 30.

[Written for the Press by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.]

Administration of the Works.

The administration of mineral-dressing works should not be in the same hands as that of the mine furnishing the ore, because a mutual control will always prove beneficial to the mine-owner. The facility of weighing and sampling all the ore treated, even in the most frequent cases where mine and works have the same owners, will result in a wholesome insight into the workings of both mine and works, and the entire financial independency of one from the other will stimulate both to promote economy. Skilled labor in these works is as important as

others, but as, on this continent, it is very scarce, the constructor should be able to train all hands required. The lack of this ability would result in long and costly inconveniences.

Both requirements, construction and putting into operation of mineral dressing works are on the European continent a specialty, for one of the most extensive machine builders and iron founders (Maschinenbau - Actien - Gesellschaft Humboldt, at Kalk, near Cologne), and in England the same is followed as a specialty by a machine company in Glasgow; but in the United States, as yet, no beginning deserving attention has been made, although there is more need for such an establishment on the Pacific coast than in any other country on the globe, and no doubt with good earnest we would achieve in mineral dressing here what in mill practice is unanimously conceded to us, viz: a progress leaving behind all precedents.

But in order to do so, we should prepare by a thorough knowledge not only of what has successfully worked heretofore, but what has proved erroneous in principle or practice, and should protect ourselves against all invention and patent humbugs, either monopolizing old useful contrivances or resurrecting old machines long ago rejected by intelligent practice. Progress is certainly possible and probable, but only based on true and established principles, and only within the limits of special application; but not in the shape of panaceas, as nearly every innovation is put up for with the ignorant ones. A machine company for the special construction of mineral dressing works under experienced and intelligent administration in San Francisco would certainly be the first and best step to acclimatize the trade in the country and to facilitate financially its introduction where there is so enormous need for it.

Wilcox's Conical Pump Valve.

The accompanying cut represents one of W. C. Wilcox's improved water valves, which is designed especially for working under heavy pressure. It will readily be seen that the construction of the valve is such (being, when seated, entirely encased in metal) that no amount of pressure can crush it. Any expert examining the valve will readily see the ease with which water can pass through it in comparison with the usual form of valve which consists in openings through a horizontal surface, covered by a plain horizontal valve; hence the water, on passing through strikes the cover and reacts upon itself, thereby causing a great loss of power as well as capacity to carry water in proportion to the size of the openings. By the peculiar shape of the valves illustrated the water starts in a line on its way up, meeting with none of the usual obstructions.

The valve was the invention of Mr. W. C. Wilcox, of this city, and he is now putting it on such pumps as are intended for heavy work. For mining pumps it is first-class, the openings being large in proportion to the pipe, and there being nothing to get out of order. These valves are working in some of the Wilcox pumps which are hoisting water 500 feet perpendicular, and giving entire satisfaction.

CHIEF JUSTICE WAITE has announced that, on account of the insufficient appropriation, the Supreme Court will be unable to sit after May 15th, and will, therefore, not hear cases later than May 7th.

CORRESPONDENCE.

Mills and Mines at Pioche, Cherry Creek and White Pine in Eastern Nevada.

[From Our Traveling Correspondent.]

Pioche, the county seat of Lincoln county, is at present unusually quiet. Like the sick man at the pool of Siloam, she seems to be waiting in patience and faith for "the moving of the waters." Little is going on outside of the Alps, the Meadow Valley and the Raymond & Ely, and these, unless the first named is excepted, are doing comparatively little. The principal lode of the district, on which the Meadow Valley and Raymond & Ely are located, lies in the quartzite, not far from the limestone, and is looked upon as a true fissure. It varies in width from three to 15 feet. Its productiveness in the past needs no repetition. The number and amount of its dividends will not soon be forgotten, but a cloud at present overshadows it. There is no good reason to think that the trouble arises from any diminution in either the quantity or quality of the ore, as it is reported as at least of good fair grade at the greatest depth attained. If the immense body of water encountered at the 1200-foot level by the two leading companies can be permanently lowered, there is every reason to believe that the district will regain her wonted prosperity, and bask anew in a sunshine as bright and glowing as that which gladdened her palmiest days.

The Meadow Valley M. and M. Co., J. B. Duff, Esq., Superintendent, have already in place a portion of their pumping machinery, said to be equal to anything on the Comstock of the same capacity, and are awaiting its completion before anything further can be done towards developing the mine. The vein at the greatest depth reached is represented as a true fissure and better defined than in the upper levels. The ore has changed from a chloride to a sulphide of silver, averaging \$125 per ton. Some ore is still extracted from the upper works. Nothing very definite was learned as to the intentions or future movements of the company.

The Raymond & Ely M. Co. Had also reached the 1200-foot level, where the water was struck, and appear to have been gaining upon it, when one of the gear wheels of their powerful machinery was accidentally broken. While waiting for repairs, they have been engaged in searching for new bodies of ore in the upper levels, where there is still a large amount of undeveloped ground, which gives fair promise of yielding bodies of paying ore. All the tailings from the whole of the ore worked from the very outset have been preserved in good shape to the amount of 6,000 tons. Capt. H. H. Day, the Superintendent, sets their value in the gross aggregate at \$2,000,000. The company have two fine mills, one of 30 and another of 20 stamps, which are now ready to start upon the tailings, besides working the ore that may be taken from time to time from the mine.

They have also a narrow-gauge railroad from mine to mill, 20 miles in length and rolling stock complete, which gives them cheap and rapid transportation for their ore. In addition to this they have connected with their works a well appointed foundry and machine shop, ample not only for all their own requirements, but for much custom work called for in the vicinity.

§The Alps S. M. Co.

Mill of 15 stamps, 6 pans and 3 settlers, at Pioche, is kept busy on custom and Alps ore. But owing to scarcity of water, is running day-time only. It has been largely dependent upon the Raymond & Ely mine for a supply of water and will not be able to run 24 hours, until that company's pump shall have started. The Alps Co. have at their mill some 6,000 tons of valuable tailings which are waiting for an increase of water before they can be worked.

They have also leased the Newark mill in Condon canyon, which is running night and day, partly on concentrations and partly on custom ore,—a large portion of the latter coming from the mines of A. T. Barber, at Leeds, Utah, of which mention was made in a late letter from that district. Mr. J. H. Collier has charge of both mills. The mine is being thoroughly prospected on the lower level with very favorable indications—what ore that is extracted coming from the upper works. A. J. Blair, Esq., is the Superintendent.

On the road from Pioche to Cherry Creek there was

A Lost Vein Luckily Found

Somewhere about the 1st inst. (April) from 20 to 30 miles from Ward. It was V-shaped and evidently no true fissure. The "honest miner" would have little thought of locating it. Its contents carried not a trace of either gold or silver. It is needless to say

"Who steals my purse steals trash, 'tis something, nothing; But he that filches from me my good name, Robs me of that which nothing enriches him, And makes me poor indeed."

In the way of "the needful," it contained nothing but greenbacks, but what was of far more importance, papers of value, affecting the interests of others, the loss of which might have seriously damaged one's reputation for honesty and integrity. Thanks to Mr. Fred. Gilmer, agent at Ward for Gilmer, Salisbury & Co.'s daily stage line from Pioche to Eureka. No sooner were the facts laid before him than he set out on the uncertain search. Thanks also to the honest young employee of the Co. at Beef Station into whose hands it fell. The pocket memorandum with contents entire were promptly forwarded within 24 hours from the time it was found missing.

§In Robinson District.

White Pine county, only a few claims are being worked, from which you will hear something in due time if the results are as favorable as anticipated. Between this and Cherry Creek there are two new and promising camps, lying on opposite sides of the same range, known as Granite and Hunter mining districts. The latter is creating at present quite a stir and promises to be unusually lively the coming summer.

Cherry Creek,

Also in White Pine Co., presents many of the marks of a good metalliferous neighborhood. The visitor is struck with astonishment at the external indications that meet him on every hand in the character of the wide spread float rock, the bold and massive cappings and other unmistakable signs of mineral. Knowing as he does that nature never misleads if her language is rightly interpreted, he is led to wonder why so little comparatively has been done in view of the encouraging prospects.

The district contains a number of excellent veins and much rich ore, but litigation has been the bane of the camp—not a bad sign, by the way, as going to show that there is something here worth contesting. It is hoped that drawbacks of this kind are about ended. A brighter day is already beginning to dawn. The present outlook is far more hopeful than ever it has been here, and events are thought to be shaping themselves in such a way as to soon render it one of the most prosperous districts of eastern Nevada.

A few cases will now be given, showing the formation, size of veins and value and kinds of ore.

The Pacific Consolidated S. M. Company

Are working their mines through a tunnel, stopping ore from the upper levels, and sinking a winze at the same time from the tunnel level, with splendid prospects of developing a good body of ore. It has already passed through two or three strata of good ore, which is believed to be the extreme south end of a fine chimney previously struck above. A drift will be extended north through the ore body as soon as the depth of 1,000 feet is reached. Vein eight feet in thickness; direction north, 30° east. The country rock seems to dip generally to the west, while the lode dips east at about the same angle (45°). The ore, usually found in chimneys with strike to the south, varies in value from \$60 to \$180 per ton. Mr. J. H. Roberts, the Superintendent, characterizes it as a true fissure vein, cutting in its course both the granite and porphyry.

The Mary Ann, at present worked through the same tunnel, continues northerly 1,500 feet to the Flagstaff. The vein is said to be strong and the out-crop very large.

The Flagstaff is opened by three shafts, showing good bodies of ore, and will also be cut by the same tunnel as the last mentioned.

The Geneva Consolidated M. Company,

Mr. J. T. Maclean Superintendent, own the Ticup and Geneva, the former being opened by incline 575 feet on the vein. It lies between the slate and the limestone; width from one and a half to four feet. It is said to be traceable for not less than seven miles, with ore at intervals the whole length. Selected ore has heretofore worked from \$480 to \$560 per ton, but as the company have a mill of their own, they prefer to work all classes together, and are making it average them \$154 per ton. The character of ore, bromide-chloride and black sulphurets of silver. It works up to 94% of assay value without roasting. Hoisting works are in process of erection. As soon as completed a full force will be put on, when the mine will no doubt become very productive.

The Geneva is represented as a good, large contact vein, between the quartzite and limestone, the ore carrying a high percentage in gold and averaging \$250 per ton, some first-class shipped having run as high as \$1,000. The company have also an excellent little mill of six stamps. It really consists of three two-stamp batteries, placed side by side. It is claimed by Mr. W. R. Hughes, the Superintendent, that it will crush as much ore as a 10-stamp battery as ordinarily rigged, its capacity being from 12 to 15 tons per day, which is attributed to the opportunity afforded for a treble discharge, saying nothing of the saving in the wear and tear of belts, pulleys and the gearing generally.

The Star S. M. Co.

A shaft has been sunk to the depth of 370 feet, at the foot of which the vein was cut at right angles by a short drift and a level run 80 feet in length, showing a width from wall to wall of 8 feet.

It is in a quartzite, the walls nearly perpendicular. The character of ore, ruby and antimonal silver, much like that of Austin, requiring to be roasted. As much as \$121,000 worth of ore has been worked in the neighborhood, running \$180 per ton.

Several carloads of first-class shipped averaged \$400. It is expected that work will soon be resumed, the Tehama mill having been recently removed from the Shell Creek range for the purpose of working the ore.

The Gray Eagle, adjoining, has a shaft 100 feet deep. The ore runs \$100 in silver, besides containing considerable gold. The Pine Nut, on the same ledge with the Ticup, averaged as per shipments \$379 per ton.

The Exchequer

Lies between the porphyry and quartzite, and is 4 feet in width at the depth of 240 feet. Ore works \$80 per ton, about 600 tons having been reduced the past year.

There are many mines here lying idle, principally for want of capital to work them. The Chance is said to have taken out from a shaft 100 feet deep as much as \$15,000 worth of ore.

The Baltic is represented to be from 25 to 30 feet in width, with large bodies of \$40 ore, some running high into the hundreds. Favorable mention was also made of the Wonder, the Victoria, the McGary, the Mayflower and a score or more of others.

The district was discovered about four years ago, since which it has shipped to San Francisco over \$600,000 in bullion—nearly every coach leaving carrying one or two bars, of which no mention is made, as there is no local paper to chronicle the fact.

It is said that the Ticup and Geneva mines have shipped \$100,000, and the Star as much as \$200,000.

The mines occupy two main mineral belts, running parallel and about one-half mile apart. The country rock, commencing on the east with the granite, is followed towards the west by porphyry, quartzite, slate and limestone, in the order named.

White Pine District

Is unusually quiet, only a few companies at work, and these engaged in running tunnels, or for the most part prospecting.

The Henry tunnel, on the eastern slope of Treasure hill, contemplates running 2,800 feet, and reaching a depth of 1,500 feet from surface. It is intended to cut all north and south veins in its course; among the number, the Phil Sheridan, which is said to be one of the finest prospects in the district.

There is also a very large tunneling enterprise in progress by an English company, known as the

Eberhardt and Aurora Mining Company.

They are sinking an incline on the mine, which lies on the southern slope of Treasure hill. It is now down 1,100 feet, and is intended to cut the Aurora ledges at its intersection with the tunnel—at a depth of 1,400 feet.

The tunnel will be 6,400 feet in length when completed, something upwards of 900 feet being already run. The full extent of ore body cannot be fully determined until further developments are made. The mines of the company are understood to lie wholly in the limestone. They yielded, for the year 1876, about \$63,000 per month in the gross.

North of the Eberhardt and Aurora mines come the Beecher South, the Beecher North, the Edgar, Silver Wave, O. H. Hidden Treasure, North Extension, and the East Sheboygan—all awaiting the result of developments that may be made by the English company.

The Hamilton Mill Company

Own, on the east slope of the hill, the Charter Oak, Pogonip Flat, the Othello and Pogonip North, represented to have ore that averages \$50 per ton, and yet they, like many other mines fully as valuable, if not more so, are, for some reason or other, permitted to lie idle.

The Jennie A. and Black Rock Mining Company, Superintended by W. M. Ford, are running an incline and tunnel on their mines, situated near the summit of White Pine mountain. They lie between the limestone and quartzite, and are, in places, from six to ten feet wide. The ore is galena and carbonate, valued at from \$80 to \$100 per ton, silver, and from 40% to 50% lead. Some good bodies have been passed through, the ore improving with depth, the greatest now reached being 140 feet.

The '76 mine, owned by Col. Tyson, of San Francisco, is on the west side of the same mountain. It has a four-foot breast of carbonate ore—silver, 35 to 80 oz.; lead, 45% to 55%.

The Stafford Mine.

Adjoining the Haggin & Lewis, is spoken of as one of the most promising prospects of the district. It milled to the amount of \$20,000 worth of ore last year, and has either on dump or in sight at least 1,000 tons. The incline is 50 feet on the vein; at present cross-cutting and blocking out ore.

On the west spur of Treasure hill there are quite a number of promising

Base Metal Mines,

Such as the Imperial, Fay, Whippoorwill, Charter Oak, Oden, Oh Jo, Coningsburg, the Oro, the Mineral Point, East and West, and the Compensation and Good Luck—all encouraging prospects, ores said to assay, on average, 75 oz. silver and 45% lead; yet nothing is at present doing, either from want of capital or a practical knowledge as to best mode of reducing the ores.

The Boston Mine,

Owned by James Reilly and J. T. Gilmer, who have secured a United States patent for the same, was formerly known as the Virginia. It was abandoned and relocated under the United States mining law of May 10th, 1872, and is bidding fair to become a very valuable prop-

erty. They are sinking a prospect shaft from tunnel level on the vein, encountering rich bunches of ore daily. The vein will be cross-cut at the depth of 50 feet, to develop a rich body of ore found in upper works, which is said to dip at an angle of 45° to the west. The present shaft is expected to open up a continuous body from the surface its entire projected depth of 225 feet.

Mineral Hill District, Eureka County,

The chief mines in this district are owned by the Mineral Hill silver mines company of London, and from the Superintendent, Mr. Daniel J. Bousfield, we learn the following particulars concerning the mines. Like most of eastern Nevada mines the deposits or veins of ore are found in a limestone formation. The ore in the mines of Mineral Hill as a general thing being found intimately associated with quartz and spar, contains considerable antimony, zinc and other base metals; the ore bodies as a rule dipping easterly at an angle of about 40 degrees, the vein extending regularly from north to south.

At the present time the company is extracting some high grade ore and will start up their 15-stamp mill as soon as they have sufficient on the dumps—which, judging from appearances, will be at no distant day. The last run of the mill, completed a few weeks since, was a very successful one, the ore averaging \$254 per ton.

We think that by a judicious expenditure of a small amount of capital in prospecting the mines to a greater depth, large paying bodies of ore might be discovered, and Mineral Hill would once more come to the front as one of the large bullion producers of the Pacific Coast, the "hill" so far having produced between two and three million dollars in silver bullion.

The Austin Co.'s Mine,

Lying south of the Mineral Hill Co.'s ground, is looked upon as one of the best claims on the hill. It has probably yielded to date \$400,000.

Others are working near the surface, taking out some very high grade ore, but usually in no large amounts. The 101, owned by Hulburd Bros. produces ore that runs \$1,000 and upwards per ton, while that of the Bonanza, on the same hill, has in some instances worked as high as \$1,500.

The locality of the mines shows evidence of considerable local disturbance on the surface.

The mines will in all probability become more defined and the ore more concentrated as greater depth is attained. The large quartzite dike that cuts the mountain in connection with the slate belt lying near the ore bodies may be regarded as so far favorable.

A. C. K.

Spanish Belt and Philadelphia or Belmont Mining Districts.

EDITORS PRESS:—On the eastern slope of the Smoky Valley range of mountains in Nye county, about 80 miles southeast of Austin, the pleasant and prosperous capital of Lander county, are located the two well known mining centers whose names form the caption of this article. They are easily approached from the Central Pacific by stage from Battle Mountain, and by both stage and rail from the Palisade station via Eureka. The Battle Mountain route leads directly through Austin and Smoky valley in the Reese River mining region. This vast extent of country derives its name from a small stream called Reese river, which flows from the south to the north through the valley which borders the western base of the mountains. The extreme length of this mountain stream—which can hardly be dignified by the name of river—is about 150 miles. It is a tributary of the more pretentious Humboldt, into which it is supposed to empty, but it usually sinks, and is, the same as are all the sage brush streams, lost in the parched sands before it reaches that swift-flowing stream.

Eastern Nevada,

Which is now tolerably well explored, but not so well prospected, is that portion of the State lying south of the Humboldt river and extending to the Colorado and east of the line of the 41st Washington meridian. It comprises a trifle more than half of the State, and is well known to be rich in minerals. In topographical appearance it presents a succession of parallel ridges of mountain and valley, whose axial lines extend quite regularly toward some point of the opposing polar circles. This affinity of polar strikes is a noticeable feature of not only the great mountain chains and valleys of Nevada, but is also a distinguishing feature of its numerous venous formations, great fissures and mineral-bearing lodes, and even of the structure and cleavage fractures of its rock formations.

Spanish Belt

District, wherein are located those two promising properties owned by the Consolidated and South Barcelona companies, was discovered by a party of Mexicans as early as 1867. It adjoins and is distant from Belmont or Philadelphia district about eight miles in a south-westerly direction. The two Barcelonas, the Spanish Belt, San Pedro and other mines are located on a slate formation about six miles

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MECHANICAL PROGRESS.

Suggestion for Iron Planers.

Prof. Sweet, of the Cornell University mechanical school, is making a thorough study of the metal planer, and has introduced several features which will increase its efficiency. Among others we notice one which he describes in the *Polytechnic Review* as follows: It is in regard to the proper time to feed the tool to the work. The fact is indisputable, that the tool should not be fed along while the machine is taking the cut, but it may be fed while it is going back, just as it starts back, or just as it starts forward. This latter is considered by others to be the best time, because the tool may run back in the track it has just made.

If a machine be absolutely rigid, there must be friction on the tool as it returns; if the machine springs, there is more; in either case the tool following back in the channel made must be worn away in exactly the part that does the work; besides, the part worn away is exactly square on the end. Now, my plan, which is to feed when the machine starts back, throws the tool on the uncut surface and wears the tool in a somewhat different place. Besides, the point of the tool coming in contact with the higher surface tilts the tool box and throws the tool at quite an angle from the vertical, so that the portion of the tool worn away is worn at an angle, and thus gives clearance to the cutting edge.

There is another feature about the planing machine with which I am not satisfied: In the ordinary method of arranging the feed so as to change the throw and also the direction, it is done by changing a stud in the slotted disc, so that changing the stud nearer to, or farther from, the centre of the disc gives greater or less travel to the feed rod. If it be desirable to change the direction of the feed, it is necessary not only to reverse the pawl but also to stop the planer and shift the stud to the opposite end of the slot. In point of fact this stopping the machine in order to change the pin to the opposite end is so much bother that it is not done once in ten times. We ought to be able to change the throw without stopping the planer at all; besides, in whichever way the pawl is turned the feed ought to take place at the commencement of the back stroke.

Encouragement for Inventors.

We agree with the *Western Manufacturer* when it says that it knows of no one who is better entitled to the name "public benefactor" than the man who by his intelligence and inventive genius has perfected new labor-saving machinery, and thereby created new forms of industrial labor, and so increased the capacities of production in any given direction as to furnish numberless conveniences and necessities, and luxuries even, at such low rates that the masses may enjoy what otherwise would be confined to the wealthy few. Such a man preeminently is Dr. C. O. Crosby, of New Haven, Conn., who has recently perfected a machine for automatic production of steel pens, which produces perfect pens at the rate of 150 per minute, or 90,000 per day. The *Hartford*, (Conn.) *Times*, referring to the above, says: "This item of news recalls some other incidents in the life of Dr. Crosby, which appear to be worthy of notice, as they show him to be a remarkable inventor in the number as well as the ingenuity of his productions. Dr. Crosby is a native of Hartford, and is about sixty years old. He has had a varied experience, having worked on a canal, in a printing office, a woolen factory, as a clerk in a store, as a silversmith, has been an actor, a merchant, a dentist and an inventor. One of his inventions is a machine for making fish-hooks, that makes over one hundred finished fish-hooks per minute, and so cheaply that they can be exported and sold in England at fifteen per cent. less than they can be made for in that country. Another is the needle machine, which has almost revolutionized the manufacture of needles. Accompanying this machine is another of his inventions for counting and putting the needles into papers. A machine for making and sticking pins, a ruffle and tape-trimming machine, and one for sewing boots are among the number of the inventions of this remarkable man, who has been one of the best customers of the patent office, his letters patent numbering about one hundred and fifty."

TRANSMISSION OF POWER BY SHAFTS AND ROPES.—The power lost by transmission from the prime motor to distant work is a matter of great importance. Our readers will be interested to know that the advocacy of ropes for transmission, to which we have formerly alluded in these columns, is still maintained. At the recent meeting of the English Society of Engineers, Mr. H. Robinson read a paper in which the following points were made: As regarded the transmission of power by shafting, etc., the results of several experiments and calculations showed the loss to be from 32 to 37 per cent. The application of ropes as a means of transmitting power at Oberusel, near Frankfurt-on-the-Main, at Logelbach, in Alsace, at Schaffhausen-on-the-Rhine, and at Fribourg-on-the-Saane, was next described. The loss of power by transmission by a single wire-ropes was estimated to be about six per cent. It has been stated that the cost of ropes was only one-fifteenth that

of an equivalent amount of belting, and only one-twentieth that of shafting. The wear and tear of ropes, together with the necessity of avoiding steep inclinations where the distances were long, lessened the advantages of that system. On the other hand, the loss of power in transmission by ropes, varied only as the velocity, whereas either by compressed air, or by water, the loss due to friction increased as the square of the velocity. The application of rope gearing to transmit the power from the prime mover to machinery in a factory, in substitution of toothed gearing, was also mentioned.

American Manufacturing Progress.

The most practical evidence of the progress of American manufactures is found in the way in which we are supplanting the English in the markets which hitherto they have controlled. Of our progress in the Russian trade in agricultural implements we have lately made mention. The testimony of our advance does not come from our own side of the water, but from the English, who certainly would not exaggerate the matter on our side. The last received issue of the *Colliery Guardian* says: "It is within our knowledge that the Americans are supplying agricultural implements as well as edge tools and general hardware to Australia and New Zealand; and the information is this week that they have succeeded in devising a light plow, which even the Caffir farmer has taken up, yoking it, as he now is, to a pair of oxen, to the displacement of the time-honored mamootie, which the Caffir laborer has for so many years made to do, in his own hands, the work of the spade and the plow. The American has just entered the Cape market; but once in, he has a faculty for remaining, and there is reason to conclude that in all the four great foreign markets we have indicated, he is likely to make his implements and his hardware increasingly popular, and he is beginning to sell new world hardware, as well as plows, to our fellow subjects at the Cape. The last mail thence contained the ominous requirement that a certain valuable consignment of miscellaneous hardware requisites, before bought only from firms in England, should be made up wholly in America, though the merchant to whom the order was sent has his warehouse in the heart of the hardware industries of our Midland counties."

CHEAP ELECTRIC LIGHT AND POWER.—We find in a recent lecture before the Bristol mining school the following paragraphs: The electric light apparatus has been so far perfected by Messrs. Siemens Brothers that I feel sure we can illuminate our colliery surface by night much cheaper by this means than by any other method. It can be seen working at Messrs. Siemens's works, Charlton, daily, and in a short time one of the donkey engines which is now lying idle at night will be the force employed to illuminate the pit banks at Trafaigar colliery instead of three and one-half tons of coal.

I am now making some large batteries out of our old used-up iron tubs and tar casks, and the waste ammoniacal water from the gas works, and some hematite iron ore, to drive a magneto machine for pumping water out of the workings at a distance from bottom of shaft. I have a small electric engine constructed on purpose; the battery on the table the size of a quart pot, made in the same way, will heat one-half inch of platinum wire red hot. The residue of the battery is the purest of iron, perfectly free from carbon, and made direct from the iron ore without smelting. A method of preparing iron I am not going to lose sight of; and perhaps of some commercial importance in the future if we can make our old tubs act as furnaces, and get a motive and illuminating power at the same time we are making pure iron.

UNLOADING GRAIN CARS.—An improvement in discharging grain from cars has been patented by Mr. Eugene Davis, of Clinton, Ill. A section of elevated track, of a car's length, reached by incline approaches, is suspended on an axle, and worked by aid of a cogged wheel and ratchet, by means of which the car can easily be inclined so that the grain runs under a sliding door at the end into a trough leading to the elevator or to a car on the adjoining track. The platform on which the car stands is so easily adjusted, that it almost moves automatically, and so rapid is its operation that it is stated by experts that 200 cars can be unloaded in a day with the assistance of four men.

REMOVING SCALE FROM BOILER TUBES.—Mr. S. S. Pilson, Master Mechanic of the Louisville, Cincinnati and Lexington road, removes scales from boiler tubes by placing them in a furnace. The heat loosens the scale and causes it to fall off, besides annealing and restoring the tubes. They are straightened by being placed while hot on an iron rod and hit, where needed, with a hammer. Mr. P. has also invented an attachment for grain-car doors, which excludes dust and rain, and also serves to seal and lock the car.—*Nat. Car Builder*.

IMMENSE CABLE.—The *Polytechnic Review* learns that Messrs. Kay, McKnight & Co., of Pittsburg, have recently furnished the Economy Society with a Manila drilling cable 3,000 feet long, weighing 3,600 pounds. This was purchased to finish the gas well which the society is now drilling at Beaver Falls, now down about 1,800 feet, and is said to be the largest hawser laid cable, without splice, ever made in this country. It was manufactured by Messrs. Henry Lawrence & Sons, of New York.

SCIENTIFIC PROGRESS.

Soils and Geology.

We notice that a Scotch geologist has been taking the scientific societies to task for bestowing so much attention to sea bottoms and losing sight of the soils which cover the surface rocks. In the report of a late meeting of the Edinburgh Geological Society we read a lecture by Mr. Melvin, in which he makes the following points on the importance of the soil as a theme for geologic research. What was wanted was, in his opinion, a minute and careful description of these soils and sub-soils, and of the materials of which they were composed, distinguishing the sources of the various mineral constituents, and the rocks from which they had been derived, as well as the nature of the vegetable and animal remains found in them. The agricultural maps of M. Delesse of Paris, were described and commended, and the hope expressed that the British Geological Surveys would not confine themselves to studying and mapping the bowels of the earth. Explaining that he meant by the surface soil that thin upper covering which, wherever vegetation existed, enveloped everything, and was the material worked on by the agriculturist, Mr. Melvin went on to point out that while the vegetable soil owed its origin chiefly to the growth of vegetation and insects, it afforded proof of a provision in nature for counterbalancing the destructive effects of atmospheric agents, the growth of plants and insects, and their death and decay, forming a soil whereon other plants and insects could grow with increased vigor. The earth could not otherwise, he thought, be what it was, as frost and heat and rain and wind would so act on its surface that it would become either a sandy desert or an arid wilderness. He then argued at length that the surface soil or mold was the product of vegetation and insect life, and it was steadily increasing; that it was the great preserver of the surface strata from disintegration and denudation; that the waste of the land was chiefly from the sides and bottoms of runs, streams, or rivers, while the great surface of the country, covered with vegetable soil, lost comparatively little—a position which, it was explained, was at variance with the views of Hutton and Playfair. Such able writers as Professor Geikie, who advocated the Huttonian theory and the uniformity of all geological phenomena, had never, it was remarked, shown how the vegetable soil or mold had attained its present thickness. Admitting that the soils were made up of boulder clay and other deposits, which formed the mother soil of most countries he was acquainted with, this did not account for the manner in which the soils had been formed. The fallacy of the views entertained by the writers referred to, was that, while they admitted the existence of a covering of vegetable soil by mold, they denied that it increased. The facts, in his opinion, showed that, at one time, the surface of the country had no covering of surface soil, but that, as vegetation spread, a soil began to form on its decay, being fed by successive coverings, and that this soil had continued to increase, and was still increasing, wherever it was not deprived of the decayed produce of its growth by the hand of man. He pointed out that the finest and deepest soil in Australia lay on an elevated tract in the interior of Queensland, and not along the coast where, were the Huttonian views correct, the action of water would be expected to have carried it. The soil along the Australian coast was generally not deep. In conclusion, he stated that the soil was similar in depth, and possessed an equal power of producing vegetation or insect life in both hemispheres, and argued from this point that the same causes had produced the soil in both cases, and that age corresponded in a like degree.

GOLD METALLURGY BY THE WET PROCESS.—In reducing pyritous gold ores, J. O. Stewart has found a curious chemical change which is not noted in the books, and which we shall state briefly. The ore was a lot of 20 tons from Gilpin county, containing two and one-half oz. gold, and 3% copper per ton, and carrying about 15% quartz. Part was roasted with the addition of 3% of sulphate of soda, and the rest by itself, all without salt, and then passed through the Hunt & Douglas process. Mr. Stewart supposed that after roasting the gold would appear in a metallic state, contaminated only with the sulphates of copper and iron, and was surprised to find that only 10% to 40% of the gold would amalgamate in the pans. Upon investigation he discovered that 60% to 90% of the gold was held in solution in the liquor as a chloride. This he precipitated with metallic copper, and was pleased to note that by the combined bath and pans he had made a saving of 95% of gold. The copper contained in the ore was worked up to 98%, and we give below its chemical condition produced in the process of reduction: Ore roasted without sulphate of soda showed of the copper 40% as sulphate, 59% as oxide, and 1% as sulphide. Ore roasted with sulphate of soda showed 60% as sulphate, 39% as oxide and 1% as sulphide. This test shows that gold is soluble in a solution of salt, iron and copper heated to 180° Fah., and is one of many experiments which have proved the advantages to be gained by using the Hunt & Douglas process on ores containing gold, silver and copper.—*Colorado Miner*.

Influence of Forests on Climate.

This is a question on which authorities disagree. It is, however, one of immense importance to dwellers in many parts of this State. We find in the *Journal of Chemistry* the following statement:

Many rivers have totally disappeared or have been reduced to mere streams by an irrational and heinous felling of the forests. In the north-east of Germany, the Narp and Gold rivers exist only in name. The classic lands of antiquity are rich in sad lessons of deforestation. The springs and brooks of Palestine are dry, and the fruitfulness of the land has disappeared. The Jordan is four feet lower than it was in the New Testament days. Greece and Spain suffer severely to this day from the effects of destroying their forests. Many parts of the kingdom of Wurtemberg have been rendered almost barren by the felling of the trees. In Hungary the periodically returning drouth is universally attributed to the extermination of the forest. We attribute the present unfruitfulness of Asia Minor and Greece to the destruction of the woods; steppes, ruins, and tombs have taken the place of what was the highest culture. Sardinia and Sicily were once the granaries of Italy, but have long since lost the fruitfulness sung of by the ancient poets. On the other hand, man can improve the condition of the land in which he lives, more slowly indeed, but as certainly, by cultivating and preserving the forests. In earlier years, reliable authorities have told us that in the delta of Upper Egypt there were only five or six days of rain in the year, but that, since the time when Mehemet Ali caused some 20,000,000 trees to be planted, the number of days of rain in the year has increased to 45 or 46. The Suez canal has produced remarkable results. Ismailia is built on what was a sandy desert, but since the ground has become saturated with canal water, trees, bushes and other plants have sprung up as if by magic, and with the reappearance of the vegetation the climate was changed. Four or five years ago rain was unknown in those regions, while from May, 1868, to May, 1869, fourteen days of rain were recorded, and once such a rain storm that the natives looked upon it as a supernatural event.

NAPHTHA WELLS IN RUSSIA.—A few miles from the town of Bakou, in the Caucasus, are situated the naphtha wells of that district. For hundreds of years naphtha has been extracted by the natives of this locality, and the quantity underground appears to be unlimited. A well 81 feet deep is shown to the visitor which was dug 200 years ago by the Persians when they were masters of the country. In summer, when gases are generated in the bowels of the earth, the naphtha is thrown up in jets, some reaching 100 feet in height above the ground, and then runs to waste in the absence of means to collect such large quantities of this oil. Mr. Churchill, the British Consul at Resht, Persia, reports that while at Bakou last year on the way to his post, he visited the wells on the neighboring plateau of Balakhana. He says that in 1874 the tax of 25c per pood (36 lbs.) of petroleum brought the government 280,000r., showing a production of 1,120,000 poods of petroleum, and a consumption of three times that amount of naphtha. In that year upwards of 180 manufactories were at work in the outskirts of Bakou, but, owing to the enormous competition of American petroleum, many of the smaller manufactories have been compelled to shut up. The two largest are at Surakh Khana, eight versts from Balakhana. This spot was chosen for economy of fuel, as gas issuing out of the surface is used in lieu of coal or naphtha. You have at Surakh Khana the wonderful sight of green fields and waving corn, in the midst of which removal of a foot or two of earth will reveal a jet of gas that will raise an enormous blaze if set on fire. It is here that the Hindoo monastery of fire-worshippers is established, where a tongue of flame is perpetually kept up.

LABORATORY MANIPULATIONS.—Dr. P. T. Austen, of the New York Academy of Sciences, says the following apparently unimportant details often contribute much to the ease and pleasure of working: (1) The use of square pieces of felt, such as are used under beer glasses in saloons, for setting hot beakers and flasks on to prevent chilling and consequent cracking. (2) In crystallizing substances for examination under the microscope, one watch glass is placed upon another with the substance between them, and the upper glass filled with ether, the cold produced by its evaporation hastening the crystallization. (3) Removing precipitates and solid matter from flasks, by heating to boiling and inverting in a vessel of water. (4) Crystallization by gradual dilution. (5) Filtering water without ash. In German laboratories it is customary to dissolve out the mineral matter from white filtering paper by washing in dilute hydrochloric and hydrofluoric acids. (6) The use of infusorial silica for drying purposes. Being very porous, it will absorb five times its own volume of water. If a filter paper, holding a wet precipitate, be placed upon a layer of this earth, it will become quite dry in a very short space of time. Mr. Austen also remarked that substances retain their heat for several days when placed in cork boxes. To keep a substance air-tight, it may be placed in a flask, the neck painted with a solution of india rubber in chloroform, and a plate of glass laid upon it. The solvent quickly evaporates, leaving a delicate film of rubber, which holds the glass tightly in place.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 20.	Week Ending Apr. 3.	Week Ending Apr. 12.	Week Ending Apr. 19.
Alpha.	151 1/4	152 1/2	123 1/2	11 1/2
Alma.	1 1/2	1 1/2	1 1/2	1 1/2
Andes.	1 1/2	1 1/2	1 1/2	1 1/2
Baltimore Con.	1 1/2	1 1/2	1 1/2	1 1/2
Belcher.	1 1/2	1 1/2	1 1/2	1 1/2
Belmont.	1 1/2	1 1/2	1 1/2	1 1/2
Best & Belcher.	1 1/2	1 1/2	1 1/2	1 1/2
Bullion.	1 1/2	1 1/2	1 1/2	1 1/2
Caledonia.	1 1/2	1 1/2	1 1/2	1 1/2
California.	1 1/2	1 1/2	1 1/2	1 1/2
Challenger.	1 1/2	1 1/2	1 1/2	1 1/2
Chollar.	1 1/2	1 1/2	1 1/2	1 1/2
Confidence.	1 1/2	1 1/2	1 1/2	1 1/2
Con Imperial.	1 1/2	1 1/2	1 1/2	1 1/2
Crown Point.	1 1/2	1 1/2	1 1/2	1 1/2
Crown Con.	1 1/2	1 1/2	1 1/2	1 1/2
Dayton.	1 1/2	1 1/2	1 1/2	1 1/2
Eureka Con.	1 1/2	1 1/2	1 1/2	1 1/2
Exchequer.	1 1/2	1 1/2	1 1/2	1 1/2
Gould & Curry.	1 1/2	1 1/2	1 1/2	1 1/2
Grand Prize.	1 1/2	1 1/2	1 1/2	1 1/2
Gila.	1 1/2	1 1/2	1 1/2	1 1/2
Globe Con.	1 1/2	1 1/2	1 1/2	1 1/2
Golden Chariot.	1 1/2	1 1/2	1 1/2	1 1/2
Hale & Norcross.	1 1/2	1 1/2	1 1/2	1 1/2
Hussey.	1 1/2	1 1/2	1 1/2	1 1/2
Justice.	1 1/2	1 1/2	1 1/2	1 1/2
Knickerbocker.	1 1/2	1 1/2	1 1/2	1 1/2
Kossuth.	1 1/2	1 1/2	1 1/2	1 1/2
Lady Bryan.	1 1/2	1 1/2	1 1/2	1 1/2
Leviathan.	1 1/2	1 1/2	1 1/2	1 1/2
Leeds.	1 1/2	1 1/2	1 1/2	1 1/2
Modoc.	1 1/2	1 1/2	1 1/2	1 1/2
Manhattan.	1 1/2	1 1/2	1 1/2	1 1/2
Mansfield.	1 1/2	1 1/2	1 1/2	1 1/2
Meadow Valley.	1 1/2	1 1/2	1 1/2	1 1/2
Mexican.	1 1/2	1 1/2	1 1/2	1 1/2
North Con Virginia.	1 1/2	1 1/2	1 1/2	1 1/2
New York.	1 1/2	1 1/2	1 1/2	1 1/2
Nevada Block.	1 1/2	1 1/2	1 1/2	1 1/2
New Coso.	1 1/2	1 1/2	1 1/2	1 1/2
Occidental.	1 1/2	1 1/2	1 1/2	1 1/2
Ophir.	1 1/2	1 1/2	1 1/2	1 1/2
Overman.	1 1/2	1 1/2	1 1/2	1 1/2
Pacific.	1 1/2	1 1/2	1 1/2	1 1/2
Phil Sheridan.	1 1/2	1 1/2	1 1/2	1 1/2
Pioneer.	1 1/2	1 1/2	1 1/2	1 1/2
Prospect.	1 1/2	1 1/2	1 1/2	1 1/2
Raymond & Ely.	1 1/2	1 1/2	1 1/2	1 1/2
Rock Island.	1 1/2	1 1/2	1 1/2	1 1/2
Savage.	1 1/2	1 1/2	1 1/2	1 1/2
Sierra Nevada.	1 1/2	1 1/2	1 1/2	1 1/2
Silver Hill.	1 1/2	1 1/2	1 1/2	1 1/2
South Chariot.	1 1/2	1 1/2	1 1/2	1 1/2
Sucon.	1 1/2	1 1/2	1 1/2	1 1/2
Trojan.	1 1/2	1 1/2	1 1/2	1 1/2
Union Con.	1 1/2	1 1/2	1 1/2	1 1/2
Utah.	1 1/2	1 1/2	1 1/2	1 1/2
Wells-Fargo.	1 1/2	1 1/2	1 1/2	1 1/2
Woodville.	1 1/2	1 1/2	1 1/2	1 1/2
Yellow Jacket.	1 1/2	1 1/2	1 1/2	1 1/2

Sales at S. F. Stock Exchange.

FRIDAY, A. M., APR. 13.				
24 Alpha.	101 1/4	100	New York.	25c
380 Alma.	1 1/2	1 1/2	200 North Con Virginia.	35c
150 Andes.	1 1/2	1 1/2	500 Overman.	15c
970 Best & Belcher.	21c	21c	500 Ophir.	13c
720 Belcher.	5c	5c	300 Phil Sheridan.	10c
370 Bullion.	3c	3c	500 Rock Island.	10c
300 Baltimore Con.	15c	15c	300 Raymond & Ely.	3c
2215 Con Imperial.	1 1/2	1 1/2	300 Savage.	2c
395 Crown Point.	1 1/2	1 1/2	350 Sierra Nevada.	3c
850 Caledonia.	1 1/2	1 1/2	250 Silver Hill.	1c
1805 Con Virginia.	34c	34c	250 Solid Silver.	5c
385 Chollar.	34c	34c	250 Utah.	1c
100 Confidence.	1 1/2	1 1/2	250 Union Con.	3c
2175 Caledonia.	2 1/2	2 1/2	250 Yellow Jacket.	8c
50 Dayton.	15c	15c	MONDAY, A. M., APR. 16.	
770 Exchequer.	3c	3c	75 Alpha.	1c
1450 Gould & Curry.	81c	81c	350 Best & Belcher.	16c
385 Hale & Norcross.	2 1/2	2 1/2	485 Justice.	5c
790 Julia.	1 1/2	1 1/2	300 Bullion.	3c
20 Kentuck.	1 1/2	1 1/2	400 Crown Point.	1c
300 Leviathan.	40c	40c	300 Caledonia.	34c
705 Mexican.	1 1/2	1 1/2	100 North Con Virginia.	40c
100 North Con Virginia.	40c	40c	250 Crown Point.	5c
170 Ophir.	1 1/2	1 1/2	150 Exchequer.	3c
1330 Overman.	17c	17c	1100 Phil Sheridan.	6c
390 Pacific.	6c	6c	1150 Gould & Curry.	81c
180 Sierra Nevada.	4c	4c	1150 Hale & Norcross.	2 1/2
160 Silver Hill.	2c	2c	970 Justice.	8c
100 Sucon.	40c	40c	400 Kentuck.	3c
390 Union Con.	40c	40c	250 Mexican.	1c
1875 Yellow Jacket.	7c	7c	1150 Overman.	15c
AFTERNOON SESSION.				
50 Alpha.	1 1/2	1 1/2	680 Savage.	2c
100 Alps.	1 1/2	1 1/2	375 Sierra Nevada.	3c
420 Belcher.	5c	5c	340 Utah.	1c
100 Belmont.	1 1/2	1 1/2	AFTERNOON SESSION.	
530 Best & Belcher.	20c	20c	200 Advance.	3c
150 Bullion.	3c	3c	75 Alps.	1c
2075 Caledonia.	2 1/2	2 1/2	150 Andes.	1 1/2
205 Chollar.	34c	34c	150 Belcher.	5c
1105 Con Virginia.	34c	34c	150 Best & Belcher.	17c
1130 California.	39c	39c	2 1/2 Caledonia.	70c
175 Crown Point.	1 1/2	1 1/2	1370 California.	35c
100 DeFrees.	1 1/2	1 1/2	200 Challenge.	1c
75 Empire Id.	6c	6c	150 Chollar.	3c
375 Eureka Con.	18c	18c	1100 Con Imperial.	1 1/2
100 Gen Thomas.	30c	30c	1100 Con Virginia.	33c
50 Grand Prize.	4c	4c	500 Dayton.	1c
450 Golden Chariot.	37c	37c	470 Eureka Con.	15c
580 Gould & Curry.	81c	81c	200 General Thomas.	20c
230 Hale & Norcross.	2 1/2	2 1/2	50 Gila.	40c
35 Jackson.	2c	2c	400 Golden Chariot.	2c
95 Leonard.	2 1/2	2 1/2	2075 Grand Prize.	4c
60 Leeds.	1 1/2	1 1/2	630 Hale & Norcross.	2 1/2
430 Modoc.	2 1/2	2 1/2	315 Julia.	1c
100 Manhattan.	6c	6c	910 Lady Wash.	8c
35 Mexican.	1 1/2	1 1/2	61 Leeds.	1c
265 Northern Belle.	21c	21c	205 Leopard.	2 1/2
650 New Coso.	3c	3c	250 Leopard.	2 1/2
300 Ophir.	1 1/2	1 1/2	250 Manhattan.	7c
180 Overman.	15c	15c	215 Mexican.	1c
250 Ray & Ely.	1 1/2	1 1/2	350 New Coso.	3c
180 Union Con.	40c	40c	115 New York.	25c
1345 Yellow Jacket.	7c	7c	250 North Con Vir.	30c
SATURDAY, A. M., APR. 14.				
380 Alpha.	8c	8c	320 Northern Belle.	16c
385 Andes.	1 1/2	1 1/2	350 Overman.	15c
50 Alma.	1 1/2	1 1/2	250 Ophir.	14c
2100 Best & Belcher.	16c	16c	100 Phil Sheridan.	6c
400 Belcher.	5c	5c	140 Prospect.	25c
850 Bullion.	6c	6c	85 Raymond & Ely.	3c
250 Baltimore Con.	10c	10c	100 Rock Island.	15c
2745 California.	30c	30c	445 Sierra Nevada.	3c
2440 Crown Point.	40c	40c	300 Trojan.	50c
3650 Con Virginia.	30c	30c	2445 Union Con.	40c
115 Chollar.	2c	2c	500 Yellow Jacket.	8c
3970 Con Imperial.	30c	30c	TUESDAY, A. M., APR. 17.	
1535 California.	21c	21c	385 Alps.	1c
50 Challenge.	1 1/2	1 1/2	600 Belcher.	5c
170 Confidence.	1 1/2	1 1/2	1180 Best & Belcher.	21c
105 Dayton.	10c	10c	315 Bullion.	7c
1025 Exchequer.	2 1/2	2 1/2	705 Con Virginia.	35c
370 Eureka Con.	15c	15c	200 Con Imperial.	1 1/2
1475 Gould & Curry.	81c	81c	370 Chollar.	3c
1320 Hale & Norcross.	2 1/2	2 1/2	475 Chollar.	3c
810 Julia.	1 1/2	1 1/2	35 Confidence.	1c
1075 Justice.	1 1/2	1 1/2	175 Crown Point.	1c
300 Lady Wash.	1 1/2	1 1/2	135 Exchequer.	3c
540 Leviathan.	2c	2c	1735 Gould & Curry.	81c

MINING AND SCIENTIFIC PRESS.

MINING SHAREHOLDERS' DIRECTORY.

(Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.)

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co	Washoe	8	25	Mar 2	Apr 9	Apr 30	M Landers	309 Montgomery st
Alma S M Co	Washoe	15	50	Mar 2	Apr 9	Apr 30	W H Watson	332 Montgomery st
Baltimore Con M Co	Washoe	15	50	Mar 2	Apr 9	Apr 30	C A Sankay	332 Montgomery st
Bullion M Co	Washoe	3	200	Apr 6	May 10	May 31	J S Kennedy	419 California st
Con Imperial M Co	Washoe	3	25	Mar 9	Apr 12	May 3	W E Dean	419 California st
Dardanelles M Co	Washoe	6	100	Apr 2	May 3	May 19	W S Duval	402 Montgomery st
Dayton M Co	Washoe	7	50	Apr 2	May 3	May 15	W E Dean	419 California st
Golden Chariot M Co	Idaho	19	50	Mar 29	Apr 12	May 3	J T McGeoghegan	Merchants Ex
Gould & Curry	Washoe	3	100	Apr 5	May 10	May 31	A K Durbrow	309 Montgomery st
Hale & Norcross	Washoe	54	50	Apr 5	May 10	May 31	J F Lightner	309 Montgomery st
Julia Con M Co	Washoe	3	100	Apr 5	May 10	May 31	A Noel	419 California st
Knickerbocker M Co	Idaho	3	50	Mar 17	Apr 12	May 3	C A Shaw	408 California st
Lady Washington M Co	Washoe	17	25	Mar 16	Apr 12	May 10	B B Minor	309 Montgomery st
Lady Bryan M Co	Washoe	17	25	Mar 16	Apr 12	May 10	J H Sayre	330 Pine st
Miner G & S M Co	Washoe	17	25	Mar 16	Apr 12	May 10	D L Thomas	419 California st
North Con Virginia M Co	Washoe	8	25	Apr 18	May 23	June 12	W H McClintock	330 Pine st
Overman M Co	Washoe	37	300	Apr 16	May 21	June 11	J Maguire	419 California st
Pietou M Co	Washoe	12	25	Mar 7	Apr 9	Apr 26	G D Edwards	414 California st
Portland M Co	Washoe	12	25	Mar 7	Apr 9	Apr 26	S Phillips	414 California st
Savage M Co	Washoe	27	100	Mar 29	May 3	May 21	W Willis	309 Montgomery st
Silver Hill M Co	Washoe	11	100	Apr 11	May 17	June 7	E B Holmes	309 Montgomery st
Utah S M Co	Washoe	16	200	Apr 12	May 16	June 4	W E Dean	419 California st
Wells-Fargo M Co	Washoe	25	100	Mar 1	Apr 9	May 7	G C Pratt	309 Montgomery st
Yellow Jacket M Co	Washoe	25	100	Mar 2	Apr 9	May 4	O H Bogart	402 Montgomery st
							P Bunn	Gold Hill

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Aureola M Co	Cal	2	10	Mar 23	May 2	May 25	T B Fitch	240 Montgomery st
California and Arizona M Co	Arizona	2	2	Apr 3	May 13	June 4	J T Jewell	507 Montgomery st
Cerro M Co	Cal	1	25	Mar 24	May 1	May 22	W Easton	419 California st
Del Rey S M Co	Cal	1	7	Mar 13	Apr 31	May 21	S A Chapin	Merchants Ex
East Branch M Co	Cal	15	200	Feb 27	Apr 2	Apr 23	J H Page	112 Liedesdorff st
Ed Dorado W & D G M Co	Cal	15	200	Mar 13	Apr 13	Apr 30	H Elias	524 Sacramento st
Edith Quicksilver M Co	Cal	10	50	Feb 24	Apr 18	May 7	W Stuart	113 Leidesdorff st
El Tesoro M Co	Lower Cal	2	10	Mar 31	May 16	June 13	W H Chickering	220 Sansome st
Equitable Tunnel & M Co	Utah	14	25	Apr 3	May 8	May 26	C S Healy	Merchants Ex
Gold Butte Gravel M Co	Cal	1	10	Mar 7	Apr 10	Apr 27	T F Hopkins	438 California st
Great Eastern Con Quicksilver M Co	Cal	5	25	Mar 29	Apr 30	May 19	J G Riley	320 California st
Golden Star M Co	Cal	18	30	Mar 25	Apr 23	May 21	G E Crane	410 Montgomery st
Gold Run M Co	Cal	13	25	Apr 5	May 20	June 7	C O Palmer	410 Montgomery st
Grass Valley New M Co	Cal	13	25	Apr 5	May 7	May 25	Geo Fletcher	424 Montgomery st
Idaho S M Co	Idaho	1	50	Mar 5	Apr 5	May 5	H Jacoby	424 Montgomery st
Mariposa Land & M Co	Cal	10	100	Mar 28	Apr 30	May 28	J Leavitt	309 Montgomery st
Mitchell M Co	Cal	10	100	Mar 28	Apr 30	May 28	A C Hammond	401 California st
Moore's Flat Blue Gravel M Co	Cal	3	100	Mar 6	Apr 30	Apr 30	J M Burlington	309 California st
Orange Con M Co	Cal	3	100	Mar 6	Apr 30	May 23	E A Rixford	402 California st
Ocean View Quicksilver M Co	Cal	1	25	Mar 10	Apr 25	May 23	B S Kellogg	218 California st
Occidental Reduction R & M Co	Cal	3	100	Mar 9	Apr 18	May 18	A C Hammond	401 California st
South Silver Hill M Co	Cal	3	10	Feb 26	Mar 31	Apr 21	B F Dahl	417 California st
Starr King S M Co	Cal	14	124	Mar 7	Apr 13	May 7	L Kaplan	Merchants Ex
South Modoc M Co	Cal	1	25	Mar 30	May 2	May 24	F M McLaren	330 Pine st
Taylor M Co	Cal	3	100	Mar 9	May 9	May 25	S S Leroy	607 Montgomery st
Union G & S M Co	Cal	14	11	Apr 11	May 11	May 26	R Vincent	Grass Valley

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

ANOTHER ALPINE BONANZA.—*Alpine Chronicle*, April 14: It is gratifying to us to be enabled to announce another instance of the wisdom of changing the system of mining in this county, the tunnel having been generally discarded for the shaft. The sinking of shafts have made the Excelsior and I. X. L. at Silver Mountain, paying mines, and we have now to chronicle an important strike in the Advance mine, at Monitor. The west drift of the advance at the 320-ft level, running toward the prospecting shaft of ledge 3, has penetrated ledge two 70 feet and not yet reached the foot wall. The hanging wall of this ledge is well defined—course north, 16° east, dipping east at an angle of 42°. Several feet of rich ore is found on the hanging wall; and the entire ground through which the drift has passed in this ledge is fine vein matter, thoroughly impregnated with mineral, and giving good assays in silver and gold. Increasing in value as the vein is approached. The northerly drift on this level is running outside of and parallel to ledge 2, all in pay rock, including some very rich quartz feeders. No cross-cutting has been done in this drift yet, but the course of the several feeders it penetrates indicates that this pay belt extends considerably beyond the limits of the drift. Work in the mine at present is confined to cross-cutting No. 2 ledge and preparing the ground by drifts for extracting a supply of ore for the mill as soon as it can be made ready to start; but work on the shaft will soon be resumed and drifts run at lower levels.

The Advance Co. commenced operation about eighteen months ago, and they have fine hoisting works and a three compartment shaft.

AMADOR.

YONK'S PLACER CLAIM.—*Amador Ledger*, April 14: Cleaning up is in order at Yonk's claim at Butte. The prospects indicate that it will pan out big. The Hinkley mine, of Jackson, has been idle for over twelve months. In consequence of the owner not possessing funds to prosecute development. It seems to be the prevalent idea that the mine is pockety, with no well defined ore chamber or ledge. This is incorrect. The opinion of those best acquainted with the property is that it constitutes a regular chimney of quartz. So far as opened the mine has paid from the very start, the rock being of high grade, every ton of it yielding handsomely at the mill. The shaft is down nearly 100 feet, the ledge continuing all the way. About this point, however, the ledge appeared broken, apparently by some disturbance subsequent to its formation. To follow it, drifting became necessary, which was pushed forward, until the sinking of a new shaft became absolutely necessary. Then came the sticking point. The owner had not the means to make the putting down a second shaft, and so work was suspended. The hole in the ground is not a very large one, but it has surrendered for \$13,000 to \$20,000. We are glad to learn that there is a prospect of speedy resumption of work.

COMET.—Gratifying intelligence reaches us concerning operations on this mine, lately purchased by John A. Starr. On Wednesday last a very rich body of quartz was struck.

NICHOLS'S GRAVEL CLAIM.—A tunnel has been run into the mountain a distance of 30 feet, passing through a seam of gold-bearing gravel, eight feet thick. Some idea of the richness of the bed may be gathered from the fact that pans of picked dirt have yielded as much as \$14 to the pan. The owners are happy in the anticipation of a golden harvest in the near future. The gold is of a coarse grain, indicating that it is present in considerable quantities. It has been the impression with many experienced miners that Butte mountain was pregnant with gold, and now that a large streak of pay dirt has been discovered, it is probable that other prospectors will be stimulated to tunnel into its rugged sides in search of hidden treasures.

The Volunteer mill is being removed to the Beck mine. This small mill is intended more for prospecting to test the quality of rock at Spanish gulch than anything else. A CLAY-UP of the rock from the Griesbach mine, at Mace's mill, last week, realized \$3,000 from about 100 tons of rock.

The Volcano tunnel is in 550 feet—just one-fourth the entire distance. The rock is not quite so hard as that encountered lately.

We learn that Mace's mill is now engaged crushing rock from Stoken's claim.

CALAVERAS.

EMERSON HYDRAULIC.—*Calaveras Chronicle*, April 14: Piping progressing steadily in the Emerson hydraulic, in Happy valley. A large area of gravel has been put through the flume since the last clean-up, and a good deal more will go the same way before the water falls.

DURYEA MINE.—Everything is progressing very favorably at the Duryea mine, in Chile gulch, and work is being pushed forward with all the energy of the season. Twenty-nine men are employed in and about the mine, operations progressing day and night. The battery is kept in constant motion, with very satisfactory results.

MOUNT TOLU.—Work has been resumed with increased vigor in the Mount Tolu quartz mine. The battery is running, no difficulty being experienced in mining rock sufficient to keep the stamps constantly employed.

GOVERNOR CLARK.—The Hon. Mr. Clark, proprietor of the Consolidated hydraulic claim, on Tunnel ridge, cleaned up lately, after a short run on "top dirt," no bedrock having been uncovered during the washing. The yield was in the neighborhood of 100 ounces—good returns, certainly, for the time consumed in piping and the number of hands employed.

COOK & CO.—In the hydraulic claim of Cook & Co., on the Calaveras, about five acres of top dirt have been stripped off, and everything is in readiness for piping up the bottom. As the gravel on and near the ledge is very rich, the company cannot fail of realizing a large amount at their next clean-up. Water is getting a little scarce.

MINING ITEMS FROM THE UPPER COUNTRY.—At West Point stopping still continues in the Champion. Rock from that mine is still being crushed, and the mill will probably be running in motion a couple of weeks longer. The Granite mine has been bonded to the Josephine company, and the machinery now on the latter mine is to be moved to the former. The machinery for the new mill on the Zacetero will all be on the ground next week. At Mosquito, Garland's mill has just completed crushing several lots of custom rock. Twenty-eight tons from Gass & Co.'s mine yielded \$34 per ton—a very handsome average. The ledge is a wide one. Eleven tons from the Blue Jay, owned by Potter & Rodgers, paid \$32 per ton. A new pump is to be put into the Champion mine, at Railroad. All the mills in the upper districts are now running, and times are livelier than they have been for years.

FRESNO.

CONFIDENCE.—*Fresno Expositor*, April 12: We learn that the Confidence quartz mine is about to be started up under more favorable auspices than ever before. The company will immediately erect a mill to be run by water power, for the purpose of crushing the ore from the mine. The work of developing the mine will also be pushed vigorously ahead. The services of an efficient mining Superintendent have been engaged.

INYO.

MACHINERY ARRIVED.—*Inyo Independent*, April 14: Considerable new machinery is to be put in the Rex Montis mill; among the rest, quite a heavy boiler to furnish steam for the pans, which was sent up to the mill two or three days since.

MINING EXCITEMENT.—Quite an excitement is said to have been created last week by the discovery of a large ledge of unusually rich quartz, located near the summit of the lofty peak in the Inyo range, nearly opposite Alabama hills. From accounts there is good reason to believe the reported discovery will prove of material importance, but we are not in possession of data sufficient to warrant a statement in detail.

STARTED UP.—*Conso Mining News*, April 14: The Minnetta mill was to have been started up yesterday or to-day. We presume it is now pouring out the silver. A large lot of very high grade ore awaits its turn for crushing; among others a Mr. Higgins has five tons on the mill dump, taken from a new find, which assays nearly \$500 per ton silver.

LOOKOUT.—Thos. C. James, foreman of the Modoc, says the Modoc never looked so well. Within the last week the ore bodies have increased to such an extent in the different districts that the company has been enabled to make more than supply both furnaces by disposing with the services of seven workmen. It is thought that the raise to connect No. 3 with No. 4 is within 10 or 12 feet of completion, and when that is done he can keep both furnaces supplied with ore and further dispense with 10 or 12 men. The bullion now being turned out averages over \$800 per ton.

The Defiance furnaces, which have been running since the 13th of March, were compelled to shut down last evening in consequence of a non-supply of ore, the work of running the cross-drift from the main hoisting shaft to the second ledge consuming more time for its completion than was anticipated. This cross-drift is for the purpose of facilitating the hoisting of the ore by the steam works, instead of handling some over two or three times at great expense. When this connection is made, which will probably require a week or two longer, ore can be taken out in sufficient quantity to satisfy the insatiable appetite of the two furnaces.

THE GOLD MILL.—The three-stamp gold mill of J. F. Trapp got up steam last Wednesday, and is now pounding away on ore that is believed will yield a handsome return on the money invested. If this mill succeeds, it will prove to be the entering wedge to more extensive works, not only in Old Conso but also in Snow & Grant's canyon, where there are numerous ledges, the ore from which works by arrastra over \$100 per ton.

EMIGRANT CO.'S MINES.—We took a trip to Lee district last Sunday. Although there were few signs of life at this camp, which but a short time ago was all bustle and activity, we found the mines there with piles of rich rock upon the dumps of the Emigrant company, and only waiting the expenditure of a little gold or gold notes to extract the silver and gold contained therein. This state of affairs, we are assured by Mr. Peter Taylor, the Superintendent, will not last much longer, as arrangements have been made to resume work. He went out last Tuesday and put a few men to work upon the mines, and in a few days he expects to receive orders from the Directors to start up the mill. During the interim of running through the old tailings and a few tons of the rich ore, a force of men will be sent to the mines to begin work upon the completion of which the mill will be removed from its present site to the mines, where the ore can be worked much more profitably and to a greater advantage.

NEVADA.

CASSIDY MINE.—*Grass Valley Union*, April 15: We were shown, yesterday, some fine ore which had just been taken out of the Cassidy mine, at a depth of 48 feet. The ore is very heavy and shows free gold and a great abundance of sulphur. The quartz has a very lively appearance. The Cassidy mine is on Opp Hill, a little east of the old and celebrated Empire mine. The Empire and Cassidy ledges are parallel. The prospects of the latter for resulting in a fine mining property are splendid. The ledge is about twenty inches thick where the good ore is now coming out. Some recent mill tests show that the rock will yield over fifty dollars to the ton.

CALIFORNIA.—*San Juan Times*, April 14: The American mine, at Sebastopol, cleaned up a portion of their boxes this week. Only a few of their head boxes were cleaned up, and yet the yield was much greater than they anticipated. At the close of another 30 days they will clean up their entire boxes from head to foot, including their under currents. They are now washing very rich ground.

RIVER MINING.—*Foot-hill Tidings*, April 14: River mining is still attracting a large share of attention here and in Sacramento. The pioneer organization for opening up the wonderful gold deposits known to exist in the beds of the various rivers flowing from the mountains in California—known, because worked in spots before the filling up of the rivers prevented "stripping" any more—was the Yuba River Mining Co. This company are down with their shafts near the point where the river will be run under the river and it cannot be long ere the results of the venture will be known. The rock became harder last week, impeding progress, or the drift would now be well under way. This change in the rock it is thought indicates the permanent bed of the river, and as no water seems to come in from the river side yet the feelings of stockholders are well up. So also are those of owners of other claims along the river, who are waiting for the word to start the "Long Bar" and the "Sand Flat," each of which have much promise in their mines, have been incorporated this week. As we predicted some weeks ago, so we reiterate now: river mining is destined to be the exciting and also the paying field of venture for the next few years. Fifty years will not see the river beds worked out as to their bed-rock deposits, and when these are worked out the gravel and slum deposits above will pay for hundreds of years more.

PLACER.

BLAST.—*Dutch Flat Forum*, April 13: The Baker claim exploded its second blast in solid gravel yesterday; 4,000 lbs. of dynamite were used in this blast, which resulted in excellent execution, loosening a large amount of gravel and exceeding the expectation of the most sanguine. As expected, the shaft was plugged, which will require several days to open.

The Star and Union is running well and washing in very rich gravel. The next clean up from this claim is looked for with considerable interest, as it will probably be one of the largest ever made in this district.

The Polar Star exploded a blast of 250 kegs of black powder on Saturday last. The drifts were run on the bed-rock and the effect was wonderful. The incline was partially plugged, but has since been cleared. Sufficient gravel was loosened to keep the claim in dirt for some time to come. This claim and the Southern Cross are washing as steadily as possible.

The Pacific is at cleaning up. There remains only one run down, when this claim will be exhausted on present level.

The Elmore Hill claim has let off three small blasts since our last. It is now washing again and is doing well. At Gold Run the Cedar and Bonanza claims continue washing, neither being ready to clean up yet.

The North Star and Illinois continue washing, and will probably run as long as the water lasts.

BEAR RIVER.—The Centennial and Crissman Co.'s mines, will be connected by means of a tunnel in a few days, and when accomplished, both mines will be worked through the same shaft or incline.

The Whipple mine still continues to pay well.

SHADY RUN.—Hydraulic progresses in the Wild Yankee, the mine is looking well, and it is thought will pay a dividend in a short time.

YOU BET.—The Nece & West and Walopla companies, under the superintendency of G. W. Powers, continue to wash with unabated success.

The Nevada M. Co., or better known as the Hayward claim, continues to wash from three points, all of which are making a good showing.

LIBERTY HILL.—As there is still an abundance of water the Liberty Hill Co. continue making splendid progress in hydraulic.

LITTLE YORK.—The Empire and Christian Hill Cos., continue to wash with full heads of water. The mines are looking well.

PLUMAS.

ANOTHER BIG CHUNK.—*Plumas National*, April 14: Edman & Co., on Eagle gulch, have certainly struck the "coarse gold streak," having found three big pieces in the last few weeks. The first weighed 43 ounces; the second, which we mentioned a week or so ago, 17 ounces, and now we learn that they picked up a chunk on the last which came up to 27 ounces. They came near losing the last piece, as it went through the upper flume and "grizzled," and half way through the lower flume before it lodged. Besides the big nuggets the claim is paying first-rate, and our friend Edman will be a "bloated bondholder" soon. Well, he and his partner have worked faithfully to open their claims, and certainly deserve their success. We hope the big "chunks" will continue to come, and increase in size as regularly as the three above spoken of.

THE BELL MINE.—Mr. R. Z. Bell, of the Bell company, arrived from Dubuque, Iowa, on Wednesday. The company have purchased all the necessary machinery for a new quartz mill, which is on the road, and will be at the mine by the time it can be used. Ten stamps will be started in first, and more will be added when necessary. The work will be pushed forward as rapidly as possible.

GOOD PROSPECTS.—Mr. A. Bolyar has during the past winter been running a prospect tunnel for drift diggings above Spanish ranch, his claim joining Garland's lava bed claims, and recently he struck splendid pay ground. This is encouraging, as Abe has worked hard to get at it, and besides the strike makes the chances of other prospect claims in that vicinity better.

IMPORTANT SALE.—Greenville correspondent, writing under date of the 11th inst., informs us that Messrs. Lawrence & Reed have purchased from John Ellis and Jack Lowery, the ledge recently discovered at the head of Soda creek, by Ellis, and known as the Washington mine, for the sum of \$20,000. Our correspondent says the experts, or, as he has called them, "bonanza sharps," consider this discovery the biggest strike ever made in that section. The strike will stimulate quartz prospecting all over the country. Many a ledge as good is to be found by a little patient labor, and with such chances it is well worth while to make an effort to find them. We are satisfied that the gentlemen who made the purchase will develop a very valuable mine, as they are too well posted on mines to pay that price for a poor prospect.

SIERRA.

AMERICAN HILL.—*Mountain Messenger*, April 14: The American Hill gravel mining company are reported to be getting along nicely. They have run off a large amount of ground and the prospects for a good clean-up, considering the scarcity of water, are first-class.

GOOD.—The Bald Mountain company recently took out 130 ounces of gold after about 12 hours working in the smelter.

The North Fork company have only some 500 feet more of tunnel to run to open their mine.

KANAKA.—Al. Bixby has returned from San Francisco and will proceed to open a creek claim in Kanaka creek, below Allegheny. The ground he claims has never been worked on account of the difficulty of getting down.

ORO.—The Oro company, by a large majority, voted to build a mill, and to accept the proposition of J. D. Olin to erect the erection of the same. No contract has yet been signed.

MONTE CRISTO.—All the men here are busy just now—35 all told. The Exchange is paying well at present and bids fair to do better soon. D. E. Williams one of the owners, still assists and directs its workings. The Mountain Lava, Swallow, Poodle, Cold Springs, Bull Dog and Scott's claims are being worked, many of which are paying good wages. There is a chance of doing better in course of time. McBride and Spencil intend running for the back lead.

EUREKA.—All the miners here are idle, except at Moore & Walker's diggings, Mugginsville, which are being worked. A short water season anticipated, and consequent dull times.

TRINITY.

QUICKSILVER.—*Trinity Journal*, April 14: Mr. Lawrence, Superintendent of the Altos and Boston mines, in Chinatown district, was in town this week, and from him we learn that the mines under his supervision are yielding sufficient quicksilver to pay a handsome profit, even at the rate of 40 cents per pound; 420 flasks were procured last month, with the retorts now in operation. It is probable that furnaces will be erected before another season.

TUOLUMNE.

NOR WORKED OUT.—*Tuolumne Independent*, April 14: Last Saturday a Chinaman working a claim just south of the Catholic cemetery at Columbia, found a piece of quartz and gold valued at \$208.50. This claim has been worked and reworked and abandoned three or four times. The last while owner, selling it to the Chinamen for \$400. Everybody felt confident that the Celestials had been badly swindled; but such was not the case. Ever since their purchase they have been getting good pay, and this big lump will help to lengthen the white man's face. They go down in holes between boulders one would think hardly big enough for a rat; but John, with a patience and perseverance worthy of all imitation, manages to skin out the narrowest crevices and gopher the richest streaks. We like to see these poor devils come out ahead when some white Alec imagines that he has sold them.

FERGUSON.—The owners of this mine are in a happy frame of mind at recent developments. Messrs. Hall and Ferguson visited the property last week, and brought to Sonora some very fine specimens of ore, said to go for at least \$50 per ton. The company have driven the tunnel 1,500 feet and are 10 feet on the Anderson chute—the vein starting as a mere stringer one-quarter of an inch thick, has increased in this distance two feet—at this point gives the company 300 feet back. This is the chute that Mr. Richard Inch was trying to develop, when he was so unfortunately drowned in the Tuolumne river while attempting to cross.

Nevada.

WASHEO DISTRICT.

UTAH.—*Gold Hill News*, April 18: The west drift on the 1150-ft level is steadily advancing. The work in the mine is confined to this one drift for the present, every effort being made to reach and prospect the ore vein at that point at the very earliest moment possible.

BEST & BELCHER.—A streak of clay was passed through in cross-cut No. 3 on the 1700-ft level during the first part of the week, and the face of the drift is again in soft vein porphyry.

SOLID SILVER.—Since last week's report a cave has occurred in the main drift north, interfering with operations somewhat, but it is likely to prove more of an advantage than otherwise, for it brought down a large amount of quartz, some of the pieces of which weighed over a ton, giving excellent assays in gold.

BULLION.—The new engine is working splendidly. The north drift on the 1500-ft level is making good progress, with no important change to record.

CALADONIA.—Yesterday morning the engines were stopped and the work temporarily suspended to make some necessary repairs to the steam pipes and machinery. That work was completed and everything is running full blast.

SOUTH COMSTOCK.—Continued good progress is being made in sinking the shaft, and it is now down 160 feet below the 300-ft station. The material at the bottom is ledge porphyry, with streaks of clay and small veins of quartz which give good assays.

SILVER HILL.—The south drift on the 650-ft level is showing some very fine quartz. Both drifts are making an average of four feet per day.

CHOLLAR-POTOSI.—Daily yield, 100 tons of ore, the average assay value of which is \$26 per ton. The old ore stops on the upper levels exhibit no material change.

BELOCHER.—Opening up the 1850-ft level is going rapidly forward. Sinking the main incline is making the usual good progress.

LADY WASHINGTON.—The east drift on the 950-ft level

has cut some fine quartz and has every appearance of being on the point of penetrating the vein proper.

COX VIRGINIA.—Daily yield, 40 tons of ore; 150 tons of this ore is extracted from the 1550-ft level, and the remainder from the 1650-ft level. The ore stops are looking well and yielding splendid ore at all points. The ore breasts on the 1450-ft level are being gradually extended, both east and west and south, and will soon be sufficiently opened to allow of a large increase in the amount of ore extracted from that portion of the mine. If it is desirable to do it, the south drift on the 1650-ft level, running to connect with the deep winze, is in a distance of 135 feet, the face still in rich ore. This drift has about 60 feet to yet run to make the connection. The upraise from the 1550-ft level, to connect with the 1400-ft level, to assist in the working of the southwest ore body between those two levels, is being pushed steadily forward.

CALADONIA.—Daily yield, 500 tons of ore. There is little or no change in any of the ore stops on the 1550 or 1600-ft levels. The character of the ore extracted is still of the heretofore high grade, and the mills are kept busy crushing up to their fullest capacities. The prospects of the mine were never better than at the present time. The mills in better order for a long and successful bullion producing run. The north drift, running to connect with winze No. 3, is being pushed vigorously forward, the face still in porphyry. This drift is being run some distance east of the ore vein, and will have 70 or 80 feet to run to reach and connect with the winze. Sinking the C. & C. shaft is being pushed steadily forward, the bottom still in hard blasting rock, and the flow of water strong. It is believed that the shaft will have attained a depth sufficient to commence the opening of the 1700-ft station by the first of May next.

OVERMAN.—The east drift on the 1300-ft level has penetrated the vein a distance of 65 feet, the entire distance in fine quartz. At that point the drift has been temporarily suspended in order to permit of the starting of a drift to the southward in the vein, to see what lies in that direction. As soon as the south drift is fairly under way, work in the drift eastward will be resumed.

OPHIR.—Daily yield, 30 tons of ore. This ore is being extracted from the old ore stops on the 1600-ft level, and has an average assay value of about \$20 per ton. The Winfield mill commenced crushing ore again to-day. Sinking the main incline is being pushed forward with all possible speed, and will reach a depth sufficient, if nothing extraordinary happens, to begin the opening of the 1900-ft station by the first day of May next.

JULIA.—The south drift on the 1800-ft level is rapidly advancing, the face still in quartz of a fine character. The west cross-cut from the main drift has penetrated 70 feet of fine quartz and low-grade ore. The east cross-cut (No. 2) recently started, and which it was supposed would only have a few feet to run to reach the east wall, passed through 12 feet of low-grade ore, then encountered a broken mass of porphyry and quartz for a distance of 25 feet, after passing through which, it cut a thin clay slip, the entire face of the drift being again to-day in a very encouraging character of low-grade ore.

NORTH COX VIRGINIA.—Sinking the shaft is being pressed ahead with the usual vigor, the bottom in splendid working ground. It is now about down to the 1300-ft level. An electric battery has just been procured for firing the blasts at the bottom of the shaft. This method admits of much better progress. The holes for the charges of giant powder in the bottom of the shaft are each drilled five feet in depth, by the Burleigh drills, and are then exploded 21 at a time with the battery, making a fearful excavation at each discharge.

The face of the vein is covered in soft ledge porphyry, with streaks of clay and quartz, requiring constant and careful timbering in order to prevent caving. The powerful drilling machinery heretofore employed is not so much needed just now, consequently the force of men is somewhat decreased; but with the next hard stratum encountered comes an increase of the working force again to keep the drills in full operation. The tunnel is passing through the various strata of the vein, and is now in a position to be parallel with the great Comstock fissure, and will penetrate the main range itself in the early part of next year.

CROWN POINT.—The east drift on 2000-ft level is being pushed ahead with the usual vigor. The face of the drift is to all appearances rapidly nearing the ore vein. The porphyry is steadily softening, the flow of water in the face has increased to about six inches in some places, and small seams of quartz and clay are beginning to be encountered. From some of the stringers assays of \$5 to \$8 per ton has been obtained.

MEXICAN.—The upraise above the 1455-ft level recently started on the six-foot streak of ore developed at that point, is being steadily pushed ahead. This raise is ten feet square, the entire face now being in ore that gives average assays of from \$20 to \$25 per ton. The flow of water in the bottom of the new shaft has been very strong during the past week, but is again gradually slackening. The north winze, below the 2040-ft level, is being sunk at the rate of five feet per day, and has about seventy feet to go to reach the 2200-ft level.

JUSTICE.—Daily yield, 400 tons of ore, which is being crushed as fast as extracted. Two or three steps are looking well on the 600, 700 and 800-ft levels. The ore body on 700-ft level is opening out finely to the eastward and promises a fine yield from that portion of the mine. The south drift on the 1000-ft level is still developing fine ore. The incline will soon have reached a depth sufficient to begin the opening of the 1100-ft level.

BALTIMORE AND AMERICAN FLAT.—The northeast drift on the 1400-ft level is steadily advancing, the face in making good progress, and the flow of water gradually on the increase, with evident indications of a near approach to the ore vein.

GOULD & CURRY.—The south drift on the 1700-ft level, running to connect with the Combination Savage winze, is making steady progress. The east cross-cut from the drift during the first part of the week cut through a seam of clay, having the regular north and south course and east dip of the regular ore vein.

IMPERIAL COX.—The east drift on the 2000-ft level is steadily advancing, the face in very encouraging ledge material. An east cross-cut has been started near the middle of the mine, on the 2135-ft level, the face of which is also in a fine character of ledge material.

HALE & NOACKROSS.—The gain on the flow of water has been but very little during the past week. The water is being held by the pumps at a point 80 feet below the 1000-ft level.

ATLANTIC COX.—The tunnel is to-day in 33 feet, and the ore vein having widened out to 23 inches, with every indication of still further widening, the Superintendent has considered it best to commence stopping upward and take out the ore for milling, which is now being done.

GRAND.—The west prospecting drift on the 815-ft level is steadily advancing, the face in a fine character of quartz mixed with porphyry and spots of ore.

SIERRA NEVADA.—The diamond drills have been used to prospect the ground to the eastward, on the 1500-ft level, without finding anything yet that will pay.

SAVAGE.—The pumps make but slow headway against the water, which is now only about 20 feet below the 1900-ft level.

UNION COX.—The north drift on the 1300-ft level is making steady progress, the face in porphyry, mixed with streaks of quartz and clay.

LEVATHAN.—Face of main drift north at the 600-ft level still continues in quartz of a very promising character.

PROSPECT.—Face of drift in hard material. Good streaks of quartz, however, are met with, some of which give high assays, principally in silver.

PHIL SHERIDAN.—Work on the 1400-ft level has been temporarily suspended, pending some necessary changes in the machinery.

SUCOR.—Sinking the shaft is making the usual fair progress.

DARBANELL.—The timbering of the new three compartment working shaft being about completed, sinking will be pushed forward with renewed vigor.

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long and from 500 to 900 feet broad. What are or were called the Wide West and the Ontario veins, were among the first discovered in the district. The former, which is said to have been opened by shaft to the depth of 50 or more feet, showed at this depth a vein 12 feet thick, which carried ore of a very fine character. The belt, whose altitude is several hundred feet above the subjacent plains and valleys, exhibits the

Unmistakable Characteristics

Which usually distinguish the rich mineral-bearing sections of this portion of the State. Both the elevation and the geological formation of this old but yet newest of new districts of southeastern Nevada are peculiarly favorable to the presence of rich and permanent ore deposits. The ore which the two Barcelona companies have thus far obtained from the surface, shaft and tunnel developments, have been of uniformly fine grade, carrying an admixture of chlorides, horn and ruby silver. At the time of my visit to this now promising locality, the joint tunnel had penetrated the hill several hundred feet on its course to the ledge. The work was being vigorously pushed ahead under the instructions of Superintendent Farrish, whom I was unable to see on account of his absence at Belmont on business. Had I met that gentleman it is not improbable that I would have succeeded in obtaining from him fuller and more accurate information regarding both the character of the explorations and the prospects met with while pursuing them, than I was able to collate from personal observation. At the entrance to the

Joint Tunnel,

Whose dimensions are, I have been informed, seven by seven feet, the visitor is brought face to face with a sign-board upon which is traced the significant legend, "No admittance." While this notice may not exactly specifically indicate the presence of ore in either this or other works where found, posted, it nevertheless is, in this instance, looked upon by miners here as good evidence that the inside developments are of so favorable a character that it will not at this juncture do to let the prying eyes of the outer world behold them. This is the view taken of it by the mining quid nuncs of Belmont at least, where it is currently reported and believed that ore of a superior quality had been found some weeks ago in a blind vein cut by the aforesaid tunnel. Be this as it may, it is very generally believed, and this belief has already exercised no small elevating influence upon the drooping spirits of the inhabitants of the vicinity. The next

Thirty or Forty

Days will, however, it is now presumable, relieve the doubts and suspense of all concerned and greatly enhance the value of the Consolidated and South Barcelona properties in your market. Should ore in paying quantities be struck in the tunnel, which is now pushed forward at the rate of from 35 to 45 feet per week, the partly dormant interests of this quarter of Nye county would, I hardly need say, receive from such discovery an impetus which would greatly benefit them, and lead to other undertakings which would help to develop the extensive mineral resources of a region that has hitherto been partly neglected. And that one and a ledge which will astonish many by their valuable and permanent attributes will soon be exhumed from amidst the superincumbent mass which cover them, I am at present, as are all who are acquainted with the locality, quite certain. No other conclusion could well be arrived at, and no other would be tenable or would do justice to the interests involved. The Barcelonas appear to be located on a true fissure of the contact order, the lode having slate on the hanging and porphyry on the foot-wall. A formation of this character, wherever found in Nevada, is invariably looked upon with confidence by the old and experienced miners and prospectors of the State. The reason of this confidence will appear obvious to the experienced miner and mineralogist, who always look for rich and enduring mines in such formations. True fissures extend to a profound depth, and their lateral expansions, as is the case of the Comstock, are also sometimes very great. They have, of course, their contractions, but they hardly ever resolve themselves into razor-like proportions by their walls coming close together. Faults and displacements they have, but they never become totally extinct in either longitudinal or downward trend. Silver mining is one of the most profitable and enduring of occupations, and without I am much mistaken, mining interests of this character will ultimately reward the enterprise of the Consolidated and South Barcelona companies.

Philadelphia,

Or Belmont mining district, of which I cannot write much at present for want of space, was prospected and incorporated in October, 1865. Colonel David Buel was the first to erect a mill there. It was a wet crusher and was completed in the latter part of September, 1866. But the ore having been reduced without roasting, not more than 50% of the silver was saved. But, notwithstanding this fact, the mill turned out \$100,000 in a little less than three months, with but 10 stamps, so high was the grade of the ore. The formation of the district is of slate and granite, the former, however, encasing the veins of the district, which are the Belmont and Highbridge fissures, which have thus far produced an aggregate of \$2,780,500 worth of bullion.

GOTHAM.

Tybo, Nevada, April 9th.

The Old Pioneer.

The following well written sketch of an old prospector and pioneer, which we take from the *Eureka Sentinel* of recent date, will be appreciated by our mining friends:

He was just getting ready for another trip, and was as enthusiastic in regard to the new El Dorado as when, 28 years ago, a roving disposition and love of adventure broke up the routine and started him in search of the golden fleece from the quiet New England life that, looking back on to-day, is sanctified in his memory. He was in the first flush of manhood then, and the little world that bounded the old homestead was circumscribed indeed, but it was all he knew; although faint rumors of fertile lands and boundless prairies in the unknown West had already unsettled his mind, and filled him with vague longings for a better field for the untiring industry that, up to that time, had been spent in a vain struggle with the granite soil and fierce elements of his native section. When the whisper of the far-off land first came laden with strange stories of wealth in the streams, and riches to be had for the trouble of gathering, he broke the ties that held him to the farm and bid adieu to the old folks with many a promise of a speedy return when he had accumulated a modest fortune, which, in the castles that he had built, was to be devoted to the comfort of their declining years. The voyage was a long and weary one, but the lapse of a few months found him among the earliest of the Argonauts. His castles were substantial structures, for his industry and frugal habits soon served him to gather the amount that was the goal of his ambition. In the lonely life that followed during his stay the little farm among the rocky hills had kept its influence over him, and he longed to see it once more; so, selling his claim after a few years stay, he was soon on his way back. Who can tell of the pleasure that he experienced after his arrival. He had only been one of the ordinary inhabitants prior to his departure; but now everything was transposed, and he woke to find himself famous. Old men treated him with deference; young men pointed him out to each other as the hero who had been to far-off lands, and then whispered among themselves as to the amount of gold that he brought back; some had actually seen a portion of it, while those not so fortunate only needed to look at the huge specimen pin in his shirt front, or the ounce ring that he sported on his finger, to realize the tangible wealth that those evidences indicated. And the rosy cheeked girls, how they singled him out and bestowed on him their favors; their partiality was quite a contrast to the time when he grubbed on the farm or hired out to a neighbor for eight dollars a month and board. All this was very pleasant, and he basked in the social sunshine and enjoyed it, but it became very tame after a while. He had intended to have settled down and enjoyed the good things that had seemed, when dreaming in his log cabin, to compass all that was necessary to render the future endurable to him. Now, after the first flush of gratification was satisfied, he began to yearn again for the old free life. The habits acquired during his sojourn in the golden land were too broad to endure the parsimony that characterized his native village, and the social restraint chafed him. He had thought of investing in a village store and settling down to enjoy the dignity that the proprietorship of that institution conferred on one; but even that attainment had lost the charm that his fancy had conferred on it; besides, winter's chill blast penetrated him as it never had before, and he sighed for the balmy air and glorious sunshine of his adopted land. So, paying off the mortgage on the old farm, making the hearts of his old father and mother happy, and bidding an affectionate good-bye to the belle of the village, whose heart he had captured and to whom he made solemn promises of a speedy return, coupled with vows of frequent correspondence, he once more turned his face westward.

Traveling facilities had improved since his first journey, and a month found him back to the old place where fortune had treated him so kindly. How his breast expanded as he drew in the balsamic odors that pervaded the air. The pines swayed in the breeze as of yore; the buckeye shed its white blossoms; the gaudy flowers peeped up and nodded their little heads in welcome, and the old log cabin, chinked with mud, with its quaint stone chimney surmounted with a square of split sticks plastered with adobe, its dirt floor, even the frying pan and bake kettle, seemed more comfortable and homelike than the luxuries that he had left behind. He was soon settled down, prepared to commence the old life again, and with pick, pan and shovel, was prospecting for one of the old-time claims. Somehow, they were not so easy to find as before. It was shallow diggings in that part of the country, and had been pretty well exhausted by this time. To be sure there were plenty of claims that yielded great money; but what was that to one who had abandoned ounce diggings for better claims. He was disgusted with his luck, especially when he thought of that pretty face waiting for him back home, and whose dear little letters made the arrival of the steamer the brightest day of the month. Finally, some of the boys commenced talking about turning the river, and he joined the company. The sawmill furnished the lumber on time, and the storekeeper was accommodating; so, when the water went down, stout hands and willing hearts soon constructed the flume and

pumped out the water. It took time, and the season was well advanced when they finished; it prospected big, and if the rain would hold off a little while their fortunes were made. Alas! the clouds gathered and the rain descended, and away went the flume down the river, leaving the company heels over head in debt, and worse still, discontented. Castles in the air were not realized as before, and he sought consolation in the saloon, and soon became an adept at bean poker. A habit of drinking took possession of him and he craved a stimulant. Thus passed an idle winter, but old habits reasserted themselves, and another season found him delving in the river. They done better this time, and managed to pay off old scores and have a modest surplus left.

Then the Fraser river excitement broke out and away went our hero with the grand army of adventurers. A year's time found him back again, like the majority, broke and disgraced. Whispers of a new El Dorado—silver this time—were rife in the air, and packing his blankets on his back he was soon a full-fledged Washoeite. How he reveled in the excitement of that wonderful period. He was rich, on paper, beyond his sanguine dreams. With what an air he exchanged certificates in the Bobtail, worth \$5,000 a foot, sir, for other equally valuable shares in the Last Chance. Unfortunately he held on too long, and when the crash came he was as impecunious as ever.

Then came Reese river, with the same luck, followed by a trip to White Pine, with no better results. Next a trip to Arizona, the blank, blankest country that fortune ever led him to; thence to Pioche, where he graduated as a fighter, and abdicated again from that role after a desperado made him a target for the contents of a revolver. Since then he has drifted from one camp to another, and has wheeled slag for the past three months in Eureka. Poor fellow; he has grown old since he first started on his travels; rheumatism racks his bones; he has been leached; his hair has turned gray, and the boys do not hesitate to call him an "old stiff." The old folks are dead, and the face that still haunts him, and whose charms he maulders over when he is in his cups, tired long since of his delay, married and forgot him, or thinks of him as gone from the earth. But he will soon be on his way to the Black hills, where he is sure that he will make a stake, and come back and enjoy it at the Bay, which is at present the Mecca of his future pilgrimage. There are some of the old boys down there who have been more fortunate or lucky than himself, and he would like to join them and talk over the days when they pioneered it together. More likely some kind, charitable hand will lay his weary bones at rest in a strange land, and if the news comes back to any of his old comrades they will sum up his life with the often-repeated epitaph, "another one of the old pioneers dropped off." He was harmless enough in this world, and if his idea of Heaven could be realized it would resemble the pine-clad foothills of California, with plenty of good diggings and no Chinamen to ruin the country.

The Black Hills.

A *Chronicle* reporter has had an interview with W. P. Wheeler, from the Black hills, who does not give a very flattering account of the country.

This is the same W. P. Wheeler whose name frequently occurred some six months since in Eastern dispatches relating to the starting from the Black hills of the Wheeler party with "1,500 pounds of gold dust," speculations as to their meeting with Indians, and finally their arrival at Laramie and Cheyenne with "800 pounds of gold dust," and their subsequent departure for the East. After relating to Mr. Wheeler what little he knew of the Black Hills country, and what he had heard and read of the Wheeler party, and asking an infinite number of questions, the reporter was enabled to make the following condensed recital of that gentleman's remarks:

"I was one of a party of nine that arrived in the Black Hills country in March, 1876. I deem myself a practical miner, having had experience in that line in Australia in 1853, and subsequently in California. I went like thousands of others to the Black hills to see what I could see and to make all the money I could. I did considerable tramping around for three months and learned that the district known as the Black hills consists of an oblong clump of hills covering an area of about 100 miles long by from 40 to 50 miles wide. Most of the hills are small, only several reaching to an altitude of from 1,400 to 1,500 feet above the surrounding plains. The hilly district is densely overgrown with tall and shapely black pine trees, many of whose trunks are from three to four feet in diameter. The numerous so-called mines in that country have no names but are numbered. In the month of June, last year, I purchased for \$1,500 what is there called a mine and a half, 450 feet, known as No. 2. It is located one and a half miles from Deadwood City, and within one-half mile of Gayville, on Deadwood creek, which with Whitewood creek forms a junction at Deadwood City. No. 2 was

The Richest Mine

Ever discovered in the hills; there is nothing but placer diggings in that territory. I worked from 20 to 30 men, and have taken out in one day as much as \$1,000. I ran two sets of sluice boxes day and night for several months and at the end of the first 50 days, I remember, I had taken out \$43,000. This created great excite-

ment throughout the hills, and was exaggerated a hundred-fold by the *Pioneer*, the paper published at Deadwood. I sold No. 2 in September for \$3,000, believing that was a big price, for I concluded I had nothing left but dead ground, yet my purchaser was anxious and I didn't object to his \$3,000. I carefully studied the placer diggings of Deadwood and then left the country, believing the whole territory was like many of the old mining districts of California to-day, about 'played out.' As many as 15,000 people visited that country last year; but fully as many returned. Of this latter class you seldom hear, for the Deadwood paper and those at the supply towns along the Union Pacific railroad have always persisted in maintaining

An Ominous Silence.

"There are many more people in the hills who would like to return to the States, but have not the means to even get for themselves the necessary provisions to last them on the tramp of 350 miles to Cheyenne, and are there waiting, Micawber-like, for something to turn up. I advise all my friends to avoid the Black hills. That vast army of idle men have, in their extremity, thoroughly prospected the entire country, but no leads have ever been found; they have found some quartz but not in sufficient quantity to pay for working it. It is the most overrated place I ever saw. Custer City is located on French creek, or what is called French creek, for it is simply a small ravine with no water in it half the time. Formerly Custer City was the principal point of attraction and had 2,000 inhabitants, but now there is scarcely anybody there. It is 80 miles nearer Cheyenne than Deadwood, and is simply a supply town. Crook City, five miles from Deadwood, is on the edge of the prairie, at the foot of the hills, and is the hay market. Hay is \$80 per ton. It is precarious business harvesting the hay, for

The Indians Object to It

And frequently kill the ranchers thus engaged and set fire to their hay. Among the hills is not where the Indians dwell; they regard them with a superstitious awe, because of the frightful and lasting thunder and lightning storms that prevail there. The Indians prefer to live out on the plains. I have seen it stated in the papers interested in having people go to the hills that certain mines have been sold for \$50,000 and \$60,000; but after investigating the negotiations it would be found that \$50 or \$60 was nearer the amounts that were actually exchanged. On our way to the States last September we were not molested by the Indians, but would have been by bands of disappointed white men had we not been in such strong force. We numbered 30, including 15 soldiers, and all well armed. The story about our party having 1,500 pounds of gold dust was considerably exaggerated."

Cerro Gordo Mine.

The *Inyo Independent* says: Aside from the operations on the Union Consolidated mines at Cerro Gordo, there has for a long time been but little work prosecuted upon many of the other prominent mines at that point, for the obvious reason "there's nothing in it." The miner's only show of realizing on the ore produced is through sale to the only party now operating reduction works on Cerro Gordo ores—the Union company; and it is authentically stated that the charges for reduction at the furnace, or, rather, the price paid for ore per ton, amounts to exactly one-half its assay value in all cases—whether that be \$40 per ton, or \$400. Throughout the district, however, there are numerous well-known mines capable of producing in the aggregate rich ore sufficient to supply at least one set of reduction works, and probably several, were they once properly developed. At late convention of the mine-owners of the district, stringent local laws were adopted, which give force to the United States statutes in regard to making proper and legal locations, and as to the annual assessment work required to hold claims. The result is a yearly expenditure which is steadily developing a large number of claims, and, in most cases, proving them to be valuable property. The prime necessity of the mining interest of Inyo, to-day and hereafter, railroad or no railroad, is a reduction establishment on the lake capable of working any and all kinds of ore, on the plan of a custom mill. Such a concern would pay, and, if honestly managed, need never lie idle. Among the outside mines now being worked at Cerro Gordo are the old Osceola and Crowning Glory, on the Belmont side, relocated by Kit Johnson and others, who have struck new bodies of rich ore. The San Lucas, belonging mainly to Rafael Diaz, is working a small force. The Ygnacio, the property of Greenley, Rothschild, et al., now under patent, has been cleared of accumulated waste and made ready for systematic work. The ground adjoining the Union on the south, the property of J. R. Hughes, is undergoing the patenting process. Abe Leyda owns a stretch of patented ground covering the famous Buena Vista, the mother ledge of the hill, the vast croppings of which are plainly visible from the valley. A little further to the south is the San Benito, belonging principally to L. Lasky. It is one of the earliest and richest of the lead locations, the galena of which assays well in gold. Speaking of the presence of the latter metal in Cerro Gordo, there is an old waste dump on ground now covered by the Union title, out of which it is estimated that there has been picked gold nuggets to the value of \$25,000.

Resources of Eastern Oregon.

A correspondent of the *Owyhee Avalanche* says: "The placer mining country of eastern Oregon covers a vast extent of territory. In the early days miners depended on reaping their golden harvest by means of water caused by melting snows in early spring time, and such was the richness of the ground that a month's work amply repaid the hardy miner for the whole year. But as these rich spots became worked out it was evident that snow water would no longer perform the services required of it and some other means must of necessity be resorted to. So many and various ditches were brought in from long distances, carrying good heads of water, thereby enabling the honest miner to work throughout the whole season and retire with a gum-bootful of dust by the time snow flies. Among other enterprises of this nature is the one projected by Mr. Packwood in 1863, and now known as the El Dorado ditch, which is at present 135 miles long, and has cost between six and seven hundred thousand dollars. I think your readers will give me credit for not going in for indiscriminate praise of men of things. In this instance I shall, however, have to turn loose and give Mr. Packwood his just deserts and when my gentle readers (and I wish for none others) see what one man by his foresight and enterprise has performed for the benefit of his country, they will indeed begin to think he has left an indelible 'footprint on the sands of time,' for generations yet to come will profit by his works. This ditch is taken out of Burnt river and runs through a mountainous country the whole distance.

The auriferous gravel belt commences about fifty miles from its head and covers the prosperous mining districts of Bull Run, Rich Creek, El Dorado, goes on to Amelia, Fourth of July, and Mormon Basin canyon, then it crosses over to the Burnt River slope again and covers Devere's Jeff Davis, Cornaut and Clark's Creek. On the top this ditch is seven feet wide, five feet on the bottom, two and one-half feet in depth and has a grade of 178.40 inches to the mile. The carrying capacity of the ditch can be judged when the company can reservoir and sell between 1,500 and 2,000 inches every ten hours, all the time between April and November, at twenty cents per inch for the first head. Some idea of the money the miners have to pay for the use of water during the season, may be formed from the following figures, which are correct in every particular, and what was paid the last season by a few companies: Leatherwood, \$6,000; Campbell and Leatherwood, \$4,000; Linn, \$3,000; Johnston, \$3,500; Kane & Daley, \$2,000. There are five miles of flume along the line of the ditch which will eventually be carried around the gulches and creeks they now bridge. Altogether there are twenty-one large companies taking first water, from one to three hundred inches each. The demand for water far exceeds the supply, but it is only a question of time when the capacity will be doubled, for a new ditch from the Malheur is located and initial surveys have been made. It must and will be *au fait accompli* inside of five years, when the annual receipts, which are now between thirty-five and forty thousand dollars, will be brought up to \$70,000. There are regularly employed from fifteen to twenty men attending the ditch and reservoirs. Last season no breakages occurred after it was put in order in early spring.

There may be said to be five hundred souls depending on this enterprise, for that number would be decreased to as many tens as there are now hundreds but for it. The amount of money taken out and placed in circulation is about \$150,000 annually. The gravel is easily washed, few boulders but can run through a flume, which is a great blessing, for handling rock is expensive and makes many an otherwise good claim run the owners into debt. Hydraulics are universally used, and the diggings vary from five to fifty feet in depth. The gold is of a fine quality, worth from \$16 to \$18 per ounce. It is generally conceded now that there is an ancient extinct river channel running throughout eastern Oregon. Mr. Packwood has given me much interesting information respecting it; from samples of the auriferous cement I have handled and descriptions from those who have traveled and observed, there cannot be much doubt but it is one of the same if not the identical great blue lead of California itself (q. e. d.) Under the El Dorado ditch are beds of cement so hard that it must be blasted; it is then exposed to the climate changes for a few months, then shoveled into sluices. It pays well even by such an old '49 process. Cement mills are talked of; nearly time, too, when \$5 to the pan can be obtained in such dirt.

Mr. W. J. Leatherwood, of the Shasta precinct, owns probably more ground than any other man, outside of California, on the Pacific coast. His enterprises are limited on account of water. Last season he took \$16,000 out of Quartz gulch, situated thirty miles west of Baker City, pays \$6,000 yearly for water on that claim alone and works twelve to fifteen white men regularly. Mr. Cartee here is another of the live go-ahead citizens of Baker county. He is interested equally with Mr. Packwood in the big ditch. In fact he is interested, and left his imprint all over the country.

A NEW FREIGHT CAR.—A freight car built of iron tubes and steel rods by the National Tube Works, McKeesport, Pa., weighs 5,214 pounds, while a wooden car of the same capacity weighs 11,560, both used for the same purpose, and has been running for the past 18 months.

USEFUL INFORMATION.

Steam and Compressed Air.

The following is from a lecture recently delivered in London: In conveying steam to a great distance, although the loss of power occurred through condensation, yet, where the pipes were properly proportioned and protected, no appreciable loss had been found in the pressure at the distance of 1,000 feet from the boiler. The Lime street tunnel of the Liverpool and Manchester railway, having a mean gradient of one in 92, was for many years worked by stationary engines, supplied with steam from boilers situated at a distance of 448 yards (Minutes of Proceedings, Inst. C. E., vol. i., 1841, p. 146). Where steam cranes were kept continuously working, the cost varied from 0.61d. to 2d. per 100 foot-tons, but where the work was below the full capabilities of the cranes it had, in two instances, reached 6d. to 12d. per 100 foot-tons.

As regarded the application of compressed air, the calculations of M. Paul Picard showed that for pressures of from one to 10 atmospheres the efficiency, where the air was not worked expansively, but was admitted for the whole of the stroke, varied from 100 to 39.1, and that, taking into account the efficiency of the machines themselves at 70%, the compounded efficiency was about 50%, although in practice it rarely exceeded 30%. Professor Rankine has asserted that the loss of power seldom amounted to less than from 65% to 75%, while Dr. Siemens had stated that the attainable limit of the useful effect of compressed air was about 50% of the power exerted in compression. Compressed air had been employed for underground haulage at Ryhope colliery, in Durham, by Mr. W. F. Hall, where the cost had been 0.97d. per ton, exclusive of the ropes, which, if allowed, would raise the cost to about 14d. per ton. It had also been used to work coal-cutting machines at Messrs. Baird's works, at Gartsherrie. In this case two and a half cubic feet of steam, at 40 pounds pressure, gave one cubic foot of air at 50 pounds pressure. Compressed air has been used since 1864 in the shops of Messrs. Easton and Anderson, at Erith, where the consumption of coal necessary to produce a given quantity of compressed air was found to be about 69% more than to produce the same quantity of steam at a like pressure.

TO PREVENT THE CLOUDING OF MIRRORS BY MOISTURE.—The laryngoscope has become a very important instrument with medical men. A writer in the *Union Medicate* states that he has by chance discovered a very simple method of preventing the mirror from getting tarnished. This is to pass lightly over the polished surface a cloth moistened with glycerine. The water vapor contained in the expired air is completely dissolved in the glycerine, so that no cloud is formed. This method is thought more practical than that of dipping the mirror in tepid water, or heating at a lamp flame; for first, there is no fear of causing the patient a painful sensation by making the mirror too hot; and second, the polished surface loses very soon, by radiation, the acquired heat, and the cloud is formed before the observation is over. A slight layer of glycerine has not these disadvantages. The writer breathed a quarter of an hour on the glass so treated, without its getting dimmed. Various other applications will suggest themselves. Thus the formation of dew on lenses of astronomical telescopes, which often disturbs observations, might be prevented by a layer of glycerine. Another application is in shaving oneself before a looking-glass, when the glass often gets dimmed with the breath.

A NEW METHOD OF SYNCHRONIZING CLOCKS.—A new method of synchronizing clocks has been introduced by Messrs. Barraud and Lund, of Cornhill, who have had granted them by the postoffice authorities the special use of a system of wires for working it. A narrow slit cut in the dial of a clock admits two projecting pins. They are arranged so as to catch the minute hand at given intervals, and to set the clock to true time. The pins, attached to a pair of slotted levers, connect with an electro-magnet. The mechanism required can easily be screwed into its place, and it remains entirely disconnected from the works of the clock. Any number of clocks varying in size and caliber can, on receipt of one time signal, be simultaneously set to accord with each other in accurately denoting Greenwich time. The Bankers' Clearing House immediately availed themselves of the advantages of a system which will remove the often recurring disputes as to "paying in" within the specified time. Other city establishments will be provided with the apparatus as soon as the postoffice employees are enabled to extend the requisite facilities. The invention must prove a great boon for all mercantile men, and for railway travelers, etc.

USE OF MAGNESIA IN CLARIFYING SUGAR.—Bernard and Ehrman find that the alkalinity of magnesia, and its insolubility in saccharine liquors, fit it for the defecation of fermented cane juice. With a dose of from three to five-thousandths the clarification is complete, and the juice is easily filtered. Any excess of magnesia remains in the scum. Laboratory experiments show an increase of six to seven per cent. in the yield of white sugar, while the quality is not inferior to the best commercial brands. Experiments are to be tried on a larger scale.

Electricity as a Woodman.

We read in an English paper that it has occurred to some ingenious gentlemen in India that artificial electricity may be so applied and controlled as to cut down trees a good deal faster than the clumsy axe or that American notion, the chain saw. The two ends of the copper wires of a galvanic battery are connected with platinum wire, which of course instantly becomes red hot, and while in that state it is gently sawed across the trunk of the tree to be felled. When arrangements were made for the experiment, it turned out that the thickness of the thickest platinum wire that could be got was only that of crochet cotton. It was at once seen that such a wire would be consumed before the tree was half severed from its trunk. However, the attempt was made. The burning wire performed its task very well so long as it lasted, but, as anticipated, the wire continually broke, and at length there was no wire left. There can be little doubt that with a stronger battery and a thicker wire, the experiment would have been entirely successful. As it was the tree was sawn one-fifth through. It is calculated that under proper conditions, a tree which at present takes two hours to fell, will come to the ground by this process in 15 minutes. It is almost needless to add that there is no waste of wood, no sawdust.

PAINTING ON ZINC.—Among recent German inventions is a simple process, depending on the use of acetate of lead, by which every kind of painting is applicable to sheets of zinc. By mixing black lead, for instance, with the salt, a very agreeable light brown hue is obtained. It is by this process that the cupola of the synagogue at Nuremberg has been painted, a sufficient length of time having already elapsed, it is said, to show that the atmosphere has had no influence on the zinc sheeting of the roof, thus showing the adaptability of the process in such cases. By the addition of other coloring matters, light or dark shades of yellow or gray may be produced.

SPONGY GOLD.—The following method of producing spongy or finely-divided gold used by dentists is furnished by the German journal, *Industrieblatter*: Make a solution of gold (not necessarily free from copper) with *aqua regia*; evaporate until the excess of nitric acid is driven off. Then add oxalic acid and carbonate of potassium, in such quantity as will retain nearly all the gold in solution; add an excess of oxalic acid and boil the solution. The gold is then precipitated, while such impurities as copper remain in solution. Carefully wash the precipitated gold until it is entirely free from acid. Dry on a filter paper, and it is ready for use.

THE COST OF MAKING MERCHANT IRON.—A correspondent of the *Pittsburg American Manufacturer* makes a careful estimate of the cost of manufacturing a ton of merchant bar iron in Pittsburg as compared with the cost of manufacture east of the Alleghenies. The items of cost in Pittsburg are given as follows: Pig iron, \$19; coal, \$2.50; ore and scrap, 88 cents; labor, \$12.50; castings, brick and clay, \$1.50; repairs, sand, oil, waste, belting, etc., \$2.20; insurance and taxes, \$1; total, \$39.58; against \$45.76 given as the total cost east of the mountains; or a difference of \$6.18 in favor of Pittsburg.

GOOD HEALTH.

Care of the Hands.

"Paul H. B.," in the *Tribune*, has some special instructions on this subject for the ladies who like to keep their hands fair: Ladies who do their own housework are apt, if they do not wear gloves, to have coarse hands. If they happen to dip them into water, they do not take enough time to dry them well before going on with their work. To wipe the hands perfectly dry after their being immersed in water is imperatively necessary, if they wish their hands to look white. To keep the hands from chapping in cold weather use a mixture of glycerine, one ounce; spermaceti, two drachms; olive oil, two ounces. Mix together, with the aid of heat. Apply this every night, and, if time will admit of it, every morning. In winter, do not wash them in cold or hot water. It should be just blood-warm, and no more or less. Do not go out of doors with them uncovered. In summer, use cold water, unless the hands perspire very much, as the hands of some people do. These latter should use tepid water.

In warm weather, a good preparation for the hands is this: Take half an ounce of powdered alum and the whites of two eggs, and mix together. Then add enough bran to make into a thick paste. Apply this once a day, after washing, and after rubbing the hands together well for a few minutes, wipe off with a soft towel. This will give them a soft, brilliant hue, and check any undue amount of perspiration. What is called cream of roses is also an excellent preparation for the hands, either in winter or summer. It is made as follows, unless you prefer to purchase it at a dollar a bottle. Take compound tincture of benzoin, half an ounce; almond and Malaga oil, of each an ounce; attar of roses, five drops; honey, two ounces; and enough rose water to make the mixture measure six ounces. Apply as often as you like.

Cheese as Food.

We are quite sure that cheese is not given its proper place as a food material. We are aware that some systems do not take to it kindly, and such persons should not press it upon their digestive economy. We are aware also that much cheese because it is poorly made is indigestible. These facts should be borne in mind. And yet as a food possessing great strengthening power and adapted to those who have hard physical labor to perform, there are few foods so satisfactory as rich and well cured cheese. We propose to give some authorities on this point, both for the good of the eater and to contribute toward securing one of our important branches of agricultural production, the demand to which it is justly entitled.

Dr. Austin Flint, one of our most erudite physiologists, says: "Old cheese taken in small quantity towards the close of a repast, undoubtedly facilitates digestion by stimulating the secretion of the fluids, particularly the gastric juice." Here its effect is attributed to a different principle than that of its fermenting quality; but an active ferment may also increase the effect of the gastric juice. Dr. Flint says: "New cheese is a highly nutritious article, as is evident from its composition."

The long experience of English, Scotch and Irish laborers proves cheese to be a wholesome as well as nutritious food. A small quantity of cheese, with them, takes the place of a larger quantity of meat, and enables them to endure such hard labor as the American thinks he can only perform upon a generous meat diet. In Germany farm laborers depend largely upon the curd of milk after being skimmed for butter. This curd is frequently used in a fresh state and makes an important part of the laborer's diet.

It is related of a certain Dane that he could carry a stone so heavy that it required 10 men to lift it on his shoulders; that he performed such wonderful feats of strength upon a diet consisting of large quantities of thick sour milk, tea and coffee. His enormous strength must have been sustained by the curd of the milk. This case refutes the common error, that milk does not furnish a diet for vigorous manhood. There are numerous cases in which a milk diet has sustained the system under the most exacting labor. Wm. Vincent, of Stonington, Ct., in a letter to Dr. Alcott, says: "I have lived principally on bread, cheese, and butter, with a few vegetables, for more than 24 years." He entirely abstained from animal flesh.

The American Encyclopedia says: "The peasants of some parts of Switzerland, who seldom ever taste anything but bread, cheese and butter, are a vigorous people."

Our American women take to little nitrogenous food, owing, perhaps, to their great predilection for the finest flour and much pastry. Their vitality is confessedly much lower than the better class of English women. Women are not such flesh eaters as men, and with their love of sweetmeats the nervous system becomes ily nourished. They may almost be said to be made of starch and sugar. If they would make cheese a more constant article of diet, and use more unbolts flour, with more open air exercise, they would soon become the most healthful and robust, as they are now the most beautiful women in the world.

Cheese is less liable to putrefactive change than flesh, and thus much less likely to develop in the human system those scrofulous diseases attributed to animal food.

WARM WATER FOR BRUISES.—The *New York Medical Journal* reports the case of a man who, while engaged in a machine shop, had his hand badly crushed. While his hand was on the anvil of a trip-hammer, the hammer (weighing 700 pounds) fell. It so happened that a file was on the anvil, and thus the force of the hammer was arrested about half an inch before it reached the bed. It was found that the whole palm of the hand was a mass of pulp. The metacarpal bones were comminuted extensively, and there was apparently but small chance of saving the hand. It was, however, placed in hot water, and kept there for two or three weeks, and then taken out and dressed. In three months the patient was sufficiently well to leave the hospital, and now, nine months after the accident, he is able to use the fingers, and has quite a useful hand. Bruises and injuries do much better when treated with hot than with cold water. The temperature should be about 103° Fah.

EFFECTS OF DISEASED TEETH.—Everything seems to urge people to proper care of their teeth. At a meeting of the New York Odontological Society, Dr. J. Marion Sims, commenting on the value of dental knowledge to the physician, remarked: As to the effect of diseased teeth upon the general health, I wish medical men generally could be better educated on that point. We are all familiar with the fact that decayed teeth frequently cause neuralgia; and this is the extent of medical education on the point. They usually do not recognize the fact that, as a general thing, decayed teeth, teeth with inflamed alveolus, with matter exuding from around the teeth, are the means of producing more nervous disorders, more terrible consequences to the general health than almost any other thing that can happen.

POISONING BY LEAD.—A case of lead poisoning, which recently occurred in France, was traced to the pewter foil used to cover Roquefort cheese. The pewter contained 12 parts of tin, 85 parts of lead and three of undetermined matter.—*New Remedies*, vi, 96.

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SAN FRANCISCO:

Saturday Morning, April 21, 1877.

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ASBESTOS.—The Salamander Felting Company, of this city, Seward Cole, Manager, advertise in another column that they will purchase asbestos, if they can procure a good quality. Parties having mines of this substance will do well to correspond with Seward Cole, 317 California street. The fibrous quality is that which is desired, but that having the appearance of soapstone, or with a very short fibre, is not salable. They will buy it by the ton, if of good quality. It is worth all the way from \$25 to \$50 per ton, according to quality. The quality like the Italian is worth \$100 per ton for manufacturing clothing, but there is not much of that here.

As soon as a mine turns out rich or some one wants to buy it, along comes somebody and says he owns it or part of it. The latest instance in point is that of the Peck mine, in Arizona. Wm. M. Lent is said to have bought it for \$400,000; and now comes Wm. Cole, of Prescott, Arizona, and says he has instituted suits to recover an undivided 900 feet in each of the two claims constituting the 3,000 feet of the mine.

BELLEVILLE.—The Virginia Chronicle says: "Mark Ezekiel's has just returned from a trip to the mining district of Belleville, and gives a most discouraging account of the situation in that section. The place is described by him as overdone, and the sight of disgusted adventurers packing their blankets out of town is quite frequent."

The North American company, at Shady Run, says the Dutch Flat *Forum*, have discharged all of their white men, with the exception of the bosses, and the mine is now being worked by Chinamen. The mine is looking well, but the principal part of the gold taken out is coarse. The supposition is that John will save the company any further trouble of declaring dividends.

Mining Excitements.

The Black Hills and Arizona.

Ever since mines were first discovered on this coast there have been periodical "excitements" about new mines, which have had the effect of drawing off a number of miners, prospectors and adventurers in search of the new El Dorado. In the early days of California men have left diggings which were paying them more in a day than they ever before earned in a month, and gone to new fields further off in hopes of bettering themselves. Gone with no preparation whatever, no knowledge of the country and perhaps with only enough means to get them there. Of course in such cases disappointment was the share of the many and riches of the few. The hope of being of that few, however, led men on to go at all hazards, and in the face of all obstacles. They believed all that was said in favor of the locality, and thoughtlessly put aside any attempts at advice of more careful people. There is still a large class of nomadic prospectors in the mining community looking and hoping for "49 diggings," who are ready to go anywhere, no matter how far away, or in how dangerous a place, with little thought about the matter except that they expect to strike it rich. Nine-tenths of them fail to make any calculation as to what will happen in case they do not strike it rich, and probably about that proportion fail to do so. The consequence is that a great deal of suffering is entailed by want of forethought. Advice in such matters is, however, generally thrown away, as even those who have been "through the mill" will go and do the same thing over again with like results.

There are just now two sections which are attracting the attention of this class of the mining community; one is the Black Hills and the other Arizona. A great deal of attention is being turned in both directions, and both excite the hopes of prospectors the more because they are a long distance from here and the sections are new. The reports circulated give glowing accounts of the mineral richness of the respective sections; both have sent out or bullion away in sufficient quantities to prove that there are some mines, at least, paying well; in each the Indians still roam about as proof that civilization has not advanced far there, and the population is scant, so there is plenty of room for the prospector and settler. The surroundings of both localities are such as to suit exactly the class of men who usually pioneer the way into new countries, and the prospectors who open up new mining regions.

The general state of mining affairs on this coast at present is such as to leave many miners out of employment. This is particularly the case on the Comstock, the most populous mining locality on the coast. A large number of these men are looking towards the Black Hills or Arizona, and already numbers of them are on the way to one place or the other. Still more are waiting and preparing to go. Those who intend going, however, should by no means go unless they have money sufficient to support them while there and enough to bring them out if unsuccessful. This is only prudent, and the people with whom we have conversed, who have been to either the Hills or Arizona, agree that neither place should be visited by them without means.

The reports from the Black Hills are conflicting in many respects as regards richness and extent of the mining region. They all agree that it is a pretty hard country for a poor man. It is estimated that there will be a population there this summer of from 12,000 to 15,000 men. The country is new, sparsely settled, and is scarcely calculated to support such a population. Some of them who go will no doubt be disappointed, and all should be prepared in case they are among the unfortunate ones. Miners who are expecting to depend on striking good claims or on obtaining employment for subsistence while there will be apt to see pretty hard times if some of the accounts are correct. Those who have means, however, and no employment here, are in a position to take the chances, but poor prospectors better stay where they are.

In Arizona the same state of affairs exists. That there are such mines there is no doubt, but that everybody who goes there will find one is doubtful. A large immigration is coming into the country, attracted by the reports of rich mining regions, but, unfortunately, many are going to have no means of support unless they obtain employment. We have conversed with several persons from different parts of the Territory, all of whom agree as to the richness of the mines; and agree also in advising persons without means to stay where they are for a while.

The reasons for this are obvious. Although many of the mines are rich there are few reduction works in the Territory, and in all the camps the miners are waiting for capital to help them out. No mines are developed enough to need any miners, and employment in all branches is scarce. Labor can be procured in many places for \$1 per day because men are so hard up, and there is no doubt but that many who are going there now will have to leave again this summer. In brief the country is not yet in a position to support the class of population going there. The local papers unite in advising men without capital to stay away for the present, telling them beforehand that there are more

men now there than can find work, and those coming to look for work will find hundreds already there in the same predicament.

It is only acting the part of discretion for men who are intending to go to either of the places we have mentioned to weigh carefully the aspects of the case before starting. Once there without money pretty hard rubs will result. Those who are now at work, or have any kind of chance to make a living, had better stay where they are and leave Arizona and the Black Hills alone. This is our advice and the advice of persons who have been in both the sections referred to.

The Coming Industrial Exhibition.

Preparations for the coming Industrial exhibition under the auspices of the Mechanics' Institute are progressing favorably, and the exhibition promises to exceed in interest all preceding ones. The managers expect a better display of exhibits than usual, as mechanics and manufacturers in these dull times have more leisure to devote to the preparation of such matters. A number of applications for space have been received from Eastern manufacturers, so that our own people must look to their laurels and show what we can do at home. Several Eastern manufacturers who realized material benefits from their exhibits at the Centennial intend sending a good display here for the coming fair. All the details of the exhibition are being quietly arranged by the managers so that everything in that line is well advanced. The premium list this year enumerates 623 medals and \$1,557 in cash, besides extra and special premiums.

We have received from J. H. Culver, Secretary, a photograph of one side of the new design for the medals to be awarded at the forthcoming exhibition. Drawings for the same were solicited from artists and designers here, and among those submitted the one by Messrs. Mayers & Stott was deemed the most appropriate and artistic. The design has been carefully studied, and is admirably worked out. Trade and commerce, art and science are effectively symbolized on the obverse. A female figure, crowned by accessories indicative of the Golden State is represented bestowing a laurel wreath on a kneeling mechanic. Her left arm rests on a shield bearing the arms of the city, and in her left hand is the caduceus of Mercury. Her head-dress is that of a Bacchante, and at her feet are the offerings of Pomona. A manufactory with smoking chimneys, a puffing locomotive, a Corinthian capital, an anvil, an atlas, a plow, a toothed wheel, a sheaf of grain, and a few open books fill up the spaces around the figures. In the background is the Golden Gate, through which a merchantman, with all sails set, is passing. Above is the star of Empire, and a bear's head to typify the State is introduced beneath the general design. The reverse of the medal contains a wreath with a suitable lettering. The medal will be struck off by the designers. It is to be of bronze, and three inches in diameter.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

The ore at the Grand Prize mill assays in pulp from \$100 to \$120 per ton. The main shaft of the mine is progressing slowly on account of heavy flow of water.

In the Justice mine the ore stopes from 800 to 700, including 750-foot level produce an increase of gold in the bullion product.

Five days' run on company work at the Eureka (G. V.) mill last week resulted in 220 ounces of amalgam.

The new air boxes in the Jefferson give good ventilation throughout the mine.

The Leopard mill has been started up on ore from the mine.

In the Crown Point mine they are approaching the ledge on 2000-foot level very cautiously for fear of an overflow of water. The face of the drift is now in a mixture of soft clay and porphyry of a copper color, with some quartz which assays from \$4 to \$5 per ton.

The 1650-foot level of the Con. Virginia continues very hot.

The water still hovers about the 1600-foot station of the Hale & Norcross.

In the Manhattan they are finding some good ore in the 517-foot east drift, but not enough to justify opening a stope.

Very rich rock has recently been struck in a drift of the Soggs mine, Nevada county.

BY INDIAN POWER.—Up in Upper Austin, H. H. Cooper is running a two-stamp quartz mill, with which he works small lots of rich ore. The Reveille says these reduction works are of one-Indian power—Captain Joe, a noted Piute chieftain, being the motive power. Lo! the poor Indian, who has come down from his high estate, and no longer hunts the ferocious jack-rabbit to his lair, but pursues the ignoble avocation of turning a crank for a two-stamp quartz mill. Truly, the American Indian has degenerated.

The Southern Pacific railroad will be at the Colorado river probably within a week.

The Hydraulic Mines.

A Short Water Season—The Debris Question.

From Mr. H. S. Jacobs, who has lately visited several of the more active hydraulic mining localities in the State, we have been able to gather some items touching the present condition and immediate outlook of that industry. The light body of snow now lying on the Sierra Nevada precludes the possibility of the season of active operations being extended late into the summer, except perhaps in a few localities. Even with the present large facilities for water storage, and the most careful use thereafter, the period of summer washing must be curtailed by several weeks, and, in most cases, by a much longer time. It is said that there has not been so little snow on the mountains in the middle of April for twenty years past; and, although the furnishing ditches have thus far been kept full, some of the higher reservoirs are far from being yet replenished, and it is doubtful if they will be entirely stocked this summer. With so little snow on the Sierra,

The Usual Summer Freshet Cannot Occur.

And the agricultural lands in the lower valleys will this year escape material addition to the tailings already deposited upon them. Indeed, the beds of the streams above have, by the filling-up process, been extended over such a breadth of surface that nearly the whole of these tailings remain along their channels in the mountains, the water being now spread out into such a thin sheet that it operates with too little force to carry any but the finest silt into the plains below. As the beds of the mountain streams fill up, they not only grow every year wider and wider, but become, also, more impacted, rendering the deposits of debris along them less liable to be disturbed and carried down by ordinary freshets; and there is little doubt but they will, through the operation of these causes, be placed, in the course of a few years, almost wholly beyond the disturbing power of even the extreme floods. In this view of the matter, the farmers may have less cause for apprehension in the future than many of them now suppose. For the present,

The Hydraulic Companies

Are not only economizing their water but are making the most of their time, every one employing a full force of hands and running without intermission where they have water in steady supply. The North Bloomfield company, having at last bottomed their channel, are washing gravel of very high grade, running over 3,000 inches of water. Their clear monthly profits range from fifty to seventy-five thousand dollars, and as they operate with but little interruption, their net revenues for the year will be very large. Much of their ground would pay well to drift, but as the company will now be able to dispose of their gravel at a rapid rate, they will hardly have recourse to this method of mining, which, where companies are without water a good portion of the year or perhaps financially straightened, may be resorted to with advantage.

The Eureka Lake and Middle Yuba Canal Co.,

Another of the great enterprises on the San Juan ridge, are also running a large amount of water and will make a good summer's work. The reservoirs and water catchment of this company exceeds in dimensions and extent any other in the country, and it is likely that they will, notwithstanding the prospective drought, have water enough to keep their own mines in steady supply throughout the year, besides furnishing a considerable amount to their usual customers. At Columbia hill, where the leading mine of this company is situated, the system of sluices and undercurrents have been planned on a vast scale, and in their arrangement are perfection itself. The management here is also distinguished for efficiency and skill, nearly the whole of this immense property having for more than twenty-five years been under the present directory.

Various Smaller But Prosperous Enterprises.

The Boston company, running 1,000 inches of water, have just completed a 1,500 foot tunnel through which they will for many years find outlet and ultimately be able to bottom their claim, which covers one of the richest sections of the Pliocene river channel that here crosses the country in great strength. Last year a cave occurred in the main pit of this company, which for a long time seriously interfered with their operations. The mass of barren pipe clay brought down by this cave having been run off, they are now washing very rich gravel, which promises to improve steadily downward. At Snow point and at Woolsey's flat, and also at Blue Tent, Omega and Quaker hill, on the other side of the South Yuba, washing is being carried on day and night, and a fair summer's work will be done. At Blue Tent the English company are using 1,000 inches of water, and having at last gotten their entire property in good shape are likely to make money hereafter. At Quaker hill, Jacobs & Sargent run about the same amount of water, and have an immense body of gravel which after 20 years steady washing shows scarcely a perceptible diminution.

Early History of the Eastern Slope—No. 4.

Still Hanking After a Slice of California.

By the Organic Act, erecting the western half of Utah into a separate political division, to be called the Territory of Nevada, provision was made for annexing thereto an area of some twelve or fifteen thousand square miles belonging to California, provided that State should by an irrevocable act cede the same to the new Territory. This extensive tract lay on and beyond the eastern declivity of the Sierra Nevada, comprising what is now the counties of Alpine, Mono, and Inyo. Afterwards a delegation from Nevada, headed by Governor Nye, visited California, and appearing before the Legislature, urged that body to take favorable action on the subject, but without avail, the proposed measure failing to meet with popular approval.

Officials Provided For.

The Organic Act made provision for a Governor, Secretary, Attorney, Marshal, Surveyor-General, a Chief Justice and two Associate Justices, to be appointed by the President of the United States. Also, for a Legislative Assembly, to consist of a Council and a House of Representatives, and a Delegate to Congress, all to be chosen by the lawful electors of the Territory, every free white male inhabitant of the United States, above the age of twenty-one years, who had been a resident in the Territory at the time of the passage of the Act, being allowed to vote at the first election. Although the question of

free soil had already become a great national issue, and was fiercely agitating the two leading parties in the East, no allusion was made to that subject in the Organic Act. While the institution of slavery was not therefore excluded from the Territory by law, there does not appear to have ever been a slave permanently within its borders, nor was any determinate effort ever made to plant the institution there.

The New Advent.

Although the Organic Act received the approval of the President on the 2d day of March, 1861, not until the month of July of that year did the Federal appointees arrive in the Territory. These officials consisted of James W. Nye, Governor, with S. C. Gallaher, his Private Secretary; Orion Clemens, Territorial Secretary, accompanied by his brother, Samuel Clemens, (Mark Twain) Assistant Territorial Secretary; Benjamin B. Bunker, Attorney-General; John W. North, Surveyor-General; George Turner, Chief Justice; Gordon N. Mott and Horatio N. Jones, Associate Justices, no Marshal having at first been appointed. Besides these official personages there came out from the East with Governor Nye several other gentlemen, the most of whom were soon after, either by him appointed or by the people elected to some official position, the duties of which, it is but just to say, were generally discharged faithfully and well.

Census Taken and an Election Ordered.

As soon as he arrived in the country, Governor Nye, in accordance with the requirements of the Organic Act, caused a census of the Territory to be taken, Dr. Henry Degroot having been appointed to supervise that business. Although but ten days were allowed for completing this work, yet with such diligence and energy was it conducted that not merely an enumeration of the inhabitants was effected but much other statistical information was collected in this brief space of time, the census returns showing that there were eleven thousand white inhabitants in the Territory in the month of July, 1861.

A Legislature Chosen and a Full Code of Laws Enacted.

The census having been completed an election was ordered by the Governor, to be held on the 31st day of August for choosing members of the Legislature and a Delegate to Congress, on which occasion a full complement of members were elected to both branches of the Legislature, John Cradlebaugh having been chosen Delegate to Congress. Meeting on the first day of October, the Legislature proceeded to frame and enact a very full and excellent code of laws, modeled pretty closely after those of California, adjourning at the end of sixty days, to which period their session had been limited by the Organic Act.

The Machinery Perfected.

The Legislature having created the usual number of county and town officers, these were duly filled at an election held January 14th, 1862. The parties so elected having qualified and been installed on the 10th day of February following, the inhabitants of this region so long distracted and given over to anarchy, enjoyed for the first time a complete code of laws with all the machinery and functionaries necessary for insuring their vigorous enforcement. And so matters remained until 1864, when the wealth of the country having been greatly multiplied and its population increased to some forty thousand, the people at an election held for the purpose of considering the question of adopting a State form of government, determined to change their political status from a Territorial dependency to

A Sovereign State,

Which measure having been consummated through the recognition of Congress, the Territory of Nevada was superseded by the State of Nevada, with such official changes as the new order of things required, no other alterations of importance having been made in the existing code of laws. The first Governor chosen for the new State was Henry G. Blaisdel; James W. Nye and Wm. M. Stewart having been elected United States Senators, and Gordon N. Mott Representative in Congress.

Disputed Boundary—Conflict of Jurisdiction.

For a long time much uncertainty had existed as to the exact position of the boundary line between California and the territory of Nevada. Out of this uncertainty there occurred in the month of February, 1863, a conflict of jurisdiction that for a time threatened to lead to violence between the local authorities of the two

Excavating by Machinery.

A city genius once condoled with a farmer because all the ground in the country was wrong side up and he had to turn it all over before anything would grow. It might also be a subject of regret that so much ground is put by nature in the wrong place, so that so much time and money must be expended in getting it into its right location. This is doubly true when men have to do the moving of earth with plows, shovels, wheelbarrows and wagons, for then it costs a good deal of money to move a little dirt. We saw something in Oakland the other day which promises to throw aside all these expensive apparatus and labor, and we were so interested in the working of the machine that we have secured an engraving of it, as may be seen on this page. It is in brief a machine which digs and shoulders its own load, and then runs off and dumps it and returns for another in a fraction of the time in which half a dozen men could throw the same quantity of earth upon a wagon. But we propose to be more definite than this, both in the description of the machine and the work which we saw it doing.

First, to describe the machine:

It is the invention of Jacob Price, Esq., of the Price Press Company, and was patented through Dewey & Co. It is totally unlike other machines made for a similar purpose, differing from them widely in principle, construction, appearance and operation. It is, in

and discharged in one second, also without stopping. Indeed, there is no necessity for stopping during an entire day's work, either for loading or discharging.

The work which we saw doing in Oakland last week was the grading of a large lot down to the level of the street and delivering the earth in a low spot about 800 feet distant, thus making two well graded blocks from two which were very much out of grade. There were six of the machines working in a circuit, which was 1,600 feet long. We timed these machines and found that the complete circuit from the point of dumping to this point again was between six and seven minutes. The machines were of different sizes. Some carried two yards of earth at a load, and were drawn by four horses. Making a trip in six minutes, 10 in an hour, and 100 in a day of 10 hours, it would move off 200 yards of earth in the working day. This is rapid work, and at 15 cents a yard, the lowest rate for excavating, a machine would earn \$30 per day. Quite a notable feature of the work was the ease with which the horses did the work. It was between three and four in the afternoon when we were at this place and yet the horses were fresh and active as the most exacting teamster could desire, although they had kept up the rate of excavating which we have mentioned since morning!

The value of the machine may be clearly seen when we state some facts from the actual working of it in the hands of Mr. Price. He took a job of excavating upon which the lowest bid by contractors working with plows, shovels, scrapers, teams, etc., was \$9,000. Mr. Price put his price at \$4,000 and cleared \$2,000 on the job. The job at which we saw him at work was taken by a contractor at 16½ cents a yard. The time was dull and the contractor took it low to keep his men at work, expecting to get

merely wages out of the job. It was a hard piece of earth and the contractor gave it up, saying he could not make horse-feed at it. Mr. Price took the job at 15 cents per yard for cutting (nothing for filling), and is moving dirt rapidly and will do very well on it beyond doubt. We noticed one other point at the work and that is that the deposited dirt is packed down nearly as hard as a roadbed by the constant passage of the machines, which with their weight and broad wheels produce the effect of repeated rolling. This is, no doubt, a point of considerable importance in the making of roads, trackways for railroads and levees.

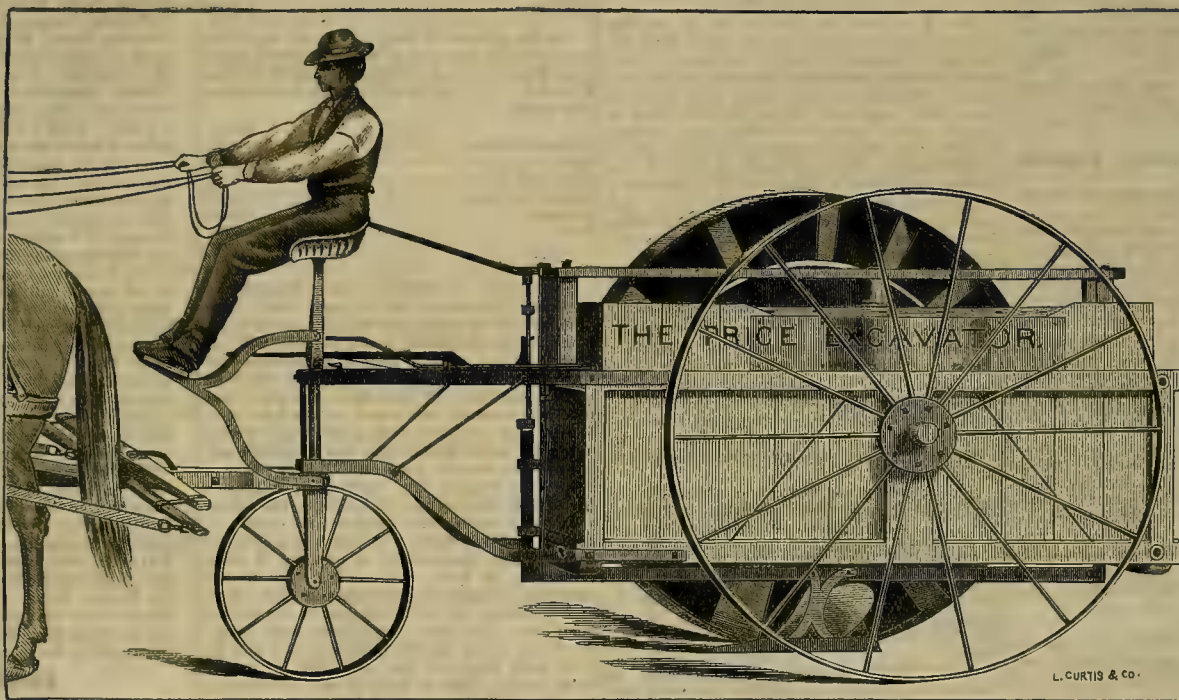
The machines are built by the Price Press Company, at the well known works of the Sweepstakes Plow Company, at San Leandro, Alameda county, where the implement will be shown to all who are interested. The city office is with Baker & Hamilton, 17 Front street, San Francisco, where one of the proprietors, Mr. I. J. Truman, may be interviewed concerning the machines.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Modoc, April 9th, \$4,855—total to date, \$29,483; Tybo Con., 10th, \$14,279—to date, \$27,714.10; Washington, 11th, 344½ ozs. bullion; Comanche, 10th, \$8,347.42; Northern Belle, 10th; \$7,073.94; Modoc, 11th, \$4,957—total to date, \$34,340; California, 14th, \$231,612.26—total to date, \$657,705.70; Con. Virginia, 14th, \$43,572.89—total to date, \$169,851.66; Northern Belle, 12th, \$8,920.93; Grand Prize, 12th, \$7,928.77; Modoc, 13th, \$5,180; Modoc, 15th, \$4,926.52—total to date, \$44,724.70; Con. Virginia, 17th, \$52,667.66—total to date, \$222,519.32; California, 17th, \$185,169.54—total to date, \$842,875.24; Northern Belle, 15th, \$15,405.32; Tybo, 14th, \$13,473.95. Total this month, \$41,188.05.

UNITED STATES ENGINEERS COL. MENDELL and Prof. Davidson, and T. J. Arad, Engineer of the Harbor Commissioners, have presented to the latter body a voluminous report and detailed maps of a new water front line for this city, which they recommend. According to the plan suggested by this report, there will be a new line of water front, extending 13 miles around the city, with a sea wall and new wharves. East street will be lengthened and made much wider than at present, so that a double track for steam cars can be laid, connecting the shipping with the railroad depot at Fourth and Townsend.

ABOUT 60 tons per week of Silver King ore are shipped from the mine in Arizona to this city.

CHAS. H. KOHLER, an old resident of Gold Hill, and for many years Chief Engineer at the Yellow Jacket mine died last week.



THE PRICE EXCAVATOR.

countries. Assuming that Plumas county extended over the fertile and somewhat populous region of Honey Lake valley, the officers of that county undertook to enforce there the laws of California, which was stoutly resisted by the authorities of Roop county, wherein the disputed district was situated.

Being unable to adjust their difficulties on a satisfactory basis, both parties, after recourse had to various processes and much legal finesse, proceeded to arm themselves, and a bloody encounter would probably have ensued had not a heavy fall of snow just then prevented the sheriff of Plumas county making his way over the Sierra into the hostile camp on the other side. Meantime the Legislature of California, now that affairs had reached a crisis, passed a law authorizing the Surveyor-General of the State, acting with a commissioner, to be appointed on the part of Nevada Territory, to survey and definitely locate the boundary line between the two countries. Subsequently a joint commission was appointed for this purpose, it having been agreed that the claims of Nevada should be respected until such time as the boundary was finally fixed, and which, when it came to be accomplished, determined the most of the disputed territory to be in the State of California and within the limits of what are now Plumas and Lassen counties.

MINING DECISION.—The Secretary of the Interior on the 17th, in the case of the Philadelpha Lode vs. the Pride of the West, Del Norte, Colorado, held that the contestant in mining cases has no right of appeal from the decision of the Commissioner of the General Land Office. The only party entitled to appeal is the one who files an adverse claim in time, and commences suits thereon, within 30 days from the date of such filing. This decision is at variance with former decisions of the Department, but it is in accord with decisions which have been made for the past year.

fact, a three-wheeled cart, the box being hung low down between the two hindwheels. The forward wheel is a caster wheel, turning freely in any direction and allowing the machine to be turned around in a circle ten feet in diameter. All the wheels are wrought iron, with cast iron hubs and steel tires, and with the exception of the "off" or right-hand wheel, have nothing peculiar about them. The one excepted, however, has a tire 12 inches wide and five-sixteenths of an inch thick, with the spokes set well over the outer edge of it. The inside of the tire is divided up into buckets or pockets, by blades of iron about 10 by 12 inches, one of which is bolted to each spoke. Beneath the box and just inside of the elevating wheel above described, is an ordinary plow, throwing its furrow on the inside of the wide tire into the above mentioned buckets. In other words, the earth is plowed into the wheel and by it carried up and emptied into the earth box. A moment's reflection will show that the buckets are in a proper position to hold the dirt, except when at or near the top of the wheel, where they are of course bottom up, or nearly so, causing them to discharge their contents. At the top of the earth box is a horizontal distributing wheel, driven by the spokes of the "near" hind wheel. This wheel serves to keep the earth level, and make it fill the box chock full in every corner. The load is discharged by turning the three bottom planks on their edge, by means of the lever shown on the left hand of the driver. The lever on the right, is for raising or lowering the plow.

The method of operation is as follows: The elevating wheel and the "off" horses travel in the furrow. The driver lowers the plow, and the box commences to fill, requiring less than a minute to take a full load. When the box is full the plow is raised, without stopping the team, and the load is driven where it is wanted

South African Mines

The following notes on the mines, climate, etc., of South Africa, published in the *Helena (Montana) Independent*, were prepared by the United States Consul at Cape Town, South Africa, W. W. Edgecomb, in reply to enquiries made by E. W. McGrath, of Helena. The letter accompanying these notes is dated Cape Town, January 13th, 1877, and the writer suggests that no persons go to that country unless they are liberally supplied with means:

Answer to Mr. McGrath's Questions:

Gold mining in Transvaal is principally confined to the Leydenburg gold fields and the Marabasta gold fields. The former has at present about 400 miners digging for alluvial gold. Rich gold-bearing reefs have lately been discovered by a Mr. Armfield, who proposes to form a company and import quartz-crushing machinery. The last-named district is principally confined to the crushing of gold quartz by an English company, under the management of Colonel Wetherby. Besides these, gold has been found in many other places within a radius of a few hundred miles, which proves the Transvaal republic to be a gold-yielding country.

Besides gold, there has been discovered cobalt, lead, copper, coal and other minerals. The two former are worked by companies in the districts of Marao and Middleburg. The country as yet has been so little explored that at present we can only with certainty say that it is a country rich in minerals, but cannot specify the deposits or localities except as above mentioned. It is the general opinion at the Leydenburg gold fields that richer gold deposits will be found about 100 miles north from the present gold fields.

Water has not been over abundant at the gold diggings, except during the summer; at the same time it cannot be called scarce, there being the Sabi river running through—or nearly so—the Leydenburg gold fields. During the past year the miners have made several water races, which seem to answer the purposes, so that lately we have heard very little grumbling about scarcity of water.

A miner's claim (so far as my knowledge goes), is 100 yards square, for which he pays to the government 10 shillings sterling per month. A prospector's claim, or to one or more persons who discover a gold-bearing reef or a gold field, is 150 yards square. As an example: Mr. Armfield and three more miners who discovered the last gold-bearing reef, received as remuneration 1,000 square yards of the best part of the reef, selected by themselves. I have heard that they received even more ground; but I am not certain, therefore I quote the lowest.

There are one or two tent-house hotels at the Leydenburg gold fields, where the charge for board and lodging is about 10 shillings per day. As a rule, the miners do not make use of hotels, but have their own mess. I quote the price of provisions as follows: Beef, six pence per pound; mutton, six pence; corn meal, from 40 to 50 shillings per 200 pounds; maize (generally used for the diggers' Caffirs), 20 to 30 shillings per 200 pounds; potatoes, 20 to 30 shillings a bag. Vegetables abundant at middling figures; the same with fruit. Many miners, particularly those that camp near the river, have their own gardens.

Wages.

I only know of one large claimholder who engaged men to work for him, and he paid 50s per week and free board and lodging, and then they only staid with him a few weeks, until they had saved a few pounds and commenced to work for themselves.

Miner's Outfit.

I believe that all that a miner usually requires, that is to say for the alluvial gold diggings, can be bought in the several South African seaports and towns as cheap as in any other country, and I have no doubt that diggers' tools and clothing can be bought in the gold fields, where there are several stores filled with merchandise.

The Transvaal Republic

Has a white population of at least 30,000, the greater part of whom are Dutch farmers, so there will always be food in abundance, and as it will become worth their while to offer their produce for sale in the markets of the gold fields, the necessities of life will be lower in price. The same as was the case in the diamond fields, where cornmeal is now selling at about 20s per 200 lbs.

The Transvaal people have had a war with a Caffir chief, Succone, during the past months, but it is nearly at an end, or will be so within a very short time. It is difficult to say whether any more disturbances with the negroes will break out. I do not think it, however. During this last war, which was only from 50 to 100 miles from the Leydenburg gold fields, the miners were never disturbed, neither by one nor the other of the war parties. In fact, the miners received messages from the Caffir chief that they need not fear of any raid upon them, as he did not wish to make bad friends with the Europeans. Consequently, only the most timid miners left the diggings during the war. As a proof of how mild our Caffir wars are, I may mention that during these eight months of warfare with the Caffirs, there were not more than 15 white men killed and a few wounded. At the same time every man should be prepared for an emergency.

Route to the Leydenburg Diggings.

For persons of limited means, and who do not particularly desire to visit other South African

sea ports, I should recommend taking ship direct for Delagoa bay, and from there walk up to the gold fields, a distance, at the utmost, of 150 miles. There is an open road between Delagoa bay and the gold fields, and guides and native carriages for baggage can be procured at the seaport. For persons who wish to see other parts of South Africa before going to the gold fields, I would say, come first to Cape Town, and proceed with the Union Company's mail steamer from Cape Town to Delagoa bay, visiting Port Elizabeth and Natal on the route.

Railway.

There is a railway to be built between Delagoa bay and Transvaal. Ten ship-loads of railway material have already arrived at Delagoa bay. The climate in all parts of South Africa is good.

Drainage of Mines.

Colorado's New Law on the Subject.

The *Colorado Miner* gives the following new State law of Colorado on the drainage of mines:

SEC. 1. Whenever contiguous or adjacent mines upon the same or upon separate lodes have a common ingress of water, or from subterranean communication of the water, have a common drainage, it shall be the duty of the owners, lessees or occupants of each mine, so related, to provide for their proportionate share of the drainage thereof.

SEC. 2. Any parties so related, failing to provide, as aforesaid, for the drainage of the mines owned or occupied by them, thereby imposing an unjust burden upon neighboring mines, whether owned or occupied by them, shall pay respectively to those performing the work of drainage the actual cost and expense of doing such drainage, to be recovered by an action in any court of competent jurisdiction.

SEC. 3. It shall be lawful for all mining corporations or companies and all individuals engaged in mining, having thus a common interest in draining such mines, to unite for the purpose of effecting the same, under such common name and upon such terms and conditions as may be agreed upon; and every such association, having filed a certificate of incorporation, as provided by the eighteenth chapter of the revised Statutes of Colorado, shall be deemed a corporation, with all the rights, incidents and liabilities of a body corporate, according to the provisions of the aforesaid statute, so far as the same may be applicable.

SEC. 4. Failing to mutually agree, as indicated in the preceding section for drainage, jointly, one or more of the said parties may undertake the work of drainage, either by sinking a pump shaft or by running an adit, after giving reasonable notice, and should the remaining parties then fail, neglect or refuse to unite in equitable arrangement for doing the work or sharing the expense thereof, they shall be subject to "an action therefor," as already specified, to be enforced in any court of competent jurisdiction.

SEC. 5. Whenever the mines thus drained are in possession or being worked by lessees, and such lessees have no property or effects out of which the judgment for drainage may be satisfied, the plaintiff bringing his action for damages shall be entitled to a writ of attachment in aid of his said action, upon filing an affidavit, showing that said lessees have no property out of which the judgment for drainage may be satisfied.

SEC. 6. When an action is commenced to recover the cost and expenses for draining a lode or mine, it shall be lawful for the plaintiff to apply to the court, if in session, or to the judge thereof in vacation for an order to inspect and examine the lodes or mines claimed to have been drained by the plaintiff, or some one, for him, shall make affidavit that such inspection or examination is necessary for a proper preparation for trial. The court or judge shall grant an order for the underground inspection and examination of the lodes or mines described in the petition. Such order shall designate the number of persons, not exceeding three, besides the plaintiff or his representative, to examine and inspect such lodes and mines and take the measurement thereof, relating the amount of water drained from the lode or mine, or the number of fathoms of ground mined or worked out of the lode or mine claimed to have been drained, the cost of such examination and inspection to be borne by the party applying therefor. The court or judge shall have power to cause the removal of any rock, debris or other obstacles in any lode or vein, when such removal is shown to be necessary to a just termination of the question involved; provided, that no such order for inspection and examination shall be made, except in open court or at chambers, upon notice of application for such order of at least three days, and not then except by agreement of parties, nor unless it appears that the plaintiff has refused the privilege of making the inspection and examination by the defendant, his or their agent.

SEC. 7. That hereafter, when any person or persons, or corporations, shall be engaged in mining or milling, and in the prosecution of such business shall hoist or raise water from mines or natural channels, and the same shall flow away from the premises of such persons or corporations, to any natural channel, gulch or draw, the same shall be considered beyond the control of the party so hoisting or raising the same, and may be taken and used by other parties the same as that of natural water courses.

SEC. 8. After any such water shall have been so raised, and the same shall have flown into

any such natural channel, gulch or draw, the party so hoisting or raising the same shall only be liable for injury caused thereby in the same manner as riparian owners along natural water courses.

SEC. 9. The provisions of this act shall not be construed to apply to undeveloped mines, but to those only which shall have been opened, and shall clearly derive a benefit from being drained.

SEC. 10. In trial of cases arising under this act, the Court shall admit evidence of the normal stand or position of the water while at rest in an idle mine, also the observed prevalence of a common water level or a standing water line in the same or separate lodes; also the effect (if any) of elevating or depressing the water in the same, contiguous or separate lodes or mines; also the effect of draining or ceasing to drain any given lode or mine had upon the water in the same, contiguous or separate lodes or mines, and all other evidence which tends to prove the common ingress of subterranean communication of water in the same lode or mine, or contiguous or separate lodes or mines.

Gould & Curry Water.

We were yesterday, says the *Virginia Enterprise*, shown an analysis of the water struck by the diamond drill on the 1700-foot level of the Gould & Curry some time ago. The analysis was made by John Hewston of the Pacific refinery. In a gallon of 221 cubic inches there was found of indissoluble sediment, of fine sand and micaceous earth, 33.24 grains. Total of soluble salts, 30.279 grains, consisting as follows:

	Grains.
Sodium.....	0.04
Silica.....	2.21
Sulphate of lime.....	14.35
Sulphate of Soda.....	6.42
Alkaline carbonates.....	7.26
Magnesia.....	None.
Iron.....	None.

For the purpose of comparison we republish an analysis of the Hale & Norcross water, made some time since and published in the *Enterprise* Feb. 8th. In a gallon of 231 cubic inches there was found:

	Grains.
Chloride of sodium.....	1.327
Silica.....	3.500
Sulphate of lime.....	22.532
Sulphate of soda.....	8.342
Sulphate of potash.....	18.513
Magnesia.....	Trace.
Iron.....	None.
Total.....	54.216

STANDARDS OF WEIGHT AND MEASURE.—Professor Hennessy, in a paper on "New Standards of Measure and Weight," says that, owing to the objections many persons will entertain to the metric system, he brought forward for consideration the standards which he had prepared several years since and which had been subsequently advocated by Sir John Herschel. The standard of measure was a bronze prismatic scale, which was the fifty-millionth part of the earth's polar axis. From that a system of weights was derived by taking a fraction of the standard of length as the side of a cube and finding the weight of an equal volume of distilled water. In that way a series of weights was constructed in bronze. A chain containing 50 links, each equal to the bronze standard, was also constructed, and that chain was, therefore, the millionth part of the earth's polar axis. The link, or standard scale measured very nearly 10.0007 English inches, and its tenth part, therefore, was very little in excess of an inch. That, as well as the geometrical superiority of the axial standard over one derived from a meridian, seemed to have influenced Sir John Herschel and others in preferring it to the meter. Geometrical measurements had, in fact, shown that the earth was a somewhat irregular spheroid; and, therefore, that its meridians were equal, while the polar axis was necessarily unique and corresponded to every meridian. On these grounds Professor Hennessy thought that the new standard might be universally accepted by all nations, if the objections to the meter would prevent its universal adoption.

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

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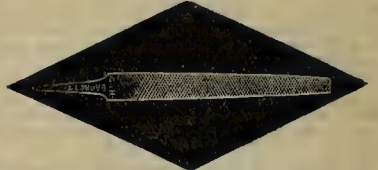
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Continued from page 245.

ELY DISTRICT.

RAYMOND & ELY.—Pioche Record, April 14: The Raymond & Ely mill is now running steadily on tailings, ten stamps being employed on ore. It is doing good work, as the bullion shipments will show. Good ore is being taken from the mine but there has been no change in the general working.

BULLION FROM HIGHLAND.—The small furnace at Highland has started again, the result being that 48 bars were brought to Rooder's store from it on Thursday and 53 bars yesterday. It works well and there is every prospect of a continuation.

HAVE QUIZ.—The chlorides in the Raymond & Ely mine quit work on Saturday, the 31st inst., the time in which they were allowed to chloride having expired. Most of them having been busily engaged shipping their ore by the N. C. R. R. to the Colorado mill in the past week.

BULLION COMING IN.—Eleven bars of bullion were delivered at Wells, Fargo & Co's office on Wednesday last from the Raymond & Ely mill, it being brought to Pioche by the N. C. R. R. This is pretty good work for a nine days run and commences to make things look like old times.

RICIN.—Some very rich ore was struck in the Raymond & Ely mine during the past week on the fifth level, the pulp assay going over three hundred dollars.

EUREKA DISTRICT.

FURNACE SITE.—Eureka Sentinel, April 13: The Hamburg company owns a fine property in the canyon north of town, including water rights, furnace sites and several buildings. It is the intention of the company to erect two furnaces on the hillside, directly opposite the old Roslin furnace, a plateau that exists at that point. A ditch is brought along the hillside directly to the spot, and an ample water supply is found in several springs, controlled by the company, further up the canyon. A good grade can be easily constructed from the Secret canyon road; and taken all in all, there is no place in the vicinity that was better adapted for the site for the furnaces.

THE ROSLIN FURNACE.—The old Roslin shaft furnace stands like a monument up the canyon, and its form and construction is about all the evidence that we have left of the early smelting operations in this camp. As compared with one of our huge furnaces of the present day, its proportions are very small, and smelters smile at the crude work done when it was erected. It has not been in operation for five years, and the building and machinery surrounding it have been torn down and removed.

WHITE PINE DISTRICT.

THE EBERHARDT AND AURORA MINE.—White Pine News April 14: Work is being pushed on the incline below the 1000-ft station, with no material change in the general formation of the ore. We learn that several new drifts are being run for prospecting purposes, with very favorable indications. But the main energies of the management are directed to carrying the incline down as fast as possible, so as to connect with the tunnel.

THE TUNNEL.—The Eberhardt and Aurora tunnel has passed its 1000-ft, and is going ahead finely. The air-flume, which was completed to give proper ventilation, works like a charm, and no further inconvenience is likely to be experienced for a long time on account of impure air. The machinery and everything connected with the tunnel, work well, and no stoppages or delays occur.

Arizona.

BIG BUG DISTRICT.—Arizona Miner, April 13: This old, favorite district is looking up. One mine, owned by Gen. Kautz, has been patented, five others, owned by merchants of Prescott, are now being patented. Several rich discoveries of both gold and silver have recently been made. Messrs. Roberts and Poland are actually quarrying out of the Mesa lode, situated some two miles above the Isabella mill, one that glitters with gold, and which, for want of milling facilities, they are reducing in horse arastras. It is a fact, not generally known, that there has been more mines developed and more bullion extracted from this district than from any other district in Yavapai county, except the Peck. The old Big Bug mill, erected by Mr. Hitchcock in 1868, ran on ore two years, and under Mr. Hitchcock's management for six months, that he ran the mill, in 1869-70, made a net profit of nearly \$3,000 per month. With the roads all made, and the facilities for timber and water, few places offer better inducements for the safe investment of capital.

LYNX CREEK.—Messrs. Elliott & Rice, owners of the Accidental mine, have just struck a bonanza in the tunnel 125 feet below their former rich strike. Few, even in Prescott, are aware of the extent of the development of the mine. The lower tunnel is in 575 feet and work is pushed night and day. The ore is hauled about one mile and a half and is reduced by means of a crusher and four arastras, run by steam power. The last run yielded \$21 per ton.

BLACK CANYON.—The Humburg mining district, near Black canyon, is attracting a good deal of attention, and there is being extracted and shipped tons of very rich ore. Five different lots of from three to five tons are now lying at the Aztlan mill, several other lots on the road, and if the miners could get their ores worked or sell them on the ground hundreds of tons would be taken out. A first-class silver mill erected in the district would pay the owners immense profits, and would soon build up a lively camp.

THE AGUA FRIA SMELTER is blowing away, day and night, Sunday included, and boiling out the precious metal, in combination with some that is not quite so precious, by the tons.

Colorado.

NEW DISCOVERIES.—Colorado Miner, April 7: Jack Baker, one of the original discoverers of the Baker mine in Argentina, has recently found a big vein at the mouth of Spring or Golconda gulch, about a mile below Mill City. Where the gulch has cut the vein, a discovery has been made on each side, and a tunnel started on the vein each way. On the west side, he has gone 18 feet, revealing a vein of mineral three feet wide. On the east, he has gone 15 feet. Further east another discovery has been made; it is a very strong vein of bluish ore, rich in copper and galena wherever uncovered.

YOUNG AMERICA LODE.—The eastern end of this lode, on Red Elephant mountain, is being worked at a point a little east of the discovery shaft, by Messrs. Rodgers and Bradley, who are taking out pay. The ore is very rich in silver, assaying over 1,000 ozs. and always averaging well at the mill. It carries a good deal of copper, and is also rich in lead.

THE ANGLO-SAXON.—The Anglo-Saxon is now being worked on two levels—one at a depth of 280 feet below the surface at the discovery, and the other at a depth of 100 feet below that, making 380 feet in all.

THE BISMARCK LODE is situated on the southwest slope of Sherman mountain. The vein has been opened for a distance of 2,500 feet—called on the west the Cataract, and on the east the St. Jo. Mr. E. Y. Naylor has obtained a patent of 1,500 feet on the St. Jo, and proposes to work it the coming season. The ore is worth \$400 per ton net at the mill.

THE CROSS LODE.—Col. Harney and Chris. King have commenced work on the Cross lode on the west side of Leavenworth mountain. The ore found in the Cross is generally rich. A mill-run made last week by parties now working on the east end of the Cross, gave a result of 900 ozs. first-class, and over 200 ozs. for second-class.

ANOTHER MILL STARTED.—The Kansas and Colorado mining and milling company have leased the old Lincoln company's mill at Mill City, and are preparing to run a fine arastras on ore from the Alchinson and Falmouth lodes, on Trail run. They propose to run the surface quartz and ship the ore, which is rich in copper. A trial of the surface quartz has already been made, which panned out \$40 in fine gold.

GREAT GOLD STRIKE.—Lewis lode, at Empire, about 400 feet above the Cambridge, is a new discovery by Gulbar & Harrington. The prospects in the pan are wonderful. Eight pans of dirt from the crevice gave \$31 in gold, or nearly \$4 to the pan. Ten pounds of the quartz pulver-

ized, gave 7 dwts, 6 grains of gold, or about 65 cents per pound. The width of the pay vein, at a depth of 1 1/2 feet, is 16 inches, and about 2,500 pounds of this rich quartz and dirt have been taken out of the shaft in going to that depth.

Idaho.

GOLDEN CHARIOT.—Owyhee Avalanche, April 14: Recent operations in the Golden Chariot have resulted in the most cheering developments. A rich and promising ledge has been encountered, which shows up splendidly in gold, and is of such dimensions and complexion as to justify the most enthusiastic hopes of all interested relative to the future of the Chariot. The new ore body bears all the characteristics of a first-class bonanza, and we can assure the owners of this magnificent property that all the indications are most promising, and that their investments here are certain to be rewarded by returns that will surpass their most sanguine expectations. The Golden Chariot mill will commence crushing next week. There are several hundred tons of rock from the Potosi, Lepley and other mines here, so that it may be a month or more before the mill commences on Chariot rock.

NORTHERN LIGHT.—Some 38 tons of rock from the Northern Light mine, near town, were crushed a few days ago, and the crushing averaged nearly \$200 to the ton. This yields a net profit to Mr. Douglass, the owner of this mine (after deducting the expenses incident to the extraction of this rock, milling, hauling and assaying), of \$5,000 and upwards, quite a snug little sum, considering that the time consumed in taking out the ore was only about six weeks. The value of the bullion was about \$7,230.

POORMAN.—Great hopes are entertained respecting the Poorman. All the old miners and prospectors of this vicinity are firm in the belief that there is more solid wealth in that mine than there is in any other on the Pacific coast.

The following mine is looming up splendidly. Mr. Cary and his associates, who have been working it for the past few months, are jubilant over the prospect. They have got a magnificent ledge, with abundance of rich ore.

The Belle Peck and Potosi mines are both looking first-rate and will soon be giving a good account of themselves in the shape of bullion yield. These mines will be actively worked during the season.

The Hidden Treasure ledge is being worked by a limited force, and the rock is being taken out through the Empire shaft. There are 12 tons ready for crushing.

From South Mountain and Wagontown we have nothing new. Prospects do not seem to be very bright for a lively season in either of those camps.

Utah.

NEW SMELTERS.—Cor. Salt Lake Tribune, April 12: Enterprises of great moment are now being entered into in San Francisco district. Messrs. Wm. Godde and Shearman & St. Luke, have made satisfactory arrangements with the owners of the Horn Silver mine, and will immediately commence the erection of extensive smelting works at the town of Frisco. The Horn Silver mine is developed to an extent that I can safely say it is the largest deposit of smelting ore in Utah. There is considerable excitement in this district over the finding of a second horn silver mine, two miles north, in the same range. Those who have visited it and are reliable, say it is all that it is represented. The lucky discoverers are new comers to the camp. On the west side of the San Francisco range of mountains can also be found a busy camp, and it is there that some very fine veins of iron ore are found, and worked to supply the smelters with flux. Copper also abounds to a considerable extent, and some very good bodies of high grade galena.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

CALIFORNIA FRUIT AND MEAT SHIPPING CO.—April 13th. Object: To deal in meat, fruit, fish, produce of every character and general merchandise, and to do a business of a transportation, forwarding and commission merchants. Directors—John Cashin, Wm. Johnston, Charles Grove, J. Earl, J. D. Blanchard, W. S. Bailey, B. B. Norton, Wm. Tothunter and J. McCusick. Capital stock, \$50,000.

SOUTHERN DEPOT LAND CO.—April 13th. Object: The buying and selling of real estate. Directors—Charles Crocker, Leland Stanford, David D. Colton, Mark Hopkins and Thomas B. Lewis. Capital stock, \$340,000.

WESTERN REFRIGERATOR CAR CO.—April 16th. Object: The operation of refrigerator cars and transportation of meats, vegetables and fruits. Capital stock, \$1,000,000. Directors—James H. Spotts, Charles M. Keeney, Bernard Lande, Albert T. Spotts and Robert Williamson.

PACIFIC CARRARA MARBLE CO.—April 16th. Capital stock, \$3,000,000. Object: Developing veins of marble and dealing in the same. Directors—Gustavus S. Ashmead, Edward T. Menomy, James Atkinson, Wm. M. Wainsley and George A. Hill.

Meetings and Elections.

CALIFORNIA STOCK EXCHANGE.—April 14th.—J. L. Armstrong, President; W. F. Hughes, Vice-President; John Gray, Chairman; E. M. Lawton, Secretary, and G. H. Brundage, M. Morgenstein and J. J. Tobin, Executive Committee.

NEW ENGLAND SHELTING AND TUNNEL CO.—Trustees: Chas. Moss, C. H. Baker, J. D. Fry, J. Ballard and W. H. Hart.

IRON WORK FOR CITY HALL.—Sealed proposals for material and work at the City Hall were opened by the City Hall Commissioners on Tuesday. The bids for iron work were as follows: Iron staircases and steps and other iron work, to be completed in 22 weeks: Lewis & Co., \$26,937; Nutting & Son, \$27,290; Savage & Son, \$28,450; J. M. Stockman, \$36,197; Jonathan Kittridge, \$27,184; Stieger & Kerr, \$34,900; Rankin & Co., \$39,745; Low & Charters, \$35,975. Wm. T. Coleman, corrugated iron arching with lathing, where the girth is less than eight feet, 4 1/2 cents per superficial foot; without iron lathing, where girth is eight feet and over, 47 cents per superficial foot; iron lathing, where used in combination with iron arching, 30 cents per superficial foot; iron bracketing and lathing for cornices, 53 1/2 cents per foot; iron lathing on wood of partition, 20 cents per foot; on wood furring of walls, 20 cents per foot; ironing, furring and lathing in partition, 30 cents per foot; fixed diagonally, 40 cents.

The Germania mine has been sold to parties in New York for \$45,000, of which \$10,000 has been paid, and the remainder will be paid August 1st.

ABOUT 1,000 northern hostile Indians made a formal surrender of their arms, ponies, etc., to General Crook this week at Spotted Tail agency, Neb.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

PATENTS AND INVENTIONS.**A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.**

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING APRIL 10TH, 1877.

189,354. TRACTION HORSE-POWER.—D. T. Gillis, San Leandro, Cal.
189,472. FRUIT-DRIER.—J. M. Keeler, S. F.
189,477. PIPE COUPLING.—S. Lightburn, Jr., S. F.

4,527. TEAS.—A. Mann & Co., S. F.
1,030. THE STOCK CONDITION POWDER.—Painter & Calvert, S. F.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

BUTTON-HOLE ATTACHMENT TO SEWING MACHINES.—Eugene Moreau, S. F. This invention relates to an improved clamp for gripping the cloth around the borders of button-hole openings in the cloth plates of button-hole sewing machines, so as to hold the cloth immovably in place while the button-hole is being worked. Heretofore these cloth clamps have been made either in the form of a single clamping plate, which entirely surrounded the button-hole opening; or in two parts or halves, one part or half serving to clamp the cloth on each side of the opening. Cloth and finished work, however, when ready for the button-holes, is often unequal in thickness at different points along the border of the button-hole, because most frequently the button-hole must be made through two and even more thicknesses of cloth. The difficulty experienced has been that although a solid clamp is pressed firmly on the cloth around the button-hole opening or upon each side as above stated, there will be still places where the pressure is not sufficient because of the unequal thickness of the material so that the needle of the machine will cause the edge to draw and thus mar the finish and uniformity of the button-hole work. The invention under consideration consists in constructing a clamp with two or more narrow independent presser feet, placed side by side, each of which will exert an independent downward pressure upon that portion of the cloth directly under it, and thus provide a continuous clamp which will adjust itself to the inequalities of the cloth, and thus insure its immovability.

HORSE-POWER.—D. T. Gillis, San Leandro, Alameda county. This invention is to provide an economical and effective means for working pumps by horse-power, and it consists in a running gear and pivoted bearing, in combination with a walking beam and rods arranged to operate a pump movement. The axle of the running gear is arranged to be propelled around a fixed center by horse-power, with a traction wheel and weight for insuring the necessary friction and rotation of said wheel, the other end of the axle is a crank rod of a pump movement. When it is desired to employ a horse to pump, he is hitched to the running gear by means of a pole and driven around in a circle, the rotation of the traction wheel and axle imparting to the pump movement the requisite stroke for pumping purposes through the medium of the crank joint, walking beam and vertical rods.

FRUIT DRIER.—Jas. M. Keeler. This is an improvement upon the American Fruit Drier, which adapts it for making raisins from grapes, and also renders it more convenient and useful as an ordinary fruit drier. We have described this machine previously, and will probably present an illustration of it shortly.

FLUXES.—Chas. F. Secor. This patent covers improvements in a combination of native fluxes for smelting "dry ores." Mr. Secor has been using these fluxes for a long time and has brought them to perfection for work on a large scale.

SILK WORM EGGS EXPORTATION.—Japan now exports silk worm eggs, principally by way of San Francisco. The route by India has been abandoned. The railroad across the American continent enables Japanese exporters to prolong the season and send off boxes down to the end of the year, which would be impossible by way of Suez. The Messageries' maritime steamers thus lose an important freight.

LEAD has advanced in Liverpool to £21 2s 6d to £21 7s 6d for good ordinary brands.

ANTIMONY has advanced in England to £51 to £53 per ton for French star regulus.

QUICKSILVER is worth £7 5s to £7 10s per flask in Liverpool.

General News Items.

The Chico incendiaries are now on trial.

The Grand Duke Alexis is in Washington.

The confession of Boss Tweed has occasioned a great flurry among New York politicians.

FIRST LIEUTENANT E. G. GRENOUGH has been detailed as Professor of Military Science and Tactics at the University of California.

HON. JOHN F. KASSON, of Iowa, has been tendered and has accepted the position of United States Minister to Spain.

OCCIDENT beat Oakland Maid on the Bay District track, on Saturday, in a match to wagon for a purse of \$2,000. Time, 2:25, 2:27 1/2, 2:27 1/2, 2:29 1/2. The Maid won the third heat.

In a day or two 200 employees of the Bureau of Engraving and Printing of the Treasury Department will be dismissed. This reduction will be followed at the end of the month by the additional dismissal of 200 more.

The West Point graduating class this year numbers 77, the largest ever graduated. There are only 40 vacancies in the army, consequently 37 will be appointed Brevet Second Lieutenants under the law, and promoted to the grade of Second Lieutenants as vacancies occur.

A DECISION has been rendered in favor of Myra Clark Gaines, in the famous Gaines suit, involving millions of dollars worth of property in New Orleans. The litigation has extended over 40 years, and this decision ends the struggle in favor of the claimant.

For sons of parents residing in this city, no charge is made for the maintenance of boys on the Jamestown training ship. For country boys, however, a charge of \$15 per month is made, payable six months in advance. The fit-out for each boy costs about \$30, and is furnished by the ship commander.

THE TRIBUNE says: The recent mails brought instructions from Australia and Cape Colony to houses in England to make up consignments of hardware from American and not from British products. Merchants in those distant countries are captivated with the beauty and low prices of our hardware goods.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening last.

The following specimens were received by donations to the cabinet: Graphite, 12 miles from Sonora, Cal., by Dr. J. B. Trask; 36 specimens of minerals from Dr. E. S. Holden, of Stockton; shells from the Colorado desert, by J. P. Moore; eight specimens of Indian skulls and other crania, from Stockton, by R. K. Reed, M. D.

Some specimens of white and of brown paper were exhibited, manufactured at Lick's mill, in Santa Clara county, from the fiber of the yucca, a plant of the Colorado desert. From five tons of the material three and a half tons of the paper were produced.

Dr. Stout presented, on behalf of Mr. Alvord, some fish eggs, from Los Angeles. The eggs are similar to those of the dog fish, in having an envelope or life preserver, but differing in regard to shape. The envelope of the dog-fish eggs is shaped like a flat-bottomed boat. The eggs presented have an envelope whirled like a wheel or helix.

Prof. Davidson read a paper on "Mechanical Defects in Micrometers," having reference to certain irregularities or errors observed as resulting from friction in the movements of the micrometer screw in procuring distances and diameters, and suggesting methods of construction calculated to determine satisfactorily the arc value of each turn of the screw. We shall publish the paper in full.

Prof. Davidson stated that, at the next meeting of the Academy, he would present some original papers on the breakwaters at Alexandria, Brest, and in England.

A SUPERIOR WATCH.—Americans may well be proud of our ingenious inventors and "artistic mechanics." They beat the world, as the present triumph of American watches testifies unerringly. The New York Watch Company, at Springfield, Mass., started but a few years since with the latest and best inventions, improved tools and select and skilled workmen. When we say now that their watches are not surpassed, and are seldom equaled for perfect finish and fine time-keeping qualities, we know that we are speaking of an article which will bear the scrutiny and closest tests of experts. Dewey & Jordan, agents, at 433 Montgomery street, S. F., have just prepared to meet purchasers on this coast with timely prices for these superior watches. Send for their price list.

SCIENTIFIC PRESS.—As the old year is drawing to a close and the new is rapidly approaching, all our mining friends should subscribe for this scientific journal, especially devoted to their interests. It is a California enterprise, and compares favorably with similar organs of years more experience and age in the old countries.—Colfax Enterprise.

METALS.

(WHOLESALE.)

THURSDAY, M., April 19, 1877.

Isom			
American Pig. ton.	20 00	43 00	40
Scotch Pig. ton.	31 00	33 50	50
White Pig. ton.	30 00	—	—
Oregon Pig. ton.	—	—	—
Refined Bar.	4 00	44	—
Boiler, 1.	4 00	44	—
Plate, 13 to 20.	7 00	—	—
Sheet, 10 to 14.	5 00	—	—
Sheet, 15 to 20.	5 00	—	—
Sheet, 21 to 24.	5 00	—	—
Sheet, 25 to 28.	5 00	—	—
Home Sheet, keg.	6 00	—	—
Nail Rod.	8 00	—	—
Norway, Oval.	8 00	—	—
Boiled.	7 00	—	—
COPPER.			
Copper Tinned.	37 00	40	—
Sheeting, B.	37 00	40	—
Sheeting, Yellow.	37 00	40	—
Sheeting, Old Yellow.	37 00	40	—
Comp. Sheet, Nails.	21 00	—	—
Comp. Sheet, Bolts.	24 00	—	—
STEEL.			
English Cast, B.	14 00	25	—
Anderson & Woods ordinary sizes.	16 00	—	—
Drill.	16 00	—	—
Flat Bar.	15 00	20	—
Flow Steel.	8 00	12 00	—
TIN.			
10x14 Charcoal.	9 00	—	—
Bacon Tin.	24 00	—	—
Australian.	18 00	16 00	—
ZINC.			
By the Cask.	11 00	—	—
Zinc Sheet 7x14 ft. 7 to 10, lb.	11 00	—	—
7x14 ft. 11 to 14.	11 00	—	—
8x14 ft. 11 to 14.	12 00	—	—
8x14 ft. 11 to 10.	12 00	—	—
NAILS.			
Assorted sizes.	3 37 1/2	—	—
QUICKSILVER.			
By the lb.	42 1/2	45	—

GENERAL MERCHANDISE.

(WHOLESALE.)

WEDNESDAY M., April 18, 1877.

BAGS—Jobbing.			
Best Standard Wheat.	9 00	—	—
Neville & Co's.	9 00	—	—
Hand Sewed, 22x36.	9 00	—	—
22x36.	10 00	—	—
Machine Sewed, 22x36.	9 00	—	—
Flour Sacks, halves.	9 00	—	—
Quarters.	6 00	—	—
4x6 1/2.	4 00	—	—
6x10, 60 inch.	11 00	—	—
45 inch.	8 00	—	—
40 inch.	7 00	—	—
Wool Sacks.	—	—	—
Hand Sewed, 3 lb. 50.	45 00	—	—
Machine Sewed.	45 00	—	—
4 lb.	55 00	—	—
Standard Gunny.	12 00	—	—
Bean Bags.	7 00	—	—
CANDLES.			
Crystal Wax.	17 00	—	—
Eagle.	12 00	—	—
Patent Sperm.	23 00	20	—
CANNED GOODS.			
Assorted Pie Fruits.	—	—	—
2 1/2 cans.	2 75	28 00	—
Table do.	3 75	42 25	—
Jams and Jellies.	—	—	—
Pickles, 1/2 gal.	3 50	—	—
Sardines, 1/2 box.	1 65	90	—
Hf Boxes.	3 00	—	—
COAL—Jobbing.			
Australian, ton.	8 50	9 00	—
Coos Bay.	8 00	—	—
Bellingham Bay.	8 00	—	—
Seattle.	8 00	9 00	—
Cumberland.	14 00	17 00	—
Hf Diablo.	17 00	7 50	—
Lehigh.	22 00	—	—
Liverpool.	8 50	9 00	—
West Hartley.	14 00	—	—
Scotch.	7 50	10 00	—
Seranton.	13 00	16 00	—
Vancouver Id.	10 50	12 00	—
Charcoal, sack.	75 00	—	—
Coke, blk.	20 00	—	—
COFFEE.			
Sandwich Id. B.	21 00	—	—
Costa Rica.	20 00	21 00	—
Guatemala.	20 00	21 00	—
Java.	19 00	—	—
Manilla.	19 00	20 00	—
Ground, in cs.	25 00	—	—
FISH.			
Sac'd Dry Cod.	5 00	7 00	—
Bonellus.	8 00	10 00	—
Eastern Cod.	9 00	10 00	—
Salmon, blk.	9 00	10 00	—
Hf blk.	4 50	5 00	—
Pk'd Cod, blk.	22 00	—	—
Hf blk.	11 00	—	—
Mackerel, No. 1.	—	—	—
Hf blk.	15 00	16 00	—
In Kite.	3 00	3 25	—
Ex Mess.	3 50	4 00	—
Pk'd Herring, Hx 3.	3 00	3 50	—
Boston Smk'd Hg.	40 00	50 00	—
LIME, ETC.			
Lime, Sta Cruz.	2 00	2 25	—
Cement, Rosen.	—	—	—
dale.	2 75	3 50	—
Portland.	4 75	5 50	—
Plaster, Golden.	—	—	—
Gate Mills.	3 00	3 25	—
Land Plaster, tn 10.	10 00	12 50	—
NAILS.			
Ass'd sizes, keg 3 25.	4 00	—	—

LEATHER.

(WHOLESALE.)

Sole Leather, heavy, lb.	22 00	23 00	—
Light.	22 00	23 00	—
Jodot, 8 Kil, doz.	48 00	50 00	—
11 to 13 Kil.	48 00	50 00	—
14 to 19 Kil.	52 00	54 00	—
Second choice, 15 Kil.	57 00	59 00	—
Cornellian, 12 to 16 Kil.	57 00	67 00	—
Females, 12 to 13 Kil.	63 00	67 00	—
14 to 16 Kil.	71 00	77 50	—
Simon Ullmo, Females, 12 to 13 Kil.	58 00	67 00	—
14 to 15 Kil.	68 00	74 00	—
16 to 17 Kil.	72 00	77 00	—
Simon, 18 Kil.	61 00	63 00	—
20 Kil.	65 00	67 00	—
24 Kil.	72 00	74 00	—
Robert Calif, 7 and 9 Kil.	35 00	40 00	—
Kips, French, lb.	1 00	1 35	—
Cal. doz.	40 00	60 00	—
French Sheep, all colors.	8 00	15 00	—
Eastern Calif for Backs, lb.	1 00	1 25	—
Sheep Roans for Topping, all colors, doz.	9 00	13 00	—
For Linings.	5 00	10 00	—
Cal. Russet Sheep Linings.	1 75	4 50	—
Boot Legs, French Calif, gals.	4 00	—	—
Good French Calif.	4 00	4 75	—
Best Jodot Calif.	5 00	5 25	—
Leather, Harness, B.	35 00	—	—
Fair Hills, doz.	10 00	12 00	—
Skirting, lb.	33 00	37 00	—
Welt, doz.	30 00	35 00	—
Buff, ft.	18 00	20 00	—
Wax Side.	17 00	18 00	—

"SPRINKS WELL," Etc.—We would return thanks for an exchange and list of names of the MINING AND SCIENTIFIC PRESS, published by Dewey & Co., of San Francisco, Cal. It is a well edited, interesting, and valuable journal and speaks well for our Pacific neighbors.—U. S. Mining and Manufacturing Journal.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THAYER—San Francisco.

H. W. CROWELL—Columbia, Butte, Sutter and Yuba counties.

G. W. MCGREW—Santa Clara county.

A. C. KNOX—Nevada, Montana and Utah Territories.

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A. U. STROM—Lake, Napa and Solano counties.

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E. G. GAERTNER—Arizona Territory.

ED. T. PLANK—Dakota Territory (Black Hills.)

THE GRAND PACIFIC HOTEL, Chicago, with its central position and railroads branching off in every direction, is naturally a point to which travellers from all parts of the country are apt to come more or less frequently. Being there, a hotel is a necessity. A first-class one in every respect will be found in the "Grand Pacific," which is the temporary home for our off-hand Western folks who want to go to the best place the first time. The hotel is a handsome one and is fitted up in fine style with all the modern conveniences. It is centrally located, keeps a first-class table with the best market affords at all times and seasons, and the proprietors know how to make their guests feel at home.

WHEN so many poor watches are being sold, it is not too much for us to say that those who buy the New York Watch Company's movements will be sure of a good article at fair prices.

THANKS—OFFERING.—REV. S. S. HARMON, President of Washington College, an interested observer of agricultural progress, writes: "I have just been looking over the RURAL PRESS. I am most favorably impressed with its contents. Its range of agricultural matter is wide and deeply interesting. One such number as the last is worth the price of the whole volume. It is a great, good work in which you are engaged, your audience is very large and should become larger every day. I do not know that truisms of this kind are of any value to you, but I write them as a sort of thank-offering for what I deem to be a very valuable service you are rendering to the State."

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A Mechanical Engineer, having an extensive experience in Marine Engineering (especially compound) and Iron Ship Building, also in Steam Engines and Machinery in general, is open for engagement. First-class references.

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CALIFORNIA THEATER, Bush Street, above Kearny. Open every evening with the best Dramatic Company in the United States. Box office open from 9 A. M. to 10 P. M. Seats may be secured six days in advance. Doors open at half past seven.

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MINING ENGINEER.

All classes of mining properties reported on, consultations had on reduction of ores of all descriptions, plans for furnaces and reduction works furnished, and the construction of them superintended. Ore tests made at the office.

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Dewey & Co. { 224 Sansome St. } Patent Agt's.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

California and Arizona Mining Company.
Location of principal place of business, 507 Montgomery Street, San Francisco, California. Location of works, Mohave County, Territory of Arizona.
Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of April, 1877, an assessment (No. 2) of two cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, 507 Montgomery Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid, on the thirteenth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fourth day of June, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.
T. E. JEWELL, Secretary.
Office, 507 Montgomery Street, San Francisco, California.

California Fruit Growing Association.
Location of principal place of business, San Francisco, California. Location of property, El Dorado county, Cal.
Notice is hereby given that at a meeting of the Board of Directors, held on the 14th day of April, 1877, an assessment, No. 4, of \$2.00 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, 331 Sansome Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the 4th day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold on Saturday the 9th day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expense of sale. By order of the Board of Directors.
HORACE JONES, Secretary.
Office, 331 Sansome Street, San Francisco, Cal.

Dolores Consolidated Mining Company.
Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Blasdel, H. G., Trustee.	16	10,000	\$1,000 00
Blasdel, H. G., Trustee.	17	5,000	500 00
Blasdel, H. G., Trustee.	18	5,000	500 00
Blasdel, H. G., Trustee.	19	5,000	500 00
Drexler, L. P. & Co., Trustee.	8	25,000	2,500 00
Fry, J. D., Trustee.	7	10,000	1,000 00
Keene, J. R., Trustee.	9	10,000	1,000 00
Tate, W. C.	10	3,100	310 00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.

J. W. CLARK, Secretary.
Office, 418 California street, San Francisco, California.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of April, 1877, to the 16th day of May, 1877, and will then take place at the same hour and place as above named. By order of the Board of Directors. J. W. CLARK, Secretary.

Klamath Quartz Mining Company.
Notice is hereby given that the principal place of business of this company will be removed to Klamath Mill, Siskiyou County, California, from the City and County of San Francisco, California, in thirty days from the date of the first publication of this notice.
GEORGE H. FOREE, Secretary.
San Francisco, March 21, 1877.

Mariposa Land and Mining Company of California.—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of March, 1877, an assessment (No. 10) of one dollar per share was levied upon the capital stock of the corporation, payable immediately in United States currency, to the Secretary, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California, or to the Assistant Secretary, at the office, No. 8 Nassau Street, New York.
Any stock upon which the assessment shall remain unpaid on the Thirtieth day of April, 1877, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Monday the Twenty-eighth day of May, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
LEANDER LEAVITT, Secretary.
Office, Room 33, Nevada Block, No. 309 Montgomery St., San Francisco, California.

Taylor Mill and Mining Company.—Principal place of business, City and County of San Francisco, State of California. Location of works, Garden Valley Mining District, El Dorado County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-ninth day of March, 1877, an assessment of Twenty Cents per share was levied upon the capital stock of the company, payable immediately in United States gold and silver coin, to the Secretary at his office, No. 607 Montgomery Street, in the City and County of San Francisco.
Any stock upon which this assessment shall remain unpaid on the ninth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the twenty-fifth day of May, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
SAMUEL S. MEEFEY, Secretary.
Office, No. 607 Montgomery Street, San Francisco, Cal.

ROASTING OF GOLD AND SILVER ORES, and the Extraction of their Respective Metals without Quicksilver, 1870. It contains 145 pages, embracing illustrations of furnaces, implements and working apparatus. Price \$2.50 coin, or \$3 currency, postage free. Published and sold at this office.

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RAILROAD AND OTHER IRON

Every Variety of Shafting.

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Hammered Iron of Every Description and Size.

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The highest price paid for Scrap Iron.

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INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

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Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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LEWIS B. MEAD.....Secretary

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STEAM ENGINES, Quartz, Flour and Saw Mills,

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Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

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PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

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ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING AND MINING MACHINERY INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS, CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES, FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES, RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES, SUGAR MILL MACHINERY, WATER WHEELS, Etc., ALL OF THE LATEST AND MOST IMPROVED CONSTRUCTION.

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IMPROVED PORTABLE Hoisting Engines,
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Steam Engines and all Kinds of Mill and Mining Machinery.

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ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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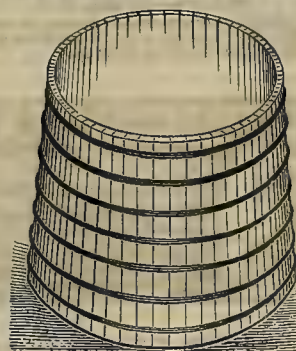
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Machinery and Castings of all kinds.

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WATER TANKS of any capacity made entirely by machinery. Materials the best in use; construction not excelled. Pan Staves, Tubs and Oak Guides for mining purposes a specialty.

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MOUSTACHE PROTECTOR.

Will fit any Cup.



Gents' Delight. Boss Novelty for Agents. Big to sell. Gents must have it. Ladies buy it for them. Only 25c by mail. Circulars free as air. Storekeepers, let me whisper to you. C. H. BARROWS, Patent tee, Willimantic, Conn.

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The Ingersoll Rock Drill



Is Extensively Used in the East and

TAKES THE PLACE OF ALL OTHERS,

Wherever introduced, because it can be run with less power, labor and repairs, and do more work than any other Drill in the market. It has but few parts, is easily handled, being light, and has AUTOMATIC FEED, which saves labor. WE ASK FOR TRIAL AGAINST ANY COMPETITOR. For particular information regarding Drills or Air Compressors, send for circular to

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Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing by this Process:

Two cords of wood at \$6.....\$12.00
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In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Consolidated Co.'s mines, in the Peavine District. For further information, apply to

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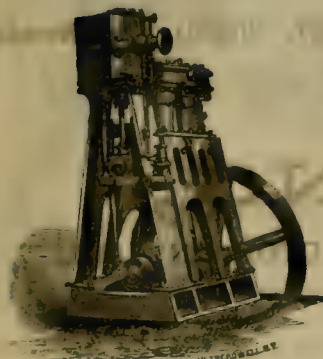
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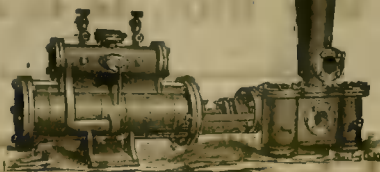
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Air Compressors,
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Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

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Chemical Engines Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.

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CAST STEEL SHOES
AND DIES.

Guaranteed Cheaper than the Best Iron.
IMPORTANT NOTICE.
Reduction in Price from 16 Cents
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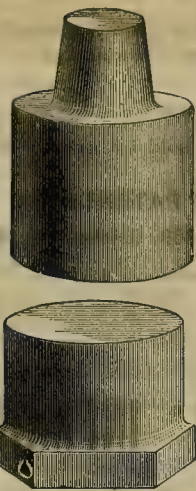
Owing to our largely increased business, the present low price of iron from which our Steel is manufactured, and the improved facilities for casting and forging, we take great pleasure in announcing that from and after this date we will supply our IMPROVED CAST AND FORGED STEEL SHOES AND DIES FOR QUARTZ MILLS at twelve cents per pound, delivered at San Francisco or Sacramento, instead of sixteen cents, as heretofore.

We also furnish Steel Plates for Blake and other Ore Crushers, Steel Out Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

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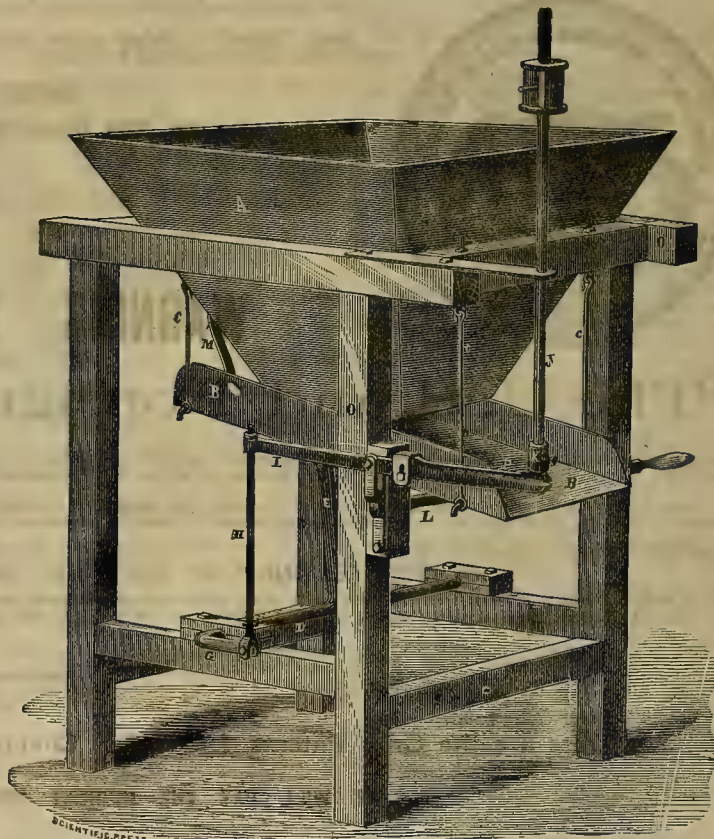
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Awarded the Centennial Medal.



The TULLOCH AUTOMATIC ORE FEEDERS have been practically tested during the last year and a half in 40 mills, of from five to 30 stamps each, and have, in every case, given perfect satisfaction. The Tulloch machine is so constructed that the drop of the stamp feeds the ore in just such quantities as the stamps require. Each drop regulates the supply required for the next drop, whether it be more or less, and this is the true principle of an automatic feeder. The tray moves longitudinally, and a stationary scraper forces the material forward at each backward movement of the tray, thus insuring the perfect feeding of all classes of ore, whether it be dry or wet.

We append a few extracts from the many testimonials which we have received from mill men and practical mining men, of the effectiveness and positive action of the Tulloch Feeder. We do not depend solely upon these testimonials, as we are aware that testimonials are easily secured for almost any machine, but the high character of the parties certifying to those herewith given, will establish their value and genuineness:

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VALLEJO FOUNDRY, October 17th, 1876.

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Gentl:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this year for my patent Straw Burning Threshing Engines give splendid satisfaction. They far surpass for regularity of speed any Governor that I have ever seen, and I have seen all the best kinds; I have seen the main belt fly off the pulley several times this season while threshing, and the engineer did not discover it, so perfectly was the speed maintained, until he was told of it; this I consider something wonderful; I consider the Governor absolutely perfect, so far as speed is concerned. I bought and put on to one of my engines a Shive Governor, to see which was the best, and after one season's trial I have no hesitation in saying they are far superior to any other Governor that I have seen or used. I wish you would send me the lowest price that you can furnish 25 Governors for next season's engines. Yours respectfully, J. L. HEALD.

The only Governor that has received awards at each of the International Exhibitions. American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Baltimore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals; International Exposition, Paris, 1867, One Bronze and Two Special Medals; International Exposition, Vienna, 1873, Medal of Progress and Decoration; International Exhibition, Philadelphia, 1876, Medal and Diploma.

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For Feeding Boilers and Draining Mines. MACHINISTS' TOOLS AND WOOD WORKING MACHINERY.

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For Steam Boilers, Pipes, etc. Best non-conductor of heat in use. It effects a LARGE SAVING OF FUEL, LASTS AS LONG AS THE IRON to which it is applied, and is reasonable in cost.

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Nevada Agency: 38 North C Street, Virginia.

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As a conqueror of Rheumatism, Gout, Neuralgia, and cure for Scrofula and all diseases arising from impurity of blood, the old and reliable Family Medicine, Hyatt's Life Balsam, stands unequalled, as proven by over 300,000 great cures during the past 30 years. Is a radical vegetable compound of Sarsaparilla, Dock, Guaiacum, etc., and a permanent cure. Sold by all druggists and country grocers. Take nothing else, and if they haven't it we will send by express; boxed, everywhere, at \$1 and \$1.25 per bottle; \$5 and \$6.50 half doz. HYATT & HYATT, 246 Grand street, New York.

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The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING AND TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

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UNITED STATES AND FOREIGN SALAMANDER FELTING COMPANY.

Pacific Branch:--SEWARD COLE, Manager.

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THE BEST NON-CONDUCTOR IN USE,

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Our Patents Especially Embrace the use of ASBESTOS, LIME and PAPER-PULP for Boiler Covering.

The Material is applied (in a plastic form), in three coats, each one-half inch in thickness.

The "first coat," which protects the outer coatings from the severe heat of the surface covered, is composed principally of ASBESTOS and lime-putty, and is strictly fire-proof and indestructible.

The "second" and "finishing" coats are composed largely of the "paper-pulp," which in combination with other light non-conductors of heat, forms a material that will never crumble or crack off, and which is susceptible of a fine enamel-like finish.

Send for circulars containing testimonials from well known authorities in the East, and on this Slope.

Each Barrel of Salamander Felting sold by us will bear our Trade Mark and the dates of our several Patents.

DATES OF PATENTS:

September 14th, 1869, October 5th, 1869, October 4th, 1870, May 9th, 1871.



WARNING TO INFRINGERS:

The U. S. and Foreign Salamander Felting Co.

Hereby notifies, cautions, and warns the public—and particularly engineers and proprietors of Steam Machinery—that their patents for "ASBESTOS BOILER COVERING," having been fully sustained by Repeated Decisions in the U. S. Courts, all infringers will be duly prosecuted.

Some of the more important of the above mentioned decisions were against the "ASBESTOS FELTING COMPANY, of New York," and parties USING THEIR MATERIAL. Pamphlets containing full accounts of these and other cases will be furnished on application. It must be remembered that those using an infringement are as liable to prosecution as those manufacturing and vending it.

All parties on this Coast, having used the

"ASBESTOS FELTING." (of New York,) and MERRELL'S SO-CALLED "STEATITE FELTING,"

(Which analysis shows to infringe in nearly every case), or any other infringing material, are hereby notified that they will in time be called upon for ROYALTY and DAMAGES; but are at the same time CAUTIONED against paying such royalty or damage to any but the authorized agents of the

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Ours are the Only Patents for Boiler Covering that have ever been established by the Courts.

WE WILL PAY THE HIGHEST PRICE FOR A GOOD QUALITY OF ASBESTOS.

PACIFIC COAST REFERENCES.

New U. S. Mint.....	San Francisco, Cal.	Dredging Pump, Morey & Dennison.....	San Francisco, Cal.	Capt. J. Parker.....	Randolph, O.	Empire State Mill.....	Virginia City, Nev.
U. S. Lighthouse Board...	do do	Steamer Constance.....	do do	B. M. & M. Co.....	Mexico.	Winfield Mill.....	do do
Palace Hotel.....	do do	Steam-yacht Elaine, S. Menzies.....	do do	Revenue Cutter.....	Mexican Government	Land Mill.....	do do
Occidental Hotel.....	do do	Steam-yacht, John Eckley, proprietor.....	do do	New Almaden Q. S. M. Co.....	California.	Nevada Mill.....	do do
Lick House.....	do do	Steam-tug Jos. H. Redmond.....	do do	Golden Chariot M. Co.....	Idaho.	Parkes's Mill.....	do do
Electric Power Co.....	do do	do Lottie.....	do do	Sperry's Flour Mills.....	Stockton, Cal.	Railroad Mill.....	do do
D. A. MacDonald & Co.....	do do	do Amelia.....	do do	Providence M. Co.....	Nevada City, Cal.	Overman S. M. Co.....	Gold Hill, Nevada.
Pacific Rolling Mills.....	do do	do Kate.....	do do	W. H. Patten, construct- ing engineer.....	Virginia City, Nev.	Belcher M. Co.....	do do
Mr. B. P. Bruner.....	do do	do Favorite.....	do do	Con. Virginia G. & M. Co.		New York M. Co.....	do do
Royer's Belt Factory.....	do do	do Jennie Gawne.....	do do	Jas. G. Fair, Sup't.....	do do	Caledonia S. M. Co.....	do do
Marden & Co., Bernard & Co., Spice Mills.....	do do	do Alpha.....	do do	Ophir S. M. Co., S. T. Curtis, Sup't.....	do do	Crown Point G. & S. M. Co.	do do
Chas. C. Bemis, Supervising Insp. Steam Vessels.....	do do	do Transit.....	do do	C. & C. Joint Shaft.....	do do	Lady Washington S. M. Co.	do do
Golden City Chemical Wks.....	do do	do McPherson.....	do do	Julia Con. G. & S. M. Co.	do do	Kossuth M. Co.....	do do
Bush & Milne, plumbers.....	do do	do Anasha.....	do do	Chollar-Potosi S. M. Co.	do do	Dayton M. Co.....	do do
Marcus C. Hawley & Co.....	do do	do Tacoma.....	do do	Ward M. Co., F. M. Thayer, Sup't.....	do do	Belcher & Crown Point Pump Shaft.....	do do
Kimball Agr'l Man'g Co.....	do do	Hanson, Ackerson & Co.....	Tacoma, Wash. T.	N. Con. Virginia M. Co.....	do do	Justice M. Co.....	do do
Phelps Manufacturing Co.....	do do	Steamer Yeaser.....	do do	I. F. Thompson, construct- ing engineer.....	do do	Succor M. & M. Co.....	do do
South Point Planing Mills, C. A. Hooper & Co.....	do do	Arcade Hotel.....	Sacramento, Cal.	Combination Shaft.....	do do	Trench Mill.....	do do
Planing Mill, H. F. Williams.....	do do	Pioneer Flouring Mills.....	do do	Imperial M. Co.....	do do	Petaluna Mill.....	do do
Evening Post, newspaper.....	do do	Starr Flouring Mills.....	Vallejo, Cal.	Sierra Nevada M. Co.....	do do	Pacific Mill.....	do do
Kimball Manufacturing Co.....	do do	Ball Dredging Co.....	Oakland, Cal.	Savage M. Co.....	do do	Douglas Mill.....	do do
National Brewery.....	do do	City Flouring Mills.....	do do	Bullion M. Co.....	do do	Pioneer Mill.....	do do
The "Hammam".....	do do	Ice Company.....	do do	Pacific M. & M. Co.....	do do	Honolulu Iron Works.....	Honolulu, H. I.
Cubery & Co., printers.....	do do	Court House.....	do do	Territorial Enterprise.....	do do	Ice Works.....	do do
Wheat's Flour Mill.....	do do	D. L. Bliss & Co.....	Carson, Nevada.	California Stamp Mill.....	do do	Sam. G. Wilder.....	do do
Millen Griffith.....	do do	Idaho M. Co.....	Grass Valley, Cal.	California Pan Mill.....	do do	T. H. Davies.....	do do
McNally & Hawkins.....	do do	Peter Johnson.....	do do			Kaalaee Plantation.....	Oahu, H. I.
						A. W. Pierce & Co.....	Honolulu, H. I.

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Patent Solicitors.

SAN FRANCISCO, SATURDAY, APRIL 28, 1877.

VOLUME XXXIV.
Number 17.

[Copyrighted.]

Mechanical Ore Concentration and Separation—No 23.

[Written for the Press by FRANCIS M. F. CAZIN, M. E.,
Santa Fe, New Mexico.]

[In a former chapter of this series Mr. Cazin sent us a description of the Blake ore crusher, to appear in that part relating to ore crushers and breakers. As, however, the cuts did not come to hand, the description was deferred until a convenient place in the article was reached. As there is only one more chapter before the conclusive remarks, it is thought proper to insert the description of the Blake crusher in this place.—Eds. Press.]

The Blake ore crusher and stone breaker, illustrations of which are shown on this page, are extensively used in this country as well as in Europe. Various sizes of the crusher are made to suit different requirements. Numbers four, five and six are generally used for mining purposes.

In the sectional view, A is the main frame; B, fly wheels; C, driving pulley; D, crank shaft; E, pitman; G, G, toggles; H, fixed jaw; I, cheek; J, movable jaw; K, rubber spring; N, wedge; O, toggle block; P P, jaw plates; and W, wedge nuts.

It will be seen that the distance between the jaws at the bottom limits the size of the fragments. This distance, and consequently the size of the fragments, may be regulated at pleasure. A variation to the extent of five-eighths of an inch may be made by turning the screw-nut, W, which raises or lowers the wedge N, and moves the toggle block, O, backward and forward. Further variations may be made by substituting for the toggles, G G, or either of them, others that are longer or shorter; extra toggles of different lengths being furnished for the purpose.

The face plates of the jaws are made of chilled iron. When worn at the lower end after long use, they can be inverted and thus present a new surface to the action of the ore, or can be replaced by new plates at small expense.

The engravings show the new pattern of crusher, large numbers of which are in use. The operation is seen at a glance. The amount of power required of course depends on the size and the work; and the amount of product depends on the distance the jaws are set apart, and the speed. As regards proper sizing for certain material, reference is made to previous chapters of this series. These crushers are made by the Blake Crusher Company, New Haven, Conn.

PROGRESS FOR YOUNG AMERICA.—In all the large Eastern cities we find amateur printing presses displayed in numerous store windows for sale. Six years ago we observed nothing of the kind. This shows progress. California is not to remain long behind. Mr. H. F. Rockey, at No. 22 Kearny street, has opened a fine assortment of presses and "all sorts of sorts" for our young folks to lay their hands on, at reasonable prices. Akin to this subject an exchange truthfully remarks: "As a source of instruction and amusement, the printing press stands pre-eminent. Parents, guardians and teachers can do no wiser a thing than to place in the hands of their children a small press and a few founts of plain type. There is a fascination and pleasing variety in printing that never ends, and in which old, as well as young, find mental advantage. We feel that we are engaged in a good work, in advocating the introduction of the press into schools and families, as a means of education and enjoyment."

A MASS meeting of the people of the Black hills was held in Deadwood City, Saturday. A memorial to Congress was adopted urging the formation of a new Territory, embracing the Black hills region, to be called Lincoln. A resolution was adopted accrediting Hon. J. B. Chaffee, Senator from Colorado, as a representative to urge this claim in the United States Senate.

The Mining Review, of Denver, is to be consolidated with the Engineering and Mining Journal, of New York City, the consolidated paper to be published in New York, with the Western office in Denver.

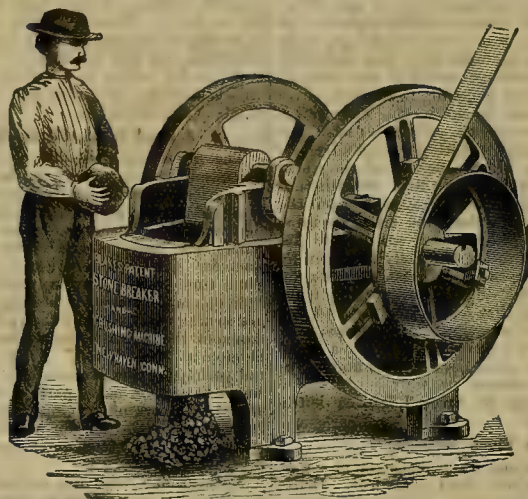
Jumping Claims.

Nothing could be more absurd than the idea that some persons seem to have concerning the United States mining laws as far as they relate to the relocation of claims. The manner in which claims may be relocated is so plainly set down in the law that it seems as if one could scarcely go wrong; and by strict compliance with the law the relocater will be protected by the courts.

When, however, miners deliberately "jump" and take possession of a man's mill, hoisting works and other outside improvements, as well

work it. For this reason, the government has a right to prescribe conditions under which the ground shall be worked; but as it never had any title to the mills or hoisting works and they were not bought or used under any agreed conditions, the government has nothing whatever to do with them, and has no more right to give them away because they are not worked than it has to do any other unjust thing. If they exceed this authority over quartz mills it would be equally fair for the same authority to be exercised over other things of like character.

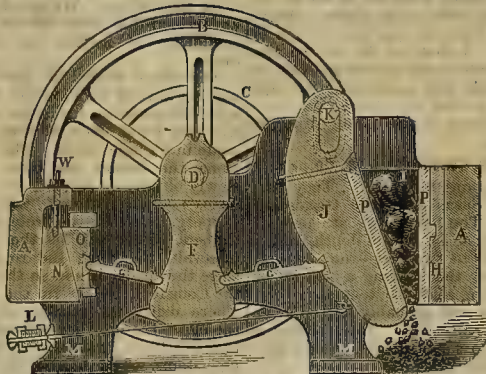
It seems almost amusing that people will continue to go on the principle that when the claim is forfeited the mill and other works in the mine are forfeited also. Scarcely a week passes that we do not hear of instances of this



PERSPECTIVE VIEW OF NEW PATTERN BLAKE CRUSHER.

as a claim, they show a want of common sense as well as ignorance of the laws. They have no more right to take up a mill than they have to take a man's house and furniture, because the mining claims on which they are are forfeited by non-compliance with the laws regarding annual expenditures. Because a mill lies idle for a year without any expense being put on it, that is no reason why any one coming along

kind. The latest case is that one in Placer county where some parties who jumped the old Montana mine near Colfax, also jumped the quartz mill with the impression that the law gave them the right to do so. On thinking the matter over a little any one can see that no claim could be justly put on the mill, and there is no doubt whatever that the original owners can take possession when they choose, and perhaps prevent the parties taking the mill prop-



SECTION OF NEW PATTERN BLAKE CRUSHER.

should take possession and acquire title to it any more than a man could go and take possession and use at will a dwelling house that had not been used by its owner or rented for a period of time. The United States government has no more to do with giving away a man's mill or hoisting works than anything else he may have and what he did not acquire from the government in the first place.

Mining ground is a different thing altogether. The minerals belong to the government, and the laws virtually give a man the right to mine ground under certain restrictions as long as he likes, and he may reap all the profit he can; but in failing to comply with the regulations presented by the bona-fide miner—the government—he must give it up to some one who will

erty, especially if it is disturbed in the slightest degree.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Modoc, April 17th, \$4,987.53; Northern Belle, 17th, \$7,530.16; Comanche, 17th, \$11,354.53; Indian Queen, 15th, \$5,828.86; Northern Belle, 19th, \$8,620.74; California, 21st, \$157,193.03—total to date, \$1,000,068.27; Con. Virginia, 21st, \$144,409.79—total to date, \$366,929.11; Tybo Con., 18th, \$15,664—total to date, \$56,832.05; Modoc, 21st, \$5,514.09—total to date, \$60,688.40; Arizona, 22d, \$2,118; Grand Prize, 21st, \$4,876; Northern Belle, 22d, \$10,552.89; Chollar, 24th, \$15,513.52; Tybo Con., 22d, \$12,133.97; total to date, \$69,166.02.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

WATER CLOSET.—Fred. R. Pohley, S. F. This comprises certain improvements on a closet patented by the same inventor, Oct. 31st, 1876. In that patent is shown a valve closing against the end of the pipe and retained in place by springs, which act upon it so as to resist a certain amount of pressure, and when the water within the pipe has accumulated to a certain extent its weight will overcome the tension of the springs and thus allow the surplus to escape. This device is susceptible of being applied to water closets in its present form, but in order to make it practical and entirely successful, Mr. Pohley has invented an improved construction which is especially adapted to water closets, and in this patent he has shown a peculiar adaptation and arrangement of the valve, which is placed at an angle so that all of the contents of the bowl will be allowed to escape without any danger of clogging and preventing the closing of the valve. The valve is supported upon a single stem, so guided as to move at an angle with the face of the valve-seat, and thus carry the valve to one side of the discharge passage, and entirely out of the way, and the closing spring surrounds or acts upon this stem or valve. The stem is constructed with a suitable lever which opens the valve, and, at the same time, admits a flow of water to cleanse the bowl; and a trap of peculiar construction is formed to receive any overflow and prevent any return of odor.

WATER FILTER.—Wm. S. Snook, Oakland. The object of this invention is to provide a cheap filter for attachment to water pipes through which water is conducted under pressure, so that the water can be purified and cleansed for drinking and other purposes. By the means employed the inventor is able to use an open-top tank as a filtering vessel. Inside the tank and a short distance above its bottom is secured a horizontal perforated partition upon which is placed the usual filtering substance. Above the filtering material is placed another partition so that it can be cleaned when desired. The water is brought into the tank under pressure by means of a pipe which leads under the partition and the water then rises up through the filtering material and is cleansed in its passage. A waste pipe is arranged so that when it is desired to clean the filter the water may be turned in above the filtering substances, and the impurities will be carried off through the waste pipe. This filter can be cheaply constructed and easily managed so that it is of great value for household purposes.

WASHING CALENDER.—Mrs. H. E. Israel, Stockton. This is a novel device, called a "Washing Calender," which consists of a circular convex form made with columns of figures radiating from a centre to the circumference, where, at the head of each column is placed the name of some article of wearing apparel. The numbers in each column run as high as may be desired, and pins are employed to mark the numbers of each article sent to the laundry; while around the circumference a space is left in which to place the total amount.

The mines of Pyramid district are looking well and the miners are much encouraged. The Reno Journal says that work is being prosecuted on nearly all of the claims—so much so that there is not an idle man there. In fact it is frequently hard to find a man to go to work when extra force is needed. As the mines become more developed the ledges look better and better. The entire district offers the most flattering prospects, and this summer will see many important strikes made.

The Vulture gold mining company filed a petition in bankruptcy in the United States District Court on last Saturday, with liabilities of \$88,105.17.

CORRESPONDENCE.

Mining in Elko County, Nevada.

[From Our Traveling Correspondent.]

At no very great distance north of Elko and other points on the line of the railroad, many new districts have been discovered during the past five years. In most of them good prospects have been found. In many of them work is at present being prosecuted with more or less vigor and success. In none, even of the most advanced, has any great depth been attained.

If, however, a judgment can be formed from the surface indications, a very prosperous future may be predicted for the county.

In addition to Cornucopia and Tuscarora, the two principal districts visited (and of which, in view of the magnitude and importance of their operations, a notice more in detail is required), in almost every direction, as far as developments have gone, good strong veins are reported, and in many instances represented as carrying ore of high grade, so that the prospects of this part of the State were probably never brighter.

Rock District

Is 60 miles north of Elko and 10 miles from Tuscarora. It was discovered in July last. The most usual country rocks are porphyry and quartzite.

The Falcon, the discovery claim, under the superintendence of Mr. R. D. Norton, and which may be taken as a sample of the district, is incased in the porphyry. The ledge can be traced for a mile by the croppings. Several other locations have been made, such as the Scorpion, Lookout, Challenge, Aspin, the Hunter and Flagstaff. The quartz on the croppings is from six to 10 feet in width, and at the depth of 45 feet on the Falcon, the pay ore is full three feet, giving assays in antimonial and ruby silver from \$300, the lowest, as high as \$2,400.

Favorable mention is made of Lone Mount, Cape, Hicks, Bull Run, Wyoming, Kit Carson, Boulder, Junction, Delano and a few other districts, but

Tuscarora

Is at present taking the lead; a new and rising star, fast becoming the great center of attraction in northeastern Nevada. The lodes are numbered by the hundreds and the locations are literally "legion." The general formation is porphyritic, accompanied with syenite, gneiss, talc and other rocks, bordered on the north by the granite. In close proximity, if not in contact with it, lies the Grand Deposit ledge, bounded on the south by the ever-present porphyry. Running parallel with this, in an easterly and westerly direction, the general formation is cut by a belt of talcose slate, on or near which the Grand Prize is located, at this time the leading mine of the district. Besides the afore-mentioned east and west veins, there are probably others.

Of north and south veins there are said to be 100 or more, covering an area of about four square miles from east to west, running parallel and nearly at right angles to the granite formation. The Young America, the De Frees and other promising mines are located on these, at no great distance from the cross ledge of the talcose slate belt already mentioned.

So much by way of introductory. Something of the kind seemed almost essential for a proper understanding of the localities of the different claims to be described. The order mapped out will be followed as far as possible, beginning with the claims on the east and west belt in the northern part of the district belonging to

The Grand Central M. Co.,

A San Francisco incorporation, embracing the Grand Deposit, previously referred to, and the Star lode. Their ground is situated from 1,000 to 1,200 feet north of the De Frees and on the same hill, and about the same distance from the talcose belt, on which the Grand Prize, Moscow and some other locations are made. It is believed that the company have a good, strong contact vein, the Grand Deposit, struck by an 80-foot shaft, being represented from five to six feet in width, carrying rich sulphuret ore. The assays are reported as running all the way from \$30 to \$3,000 per ton, silver. It is understood that work will soon be resumed under the management of Mr. S. Linkton, Superintendent of

The Grand Prize.

This mine is said to have been discovered and located, in June last, by Mr. J. Woods, of Tuscarora, associating with him Messrs. Hanam and Crane as locators. A shaft of 50 feet was sunk, laying bare such a fine body of horn-silver ore that it soon passed into the hands of one of your capitalists and afterwards duly incorporated. The 10-stamp mill of the Windsor company was forthwith purchased for working the ore, and operations renewed in earnest on the mine. It is thought to be a true fissure vein; formation, porphyry; direction, east by west; dip north 70°, and varying from three to ten feet in width. Main vertical shaft, of 220 feet, has three compartments. Main drift on the 150-foot level is 550 feet in length. Bullion to the amount of \$80,000 was turned out at the mill during the month of March, the ore paying

\$200 per ton. The total, yielded since operations commenced last fall, will reach \$125,000 and upwards. The outlook for the company is looked upon as exceedingly flattering. On the authority of the *Tuscarora Times*, "a contract has been entered into between the company and Messrs. White & Allen, of San Francisco, for the construction of a 20-stamp mill, the same to possess all the latest improvements, with 12 pans and full complement of settlers."

It is understood that the first east extension of the Grand Prize shows a similar ore at the depth of 120 feet; assays from \$65 to \$160.

First West Extension,

Owned by Messrs. Bobier, French and others, has a shaft of 120 feet on one side of the lode. A cross-cut had been made at the 60-foot level, showing a two and a half-foot vein. Assays of ore at this point ranged from \$15, the lowest, to \$358. Another cross-cut at the 120-foot level had just reached the vein when visited, showing good ore at that depth. Expectation runs high in regard to this claim, as well as to the other locations on the same vein.

The Moscow

(Muncey & Co.), lying further west on the talcose slate belt, and thought to be on the same lode as the Grand Prize, the ore possessing the same characteristics (horn silver predominating), is from 10 to 12 feet between walls, with at least eight feet of ore. It gives average sample assays of \$166 per ton, some choice pieces running in gold and silver as high as \$2,200.

The Lida,

Adjoining on the west, and owned by the same company, is nine feet in width, with four feet of similar ore.

Having given what is thought a fair specimen in brief of the east and west belt,

The De Frees Mine,

Located on a north and south lode, 1,158 feet southwest of the hoisting works of the Grand Prize, will now be taken up. Capt. Wm. Williams, a well known mining engineer, an old acquaintance, was found in charge, from whom the following facts were soon gathered: The lode has an average width of two feet, although at one point widening to six feet; direction north 53° west, dip 45° west. The wall is a porphyritic syenite, of a yellowish cast. The ore gives high assays in both gold and silver.

Without going into the details of the workings, it is sufficient to state that the adit tunnel has been driven in the aggregate on the course of the vein 255 feet, and that the total of drifts on the 73-foot level amounts to 350 feet. In addition to the ore body laid open by the developments, there are 600 tons of good milling ore on the dump, besides many more hundreds of tons that could be made to pay well by careful assorting. The company in connection with the property have also a small stamp mill, eight miles distant, with ample water power for 30 stamps.

Southwest of the De Frees 1,730 feet is the hoisting works of

The Young America,

The first location and discovery claim on a parallel ledge. Incline shaft 230 feet. Drifts north and south from shaft on one level, aggregating 380 feet, and on the 60-foot level as much as 600 feet—extending 65 feet into the ground of the Young America south, making a total drift along the vein of 665 feet, disclosing the fact of its continuance the entire distance, and a width varying from one to five feet. There are large bodies of good ore exposed to view by the developments, and some 600 tons on the dump, estimated to work from \$50 to \$125 per ton in silver and gold.

The shaft, 6x6, has been handsomely retimbered and work will soon be resumed. The average width of Young America, as shown by incline of 90 feet on vein, is 20 inches. Average sample assays from one portion of vein is reported at \$280. A shaft of 60 feet on the Young America north shows an average vein of 30 inches, and sample pulp assays from 20 tons extracted, of \$110 per ton.

On the next belt west of the Young America are the claims of

The Tuscarora Consolidated M. Co.,

Mr. T. S. Brown, Superintendent. They embrace the Warsaw, Susan Jane, the Occidental and May-be-so. The Warsaw at present worked has a shaft of 45 feet in depth, and a vein from 16 inches to two feet—the foot-wall syenitic gneiss, and the hanging a species of quartzite. In sinking shaft 25 tons have been taken out. The ore will probably mill \$75 per ton or more—principally gold. The other veins have been opened to some extent, the ore giving assays from \$30 to \$150.

The Revenue, adjoining on the south, is 18 inches in width at 25 feet, and will average \$25 per ton.

The Navajo.

Owned by Beard and Lancaster Bros., further west, averages two and one-half feet in width and contains very high grade ore near the surface. A few tons on the dump were estimated to work at the rate of \$400; average sample assays of ore from another portion of the claim having run as high as \$787 per ton.

The Diana, the first north on the same lode, owned by Messrs. Edwards, File and Truett, is well defined and four and one-half feet wide. Assays of ore on surface, \$80. The Hornet following next in the same direction, the property of Messrs. Berry, Hamilton and Raines, is reported as shipping ore last fall that worked from \$200 to \$250.

The Ophir, lying south of the Navajo on the

same ledge (shaft 45 feet, drift 35), furnishes ore assaying from \$85 to \$165. It runs about \$30 in gold.

The Robert Emmett.

(Pitz, Walsh & Co.), lies west of the Navajo and Hornet and is from 6 to 15 feet in thickness. It is incased between the porphyritic and syenitic gneiss and opened by shaft 60 feet, the ore growing more compact and vein better defined as the work advances.

There are two different and distinct strata of ore, the one largely predominating is gold and the other in silver. It is thought, with proper assorting, the ore can be made to mill from \$150 to \$200 per ton. Further south on this range the Venture, North Venture and Paymaster are opened by shafts from 40 to 50 feet deep, and are all looking well. The Venture is represented as having a three-inch seam in the vein that is unusually rich in gold, an assay going as high as \$22,000.

The Wild Cat, on the same vein, together with the Baltic, El Capitan, the Alcemany and others on the next hill west, may be mentioned as promising for the developments, giving good fair assays in gold.

The Windsor mining company have a three-foot vein of ore, represented to run high in gold. The mine has not been worked for some time, but it is thought here that it will not long lie idle.

The Mamie Norton,

Situated three miles west of Tuscarora, the property of Messrs. Black & Hampson, has a direction east of north, a few points, as most of the veins last described, shaft 60 feet, drift from 15 to 20 feet, eight feet from wall to wall; syenite forms the foot and faldzite the hanging wall. Some assays have run in the neighborhood of \$1,500, the larger proportion silver, while some of the ore, worked for the gold alone, averaged \$130 per ton.

The tale forming a portion of the gangue near the surface, changes more to quartz at the 60-foot level. There are many other locations as worthy of mention as some that have received attention, but this will suffice.

A careful review of the facts here presented will lead to the conclusion that one of the great wants of the district is

A Good Twenty-Stamp Custom Mill.

The impression generally prevails that a sufficient amount of rich ore can be taken out near the surface to make it a paying property. If so, it would at once give a fresh impetus to every department of business, labor for many idle hands, the ready means to the miner from his ores for sinking or for machinery, and at the same time opening up a wide and profitable field of employment for a large class here who are so well satisfied as to the richness and abundance of the ores as to be willing to take their chances as "chloriders." A like state of things, not perhaps of the same extent, in some places, seems to exist in many parts of eastern Nevada, where the work of development has evidently been greatly retarded for want of cheap facilities at hand for getting quick returns from their ores.

Notes from Cornucopia not yet fully written up, hope to have them in shape by next issue.

A. C. K.

The Sutro Tunnel.

We recently, says the *Virginia Enterprise*, received a private letter from San Francisco, asking if the mining companies intended using the Sutro tunnel after it reached the Comstock, and, if so, when it would be done. Not being able to answer the question authoritatively, we give the following general view of the situation and leave it for all who are interested to answer it for themselves. We simply wish it distinctly understood that what follows is written in the confidence of neither the mines nor of Mr. Sutro.

The Sutro tunnel is gradually working its way up toward the 1750-foot level of the Savage. Its progress during the month of February was very rapid, over 100 feet being sometimes made in a single week. The work of pushing along the header has been progressing more slowly of late, on account of the nature of the formations encountered, which are heavy and slippery, requiring the protection of the cut by timbers. This will be the case, doubtless, at intervals, all along the route yet to be run, since the header is now in the great ore-belt of the Comstock lode. In the Comstock mines, where drifts are usually about 4 by 6 feet in the clear, the pressure is frequently so great as to crush 12 by 12 timbers as though they were pipe-stems. The header of the tunnel is 8 by 10 feet, and consequently still greater care must be exercised to prevent caves. This, of itself, will necessitate the employment of men constantly to ease the timbers after they are put in and thus prevent their being broken down, and will, in a measure, hinder the rapid progress of the tunnel toward the present workings of the mines. The tunnel will not, as is generally supposed, strike our deep workings 2,000 feet below the surface, but near the present 1750-foot level of the Savage, or 2,000 feet below the Gould and Curry croppings.

On the 1st of the month, the date of the last measurement, the header was reported to be in 16,433 feet. This must bring it within 1,000 feet or so of shaft No. 4. The course of the tunnel carries it 364 feet north of the great Chollar-Norcross-Savage shaft, which is located on the eastern side of the ravine and far to the east of all the great workings of the Comstock.

That shaft is now being driven down below the 1,200 foot level at the rate of from 2 to 3½ feet per day. Under the old rate of tunnel speed the parallel of this shaft should have been reached about October 1st, and the Comstock January 1, 1878. At present this shaft is encountering very little water, and that is readily handled by the skeets without incurring the expense of pumping. By the time, however, that it reaches the tunnel-level very likely more water will be encountered. To be sure, the combination shaft is supplied with one of the most powerful pumping engines on the whole lode, but sufficient work will thereafter be found for that, since the company intend to go, if necessary, from 1,000 to 1,500 feet below the tunnel level in order to strike and prospect the lode.

Those who entertain the idea that this great combination shaft has been located and is being sunk to cut off Mr. Sutro from the Comstock, have, it seems to us, but a very superficial idea of the true nature of this immense mining undertaking. When it is considered that the dip of the Comstock is to the east, and that work through inclines is always prosecuted at a disadvantage, and with a loss of power besides that expended on the increase of distance; and above all, that depth is the great requisite now to success, the wisdom of going nearly a mile to the east, of sinking a perpendicular shaft, which shall at once overcome all these obstacles and gain the more readily the desired end, is apparent. We believe the accomplishment of this purpose to be the object in projecting this shaft and in pushing it on down.

By the time the tunnel reaches the line of this shaft two things may, therefore be counted upon. Mr. Sutro will want air, and the shaft companies will have water to spare. What can be more natural than that a connection should be made through the 364 feet intervening between the two, thus supplying Mr. Sutro with what air he wants, and allowing the water of the shaft companies to run down and out the tunnel. The advantage would be mutual. To be sure each could continue his allotted work independent of the other, but since the connection would result to the advantage of both, reason and common sense alike would look to the general good and make the connection.

Let us now look a little further. Should the Chollar-Potosi mining company prosecute work from their present shaft to any great extent below the 1750-foot level, they will, in all probability, be required to purchase new and heavy hoisting and pumping machinery. The same is true of the Hale and Norcross, except that they have the requisite pumping apparatus. The Savage company have both the hoisting and pumping machinery, but by using Mr. Sutro's tunnel the expense of running both would be greatly lessened and work could be more readily pushed to a greater depth. This is also true of both the other companies mentioned. And, since all these companies must prosecute in the future the work of development below their present level, what more natural conclusion can be arrived at than that the tunnel should be used as a drain for the mines, if for no other purpose.

Reasoning thus, solely on the grounds of economy and availability, the probabilities are that the tunnel of Mr. Sutro will be utilized even before it reaches the present mining operations on the Comstock, and most naturally after it gets here. It would add materially to the developments of to-day could it be made available to carry off the great head of water which is giving so much trouble in the Savage and Hale and Norcross. Even if it only allowed the water to be discharged at the 1750-foot level of these mines, a higher point than it has ever reached, it would loosen energies and motive powers, which could then be immediately concentrated and made available below that level.

In the foregoing we have confined our speculations to the case of three mines only, deeming those sufficient to answer the question asked in a general way.

ARIZONA MINES.—We are pleased to record that the mining outlook improves daily. Mining men from abroad are beginning to turn their eyes towards Arizona as the coming mining country—the new Washoe. They are beginning to find out what we have known all along—that the mines of Arizona are the equal of any in the world. It is true that our mines are, as yet, in their early infancy; but from the northern part of our Territory to the extreme south are mining districts which bid fair to become, in richness and extent, formidable rivals to those of Nevada. For years, the hardy pioneers of this once wild land have braved the dangers of a frontier life, and have done their "assessment work" with the pick in one hand and the trusty rifle in the other, not knowing what moment the latter might be called into requisition to save them from death by the hand of the hostile savage. Now, the country is pacified, and mining men who are sick of gambling stocks, and looking for a field in which they can invest in legitimate mining enterprises come every day to find what we have to show in the way of mines, and they generally, after investigation, are satisfied that we have a great mining country. Of course, the excellence of this, as a mining country, is as yet mostly in perspective, for the development of our mines, so far, is a mere bagatelle to what it should be, and will be; but we have enough of development upon our mines already to convince one who is expert in such things that they are all we claim for them.—*Arizona Enterprise.*

MECHANICAL PROGRESS.

Working Steel.

We have given several paragraphs of late on points connected with steel working. The subject is of such importance to all metal workers that we take it up again. Miller, Metcalf & Parkins, of Pittsburgh, Pa., issue the following through the *Iron World*, as the result of their wide experience:

Owing to varying instructions on a great many different labels, we find at times a good deal of misapprehension as to the best way to heat steel; in some cases this causes too much work for the smith, and in other instances disasters follow the act of hardening.

There are three distinct stages, or times of heating: First, for forging. Second, for hardening. Third, for tempering.

The first requisite for a good heat for forging is a clean fire and plenty of fuel, so that jets of hot air will not strike the corners of the piece; next, the fire should be regular, and give a good uniform heat to the whole part to be forged. It should be keen enough to heat the piece as rapidly as may be, and allow it to be thoroughly heated through, without being so fierce as to overheat the corners.

Steel should not be left in the fire any longer than is necessary to heat it through, as "soaking" in fire is very injurious; and on the other hand it is necessary that it should be hot enough to prevent surface cracks, which are caused by the reduced cohesion of the overheated parts, which overlie the colder center of an irregularly heated piece.

By observing these precautions a piece of steel may always be heated safely, up to even a bright yellow heat, when there is much forging to be done on it; and at this heat it will weld well.

The best and most economical of welding fluxes is clean, crude borax, which should be first thoroughly melted and then ground to fine powder. Borax prepared in this way will not froth on the steel, and one-half of the usual quantity will do the work as well as the whole quantity unmelted.

After the steel is properly heated, it should be forged to shape as quickly as possible, and just as the red heat is leaving the parts intended for cutting edges, these parts should be refined by rapid light blows, continued until the red disappears.

For the second stage of heating, for hardening great care should be used; first, to protect the cutting edges and working parts from heating more rapidly than the body of the piece; next, that the whole part to be hardened be heated uniformly through, without any part becoming visibly hotter than the other. A uniform heat as low as will give the required hardness, is the best for hardening. Bear in mind that for every variation of heat, which is great enough to be seen, there will result a variation in grain, which may be seen by breaking the piece, and for every such variation in temperature, there is a very good chance for a crack to be seen. Many a costly tool is ruined by inattention to this point.

The effect of too high heat is to open the grain; to make the steel coarse.

The effect of an irregular heat is to cause irregular grain, irregular strains and cracks.

As soon as the piece is properly heated for hardening, it should be promptly and thoroughly quenched in plenty of the cooling medium, water, brine, or oil as the case may be.

An abundance of the cooling bath, to do the work quickly and uniformly all over, is very necessary to good and safe work.

To harden a large piece safely, a running stream should be used.

Much uneven hardening is caused by the use of too small baths.

For the third stage of heating, to temper, the first important requisite is again uniformity. The next is time; the more slowly a piece is brought down to its temper, the better and safer is the operation.

When expensive tools, such as taps, rose cutters, etc., are to be made, it is a wise precaution, and one easily taken, to try small pieces of the steel at different temperatures, so as to find out how low a heat will give the necessary hardness. The lowest heat is the best for any steel; the test costs nothing, takes very little time, and very often saves considerable losses.

ARTIFICIAL HONE.—The smiths at Ceylon use a composition as a hone for sharpening knives and cutting instruments that is worth noticing. It is made of the capilla resin and of corundum. The corundum, in a state of impalpable powder, is mixed with the resin rendered liquid by heat, and well incorporated. The mixture is poured into a wooden mold, and its surface leveled and smoothed while it is hot, for when cold it is extremely hard. It is much valued by the natives, and preferred by them to the best of our hones.

PARISIAN RAILWAYS.—The Parisians are to have a system of underground railways similar to those of London. The total length will be 16 miles and the cost 160,000,000 francs. A double tunnel, lined with brick, will be employed, and the central station will be 21 feet beneath the level of the Palais Royal garden.

Stone Sawing with Shot.

Concerning the substitution of iron shot for sand in stone sawing, the *Polytechnic Review* gives the following detailed instructions for carrying out the process: "The method of sawing with the iron shot is similar to sawing marble with sand, and the same saws may be used, but for granite stronger and heavier frames are better, and blades $\frac{1}{4}$ " thick by 6" or 8" deep allow more pressure and cut faster and straighter than blades $\frac{1}{4}$ " thick by 4" deep. When starting with new iron shot, mix about 20 lbs. sand and 10 lbs. paste of slacked lime with each 100 lbs. of shot; the sand is to make it lighter and work better with the water drip; the lime is to prevent the rusting of the shot, and staining the stone. Use as little water drip as possible; it cuts better when the sludge from the ends is rather thick. Throw back this sludge of shot and mud to feed the saw, without washing it, until the mud gets too thick, then wash it partially. No sand is needed after the first, as the mud supplies its place, but keep up the dose of lime, as it gets washed away. Too large a feed of the shot is bad; about 25 lbs. per hour of feed to each blade does well. The rapidity of cutting depends upon the pressure used. A frame 11 feet long, weighing 1,800 lbs., swinging on iron rods three and one-half feet long, making 90 double or 180 single strokes, 20" long per minute, on a block of Quincy granite (as hard as Aberdeen) five feet long, with five blades, $\frac{1}{4}$ " thick, went down one inch per hour; with three blades it went down one and fifteen-sixteenths inches per hour; with two blades it went down three inches per hour. A pressure on the blade equal to 400 to 600 lbs. per foot length of kerf is desirable. A short, stiff blade, pressed down by screws, went down into a block of Quincy granite one foot long, 16 inches deep, per hour.

"Marble is cut from three to four times as fast with shot as with sand, in the same saws, and takes about one-half the power in proportion to the quantity sawed, all the power consumed in uselessly crushing the sand being saved. A blade $\frac{1}{4}$ " thick was worn away one inch in cutting 48" deep in granite, or 250" deep in marble. The mud from washing is run into catch-pits; the fine particles of iron thus saved are used for smoothing granite, and cut faster and last longer than emery. Hard sharp-sand, in being ground to finest mud, will wear away about its own weight of glass; coarse grained emery, about twice its weight; iron shot, passed through a No. 70 sieve, wore away 50 times its weight of glass. All journals and rubbing surfaces of the machinery should be carefully protected from the shot, as they cut and tear far worse than sand."

PREVENTING CORROSION OF IRON.—Prof. Barff recently delivered a lecture on a treatment of iron for the prevention of corrosion, which promises to greatly extend the usefulness of the most useful of all metals. The temperature of the articles to be protected is raised to about 500° Fah. in a suitable chamber or muffler, to which steam is admitted. The articles having thus been exposed at a high temperature in an atmosphere of superheated steam, the black or magnetic oxide is formed on the surface. This oxide is credited with the quality of putting a stop to further oxidation, whereas the ordinary form of oxidation or "rusting" grows on what it feeds, serving as a carrier for atmospheric oxygen to the iron to almost any depth. The black or magnetic oxide produced as above described forms a coherent and adherent coating which is not subject to change in the presence of moisture and atmospheric oxygen, and which is not decomposed in any temperature to which iron is exposed in its ordinary uses. Hence this treatment may be used for the protection of iron used for street mains, for iron instead of lead service pipes, for household utensils of all kinds as a substitute for tinning, and for all kinds of architectural ornaments. Prof. Barff makes no estimate of the cost of such treatment, but it is claimed to be less than the cost of galvanizing or tinning kitchen articles. The oxidized surface is said to be much harder than the surface of iron not thus treated, so that the durability of the articles would be as great or greater than that of similar untreated articles.—*Philadelphia Ledger*.

AN ELECTRIC BIT.—The French papers describe an invention for driving a horse by electricity. The coachman is to have under his seat an electro-magnetic apparatus, which he works by a little handle. One wire is carried through the rein to the bit and carried to the crupper, so that a current once set up goes the entire length of the animal along the spine. A sudden shock will, we are gravely assured, stop the most violent runaway or the most obstinate jibber. The creature, however strong and vicious, is "transformed into a sort of inoffensive horse of wood, with the feet firmly nailed to the ground." Curiously enough, the opposite effect may be produced by a succession of small shocks. Under the influence of these the veriest "scrub" can be endowed with a vigor and fire indescribable, and even the Rosinante of Don Quixote would gallop like a Derby winner.

STEEL RAILS.—The first steel rails laid on the Lehigh & Susquehanna Division railroad cost \$250 a ton in gold; such rails can now be bought for \$50 a ton.

SCIENTIFIC PROGRESS.

Points on Coal Deposits.

Prof. Williamson, of Owen's College, Manchester, England, lectured recently at Barnsley, taking for his subject "A Piece of Coal." Of the manner in which the coal deposits were made, he said: "In America there were seams 30 feet in thickness, some by the side of a river—but how did the plant get there? Some of our navigators had noticed the fact that in sailing in the Gulf of Mexico large masses of vegetable matter, rafts of trees and branches, had been brought down by the Mississippi, washed away by floods from the banks of the river, and carried into mid-ocean. When these rafts became so thoroughly water-logged that they could float no longer down they went to the bottom, and these navigators came to the conclusion that that process was the history of the formation of coal. But this explanation did not satisfy everybody. Some people, however, were of opinion that the explanation would be found in the history of our peat bogs. Some light was thrown on the matter in the making of the railway between Bolton and Manchester, by Mr. Hawkshaw, the engineer.

"In superintending the work he found at Clifton some fossil trees standing on the coal, the roots coming down to the coal. The stem was not less than 12 feet in circumference, with enormous roots. It was clear that these trees had grown where Mr. Hawkshaw found them, standing in the precise spot where the seeds were shed millions of years ago, shooting up and growing age after age. Consequently it was fully established that coal was made of various matters contributed by trees where it was found. In Lancashire they had from 20 to 30 beds of coal, and how did they get there? The levels of land and sea were constantly changing, and were changing at the present time. The old sea line can be traced high up on the Swedish and Norwegian mountains. It was the same in South America. If they went to the middle of the Pacific ocean, where thousands of years ago there were huge continents, the levels were going down, wherever they had volcanoes in an active state the land was rising, and wherever they had coral forming their reefs the land was lowering. If they went to the sea coast between Manchester and Liverpool they would find a submarine forest, with stumps of trees washed over by the tide. The land there was sunk and the salt water was washing the mud over the area, gradually filling up the places, and so coal would be formed years ago. The same thing existed formerly, and the sea had covered forests with fine mud, and the quality of the coals depended on the kind of routine they were subjected to. With regard to the various qualities, they would notice that whilst the floor of the bed was always the same fire-clay, the roof varies a great deal. In some places it was a dense blue clay, in others a sandstone, and the beds themselves broken and shattered by some tremendous action by a marvelous and mysterious arrangement. If those strata had remained in horizontal layers they would have been far out of the reach of man, but by some mysterious power they are turned up and twisted and brought near to the surface. They were brought within reach because there had been wonderful agents at work which tore up the earth's crust, and there are no strata so ancient but had been brought to the surface at some point. Such had not resulted from any volcanic action, but from shrinkings and contractions which the earth's crust had undergone."

A NEW PHOTOMETER.—A new pocket photometer has lately been described to the French Society of Photography by M. Schutte. The instrument has the form of a small telescope. Putting the eye to the narrow end and looking through at a light, one sees a small, luminous circle, on which is detached some figure in black. On turning the wider part of the instrument, successive numbers are seen, and the higher the number the weaker is the light perceived, and at length it quite disappears. This effect is obtained by means of leaves of waxed paper, the number of which increases with the figures. Thus a weak luminous source does not allow one to see the same number as a strong one, and the variation between the figures increases with the difference in intensity. The instrument can be used for determining the time of exposure in photography.

CLIMATIC CHANGES FROM COAL BURNING.—Mr. H. S. Eaton, President of the British Meteorological Society, estimates that the heat developed from the present annual consumption of 5,000,000 tons of coal on the metropolitan area of 118 square miles, and from all other artificial sources, would suffice to raise the temperature of a stratum of air 100 feet in depth resting on that area 2.5° every hour. The climate of London has been greatly modified during the present century by its great growth in population and corresponding consumption of fuel.

CARBONIC ACID IN AIR.—The open air commonly contains about 3.34 parts, by volume, out of 10,000; according to Pettenkofer any excess over 1 part in 1,000 is unwholesome. E. Schulze thinks Pettenkofer's limit is too low. In a club room he found 37 parts of carbonic acid, and in a school room from 14.4 to 35.6 parts out of 10,000.

Theory of Luminous Flames.

Dr. Karl Hinmann has published an elaborate discussion on this subject, in which he concludes that the theory of Davy must be altered, but need not be replaced by a new hypothesis. From a discussion of the work of previous observers, and a variety of experiments on the diminution and restoration of luminosity in hydrocarbon flames, and on the distance between flame and burner, he arrives at the following conclusions, as stated by the *American Journal of Science and Arts*:

1. The fact that a gas flame does not rest upon the burner, nor a candle-flame upon the wick, as also the fact that a flame never directly touches a cold body held within it, is to be explained by the cooling action exercised upon the gas by its surroundings. The combustible gases are cooled throughout a definite space below their ignition-temperature; the flame is therefore extinguished. This conclusion is opposed that of Glochmann.

2. The very considerable distance noticed between the burner and the flame of a gas issuing under high pressure, or mixed with a large column of an indifferent gas, cannot be accounted for on the grounds put forward by Bonevides. The production of such a distance is much rather to be traced to the cooling action of the stream of gas and of the outer air, and perhaps more especially to the fact that the velocity of the stream of gas in the neighborhood of the burner is greater than the velocity of propagation of ignition within the gas.

3. In order that other circumstances conditioning the effect may be removed, the velocity of propagation of ignition must be equal to that of the gas-stream at the point, situated some distance from the burner, where the flame begins.

Determination of the velocity of ignition should be made under these conditions for different gases, and since this magnitude is a function of the difference between ignition and combustion temperatures, conclusions may be drawn from such experiments regarding the relations existing between these points.

4. The velocity of propagation of ignition may be easily determined for solid and liquid combustible bodies; and the numbers so obtained may be regarded as comparative quantitative expressions for the liability to ignition of these substances.

PREHISTORIC MICA MINING.—In a paper read before the New York Academy of Sciences by A. A. Julien, on prehistoric remains in western North Carolina, a minute delineation was made of an extensive series of ancient excavations extending from Mitchell county southward into Georgia. These cuttings were evidently executed for the purpose of mining for mica and steatite—an industry still actively prosecuted in the region. The coarse granite strata containing the mica are divided into soft and hard bands, which have influenced the character of the mining both in prehistoric and present times. The ancient workings have been discovered in the soil veins, and consist of two classes. In one deep shafts have been found, sometimes containing tools; and these are ascribed to the Spaniards or to still later adventurers. The other class consists of open excavations, occasionally connected with small tunnels; and these are pronounced undoubtedly of prehistoric origin. Ashes have been discovered in some of the mines, showing the use of fire, as in the tunnels of Lake Superior mines. From appearances it is judged that vast quantities of mica have been taken out in prehistoric times; and it is considered that in these mines the source has been discovered of the mica plates extensively used in tombs of the Mound Builders of the Mississippi valley.

SPECTROSCOPIC EXAMINATION OF THE RAINBOW.—Taking opportunity, lately to observe with a Nicol's prism an uncommonly fine rainbow, which spanned the Oesthal in Baden Baden, *Nature* says: "M. Schiel found that with the prism in a certain position, the colors disappeared completely, and the prism was pretty dark. But on turning it through 90°, the bow appeared again in all its brilliancy. The rainbow is, therefore perfectly polarized light. Several rainbows observed since have shown the same behavior; but apparently only a very bright colored rainbow presents dark on the field of vision with the corresponding position of the prism."

FORMATION OF SULPHUR SPRINGS.—M. E. Plaugaud found near the source of a mineral spring, strongly impregnated with sulphur, a number of fine convolve, which he washed carefully and left in a flagon of ordinary water. About eight days afterwards, wishing to re-examine them, he was struck with the strong sulphurous odor which escaped the water. He then instituted experiments, which led him to conclude that sulphurous mineral waters owe their formation to the reduction of diverse sulphates, under the influence of living bodies, which act as ferments.

STAR-TWINKLING AS A SIGN OF RAIN.—Humboldt observed that in tropical regions the approach of rain is often announced by the twinkling of stars near the zenith. Montigny observed the intensity of the twinkling for 230 evenings, and found that it increased if a storm or a barometric depression was approaching. When rain is foreboded the glimmer is especially strong.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Apr. 6.	Week Ending Apr. 12.	Week Ending Apr. 19.	Week Ending Apr. 26.
Alpha.	152 1/2	124 1/2	111 1/2	142 1/2
Alta.	2 1/2	1 1/2	1 1/2	1 1/2
Andes.	90 1/2	75 1/2	80 1/2	65 1/2
Baltimore Con.	1 1/2	60 1/2	45 1/2	100 1/2
Belcher.	1 1/2	1 1/2	1 1/2	1 1/2
Belmont.	1 1/2	1 1/2	1 1/2	1 1/2
Best & Belcher.	27 1/2	23 1/2	24 1/2	21 1/2
Bullion.	13 1/2	12 1/2	10 1/2	6 1/2
Caledonia.	6 1/2	3 1/2	3 1/2	2 1/2
California.	45 1/2	44 1/2	36 1/2	37 1/2
Challenge.	1 60	1 40	1 11	1 80
Chollar-Fotosi.	52 1/2	45 1/2	38 1/2	39 1/2
Confidence.	1 25	1 20	1 15	1 25
Con Imperial.	43 1/2	40 1/2	34 1/2	35 1/2
Crown Point.	7 1/2	6 1/2	4 1/2	4 1/2
Coso Con.	150 1/2	100 1/2	100 1/2	100 1/2
Dayton.	19 1/2	17 1/2	18 1/2	22 1/2
DeFrees.	5 1/2	4 1/2	3 1/2	2 1/2
Geddes & Bertrand.	30 1/2	25 1/2	20 1/2	20 1/2
Gen Thomas.	30 1/2	25 1/2	20 1/2	20 1/2
Gran Nevada.	30 1/2	25 1/2	20 1/2	20 1/2
Gila.	50 1/2	45 1/2	35 1/2	35 1/2
Globe Con.	2 1/2	2 1/2	2 1/2	2 1/2
Golden Chariot.	12 1/2	10 1/2	9 1/2	2 1/2
Gould & Curry.	4 40	3 10	3 10	3 10
Hale & Norcross.	10 1/2	9 1/2	8 1/2	2 1/2
Hussey.	10 1/2	9 1/2	8 1/2	2 1/2
Julia.	2 1/2	2 1/2	2 1/2	1 60
Justice.	1 1/2	1 1/2	1 1/2	1 1/2
Kentuck.	5 1/2	4 1/2	3 1/2	3 1/2
Kickerbocker.	60 1/2	50 1/2	40 1/2	150 1/2
Kosher.	30 1/2	25 1/2	20 1/2	150 1/2
Lady Bryan.	2 1/2	2 1/2	2 1/2	2 1/2
Lady Wash.	2 1/2	2 1/2	2 1/2	2 1/2
Leopard.	4 1/2	4 1/2	4 1/2	4 1/2
Leviathan.	50 1/2	45 1/2	40 1/2	50 1/2
Leeds.	3 1/2	3 1/2	3 1/2	2 1/2
Modoc.	3 1/2	3 1/2	3 1/2	2 1/2
Manhattan.	7 1/2	6 1/2	5 1/2	7 1/2
Meadow Valley.	30 1/2	25 1/2	20 1/2	20 1/2
Mexican.	1 1/2	1 1/2	1 1/2	1 1/2
North Con Virginia.	75 1/2	60 1/2	50 1/2	35 1/2
New York.	40 1/2	35 1/2	30 1/2	25 1/2
Niagara.	2 1/2	2 1/2	2 1/2	1 1/2
Northern Belle.	4 1/2	4 1/2	4 1/2	4 1/2
Overman.	65 1/2	49 1/2	39 1/2	24 1/2
Ophir.	20 1/2	17 1/2	12 1/2	15 1/2
Pacific.	65 1/2	49 1/2	39 1/2	24 1/2
Phil Sheridan.	82 1/2	78 1/2	68 1/2	54 1/2
Panther.	60 1/2	45 1/2	35 1/2	30 1/2
Poorman.	20 1/2	15 1/2	10 1/2	10 1/2
Prospect.	20 1/2	15 1/2	10 1/2	10 1/2
Raymond & Ely.	20 1/2	15 1/2	10 1/2	10 1/2
Rock Island.	20 1/2	15 1/2	10 1/2	10 1/2
Savage.	6 1/2	4 1/2	3 1/2	3 1/2
Seg Belcher.	5 1/2	4 1/2	3 1/2	3 1/2
Sierra Nevada.	5 1/2	4 1/2	3 1/2	3 1/2
Silver Hill.	5 1/2	4 1/2	3 1/2	3 1/2
South Chariot.	50 1/2	40 1/2	30 1/2	20 1/2
Succor.	50 1/2	40 1/2	30 1/2	20 1/2
Trojan.	85 1/2	60 1/2	50 1/2	45 1/2
Union Con.	15 1/2	13 1/2	11 1/2	12 1/2
Utah.	15 1/2	13 1/2	11 1/2	12 1/2
Wells-Fargo.	20 1/2	15 1/2	10 1/2	10 1/2
Woodville.	65 1/2	40 1/2	30 1/2	25 1/2
Yellow Jacket.	10 1/2	9 1/2	8 1/2	7 1/2

Sales at S. F. Stock Exchange.

FRIDAY, A. M., APR. 20.	265 Julia.	14@.55
100 Alpha.	11@.11	
100 Andes.	75@.80	
235 Andes.	75@.80	
640 Best & Belcher.	19@.20	
380 Belcher.	6@.65	
400 Bullion.	12@.12	
100 Baltimore Con.	30@.30	
1720 Con Imperial.	1.05@.21	
2280 Crown Point.	8@.80	
105 California.	33@.33	
1040 Con Virginia.	33@.33	
370 Chollar.	34@.34	
40 Confidence.	13@.13	
1970 Caledonia.	3@.31	
200 Exchequer.	3@.31	
160 Gould & Curry.	8@.80	
360 Hale & Nor.	7@.70	
340 Justice.	9@.90	
450 Julia.	4@.40	
10 Kentuck.	4@.40	
200 Leviathan.	4@.40	
500 Lady Washington.	2@.20	
710 Mexican.	5@.50	
175 North Con Virginia.	20@.20	
170 New York.	20@.20	
455 Ophir.	14@.14	
725 Overman.	20@.21	
50 Phil Sheridan.	51@.51	
400 Rock Island.	15@.15	
415 Savage.	3@.31	
415 Sierra Nevada.	3.00@.33	
60 Silver Hill.	14@.14	
60 Seg Belcher.	1.00@.10	
200 Trojan.	85@.85	
40 Utah.	11@.11	
760 Yellow Jacket.	7@.71	
AFTERNOON SESSION.		
35 Advance.	14@.14	
75 Alps.	5@.50	
225 Belcher.	5@.50	
50 Belmont.	1.20@.12	
100 Best & Belcher.	3.85@.35	
140 Caledonia.	10@.10	
175 Con Virginia.	33@.33	
105 California.	33@.33	
235 Crown Point.	7@.71	
360 Exchequer.	3.55@.35	
160 Gen Thomas.	30@.30	
775 Grand Prize.	3.00@.30	
100 Golden Chariot.	2@.20	
40 Hale & Nor.	7@.70	
490 Leopard.	9@.90	
900 Leeds.	2.40@.24	
230 Modoc.	2.40@.24	
90 Manhattan.	7@.71	
130 Mexican.	5@.50	
725 Northern Belle.	17@.17	
600 New Coso.	4@.40	
165 Ophir.	14@.14	
300 Overman.	21@.21	
140 Alpha.	11@.11	
430 Best & Belcher.	20@.20	
260 Crown Point.	7@.71	
135 Con Virginia.	33@.33	
105 California.	33@.33	
230 Crown Point.	7@.71	
475 DeFrees.	1@.10	
265 Eureka Con.	18@.18	
275 Exchequer.	3.55@.35	
450 Golden Chariot.	2@.20	
450 General Thomas.	30@.30	
610 Grand Prize.	3@.30	
380 Gould & Curry.	8@.80	
50 Hussey.	1@.10	
225 Justice.	9@.90	
185 Julia.	11@.11	
200 Leopard.	3@.30	
120 Leeds.	2.35@.23	
800 Manhattan.	6@.60	
405 Mexican.	8@.80	
625 New Coso.	3.50@.35	
570 Northern Belle.	14@.14	
475 Ophir.	14@.14	
460 Overman.	21@.21	
45 Raymond & Ely.	3@.30	
500 Rye Patch.	9@.90	
175 Silver Hill.	11@.11	
630 Union Con.	4@.40	
190 Yellow Jacket.	7@.71	

245 Sierra Nevada.	3.80@.38
230 Savage.	2.40@.24
510 Union Con.	13@.13
50 Utah.	11@.11
50 Yellow Jacket.	7@.71
TUESDAY, A. M., APR. 24.	
835 Alpha.	11@.11
850 Andes.	75@.80
40 Baltimore Con.	20@.20
100 Belcher.	5@.50
640 Best & Belcher.	19@.19
210 Bullion.	12@.12
1050 Con Virginia.	33@.33
1825 Con Imperial.	1.10@.11
625 California.	33@.33
70 Confidence.	13@.13
530 Crown Point.	6@.60
1055 Caledonia.	2.60@.26
100 Challenge.	1@.10
100 Dayton.	1@.10
320 Exchequer.	3@.30
320 Gould & Curry.	7@.71
650 Hale & Nor.	21@.21
535 Julia.	11@.11
535 Justice.	11@.11
80 Kentuck.	4@.40
1100 Leviathan.	4@.40
435 Lady Washington.	2@.20
530 Mexican.	3@.30
150 Morning Star.	3@.30
625 North Con Vir.	30@.30
400 New York.	25@.25
375 Overman.	14@.14
645 Overman.	14@.14
450 Sava.	2.80@.28
730 Sierra Nevada.	3.80@.38
730 Silver Hill.	1.55@.15
30 Utah.	11@.11
1025 Union Con.	4@.40
100 Woodville.	35@.35
290 Yellow Jacket.	7@.71
AFTERNOON SESSION.	
50 Alpha.	13@.13
30 Alps.	5@.50
140 Best & Belcher.	20@.20
1030 California.	33@.33
100 Chollar.	3@.30
150 Con Virginia.	33@.33
590 Crown Point.	6@.60
670 Con Imperial.	1.10@.11
650 Caledonia.	2.90@.29
300 DeFrees.	1@.10
200 Empire Id.	6@.60
35 Eureka Con.	20@.20
150 General Thomas.	20@.20
400 Golden Chariot.	2@.20
140 Gould & Curry.	7@.71
350 Grand Prize.	3@.30
200 Justice.	9@.90
40 Jackson.	2@.20
50 Leeds.	2@.20
420 Leopard.	3@.30
555 Manhattan.	7@.71
115 Mexican.	3@.30
250 Modoc.	2.40@.24
645 Northern Belle.	17@.17
1560 New Coso.	4@.40

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M., APR. 19.		THURSDAY, A. M., APR. 26.	
185 Alpha.	10@.11	390 Alpha.	11@.11
360 Andes.	75@.80	30 Andes.	75@.80
150 Baltimore Con.	20@.20	100 Baltimore Con.	20@.20
1010 Best & Belcher.	21@.21	460 Best & Belcher.	19@.19
360 Belcher.	5@.50	1080 Belcher.	5@.50
235 Bullion.	7@.71	1680 Crown Point.	6@.66
1000 Bullion.	36@.36	1238 Con Imperial.	1.10@.11
1225 Con Imperial.	1.10@.11	200 Chollar.	3@.30
200 Chollar.	3@.30	40 Chollar.	35@.34
2250 Con Virginia.	34@.35	645 California.	33@.33
540 Caledonia.	3@.31	565 Con Virginia.	33@.33
2485 Crown Point.	7@.71	245 Caledonia.	2.60
30 Confidence.	13@.13	70 Challenge.	1.00@.10
365 Dayton.	10@.10	350 Dayton.	10@.10
545 Exchequer.	3.80@.38	50 Exchequer.	3.45
120 Gould & Curry.	8@.80	625 Gould & Curry.	7@.71
50 Hale & Norcross.	8@.80	140 Hale & Norcross.	8@.80
870 Julia.	1.55@.15	70 Challenge.	1.00@.10
760 Justice.	9@.90	900 Julia.	1.10@.11
170 Kentuck.	4@.40	140 Kentuck.	4@.40
130 Kosuth.	1@.10	700 Levathan.	50@.45
565 Lady Wash.	2@.20	270 Mexican.	2@.20
300 Mexican.	9@.90	250 New York.	2@.20
500 Morning Star.	3@.30	450 North Con Virginia.	2@.20
200 New York.	25@.25	145 Ophir.	1@.14
150 North Con Vir.	30@.30	250 Overman.	18@.18
735 Overman.	21@.21	7350 Prospect.	40@.36
335 Ophir.	15@.15	250 New York.	2@.20
1500 Prospect.	35@.35	120 Prospect Hill.	11@.11
545 Exchequer.	3.80@.38	30 Best & Belcher.	21@.21
120 Gould & Curry.	8@.80	300 Savage.	2.60@.22
50 Hale & Norcross.	8@.80	405 Sierra Nevada.	35@.33
870 Julia.	1.55@.15	250 New York.	2@.20
760 Justice.	9@.90	300 Woodville.	2.50@.20
170 Kentuck.	4@.40	500 Yellow Jacket.	7@.70
130 Kosuth.	1@.10		
565 Lady Wash.	2@.20		
300 Mexican.	9@.90		
500 Morning Star.	3@.30		
200 New York.	25@.25		
150 North Con Vir.	30@.30		
735 Overman.	21@.21		
335 Ophir.	15@.15		
1500 Prospect.	35@.35		
545 Exchequer.	3.80@.38		
120 Gould & Curry.	8@.80		
50 Hale & Norcross.	8@.80		
870 Julia.	1.55@.15		
760 Justice.	9@.90		
170 Kentuck.	4@.40		
130 Kosuth.	1@.10		
565 Lady Wash.	2@.20		
300 Mexican.	9@.90		
500 Morning Star.	3@.30		
200 New York.	25@.25		
150 North Con Vir.	30@.30		
735 Overman.	21@.21		
335 Ophir.	15@.15		
1500 Prospect.	35@.35		
545 Exchequer.	3.80@.38		
120 Gould & Curry.	8@.80		
50 Hale & Norcross.	8@.80		
870 Julia.	1.55@.15		
760 Justice.	9@.90		
170 Kentuck.	4@.40		
130 Kosuth.	1@.10		
565 Lady Wash.	2@.20		
300 Mexican.	9@.90		
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200 New York.	25@.25		
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735 Overman.	21@.21		
335 Ophir.	15@.15		
1500 Prospect.			

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

THE ADVANCE BONANZA.—*Alpine Chronicle*, April 21: The Advance mine continues to develop grandly, and everything relating to the work in and about the mine is progressing satisfactorily. Three shifts are working in each drift, and a No. 2 Root's blower gives excellent air in the mine. The west drift is 80 feet in the ledge, and the whole face in pay ore. The foot-wall not yet reached. The north drift, running in the eastern casing of the ledge, is in 35 feet—all in pay rock—from which point they are cross-cutting east and west, and have already run 16 feet in good paying ore, the westerly face containing high-grade ore, the quality improving as it approaches the ledge proper. Having visited the mine this week, we can assure our readers that the Advance ore body is simply immense, and were it on the Comstock, the stock would go up to the highest figure. The company will put its mill in good order as soon as possible, and expect to be shipping bullion before the first of June.

O'HARRA FURNACE.—It is gratifying to know that the O'Hara champion furnace, recently put in operation at the Exchange mill, has proved a success and been accepted by Manager Chalmers.

AMADOR.

OLIVE.—*Amador Ledger*, April 21: Sinking continues on this prosperous Drytown mine. The shaft is now down 70 feet, the ledge varying from four to seven feet. It is a noteworthy circumstance that the rich specimens which marked the claim in the earliest stage of its development, are no longer met with. The gold now appears to be more evenly distributed through the quartz, but little free metal being discernable, nevertheless the rock is expected to rival that of the first run, which gave up \$18 to the ton. John Greenwell is general Superintendent, with A. J. Burns as foreman. The Bonanza mill is engaged for another crushing of the rock in May.

YELLOW JACKET.—This claim is the south extension of the Crown Point ledge, at Drytown. A limited amount of work has been done, the dirt and rock taken at various points yielding several dollars to the pan. So far work has been prosecuted at a considerable elevation above the creek, and it is thought probable that when the level of the stream is reached a permanent ledge will be struck.

YORK'S GRAVEL CLAIM.—The clean-up on this mine, at Butte City, for a run of 30 days, was finished this week. The result is between \$1,500 and \$1,600 in gold. This is considered satisfactory, though not so good as the sanguine pictured.

COMET.—There is no doubt that an important strike has been made on this mine. We were shown on Saturday a sample of rock taken from the shaft that morning. It was that dark-looking character, full of sulphurets, with one or two patches of coarse gold.

OSIDA.—Twenty stamps are kept running steadily on rock from the lower levels. The old shaft is being repaired, and sinking will be the next thing in order. The Onida takes rank among the largest mines in the county, giving employment to a small army. The ore has chiefly been of low grade, and the nature of the ground being such as to require heavy and frequent timbering, involving much expense, the proceeds have mostly been swallowed up for working expenses. The lowest level is 1,100 feet down. It is now proposed to go 200 feet beyond this.

WHEAT.—The first clean-up of this mill was made this week. The precise amount realized is not yet known, the returns from below not having been received. From the quantity of amalgam shipped, it is safe to estimate the total yield at \$5,000, an average of \$13 to the ton.

CALAVERAS.

MOUNT TOLSON.—*Calaveras Chronicle*, April 21: A contract has been let to sink a shaft in a Mount Tolson mine, Jesus Maria district, 50 feet deeper, with the privilege of 100. Should the ledge show well upon the completion of the sinking, 25 more stamps will be added to the battery and hoisting works put up. We learn that the Baron von Gleichenberg has assumed the duties of Superintendent.

BLAST.—A blast of eight barrels of powder was set off in the Yelch mine on Monday last, doing good execution. **READY TO CRUSH.**—Gamble & Co., at Railroad Flat, have out quite a quantity of rock, which is to be crushed in Clark's mill. Everything is in readiness to commence hauling, and the stamps will probably be set at work Monday. Clark's mill has lately been thoroughly overhauled and repaired.

GRIN MIXT.—The work of running the 1300-ft level in the Grin mine is progressing. The ledge showed 15 feet wide in the cross-cut near the shaft, but as the level is run it narrows. The rock obtained so far is not first-class, but, as in the levels above, it will undoubtedly improve as work progresses.

EL DORADO.

GOOD NEWS.—*Mountain Democrat*, April 21: Arrangements have been consummated for a transfer of the Pacific mining property in the points of Placerville, from the hands of the present owners, an English company, to a new company, one-half of the stock of the latter to be held here and one-half by San Francisco capitalists. When it is understood that the same parties who control the St. Lawrence mine will control the Pacific under the new management, the public will feel assured that the Pacific "means business." As a measure of prudence, and to infallibly establish what is already beyond reasonable doubt, one extensive crushing of ore from the Pacific mine will be made at the Brewster mill, and if that realizes expectations a large 20-stamp mill, with all of the latest improvements, will be immediately erected on the Pacific ground.

NEW DITCH SYSTEM.—The Park canal and mining company, successor to the old Eureka ditch company, is inaugurating a new system of ditches which will afford adequate supply of water, not only for their own mine at Dry gulch, but for the large belt of auriferous gravel lying further to the west. A ditch nine miles in length will take up the water of the North fork of the Cosumnes and carry it into Camp creek, above the Baltic mill. A five-mile ditch will then take it over to Park creek, where the company have two of the finest reservoir sites in the mountains. From Park creek a ditch already constructed will carry it to the summit of the divide between the Cosumnes and Webster creek. With the aid of the Sly Park and Hazel Dell reservoirs for storage purposes, the supply of water will be made continuous throughout the year, and we may confidently look forward to a rich return from the mines of that portion of our county.

LAWRENCE.—The Lawrence mine next Monday week. Simultaneous with the sinking of the main shaft from the 800-ft level, they have been running north from the old workings on the 300-ft level, at which point they have opened up a large body of fine ore, apparently extending indefinitely to the northward, and already demonstrated as having an extent of 130 feet up and no working. There are now about 300 tons of this ore on the dump and the work of extraction goes bravely on.

EXCELSIOR.—The flume of the Excelsior mine is being extended across the Diamond Springs road, through a heavy cut, to Slaughter House ravine. The extension will make this flume more than a mile in length.

INYO.

MINNETTA MILL.—*Coso Mining News*, April 21: From R. C. Jacobs we learn that the mill at the Minnetta mine started up on the 17th instant, on a batch of 20 tons of ore, simply as an accommodation to some prospectors at work on their mines near Snow's canyon. The ore is very rich, and Mr. Jacobs thinks it will yield \$200 to \$300

per ton. The owners are Messrs. Woodman, Higgins, Gannon and others. As soon as this batch is worked, Mr. Jacobs will start the mill on the regular contract with the Minnetta company, which will keep the mill running steadily for six months. He expects to clean up \$1,600 to \$2,000 every 24 hours. The ore, so far as tested, averages \$100 per ton.

NEW COMPANY.—A company has been formed in New York to mine and mill in Lookout district. The parties are expected here next week. They own some very rich mines in the vicinity of Snow's canyon, and are now having small batches of rock worked at Jacobs's mill, as a test prior to beginning work on a grand scale.

MINNETTA BELLE.—This mine, under the management of Mr. C. S. Peck, the new Superintendent, is looking well. Three men took out 50 tons of ore last week, which will go from \$100 to \$150 per ton. The mine is being worked in a new place, and is said to far exceed any opening heretofore made.

CONTRACT LET.—*Inyo Independent*, April 21: Last week Mr. Elsbeth, pursuant to instructions from the company below, let a new tunnel contract on the Kearsarge mine, and the work of driving it is now going on. It will be remembered that the contract on the original tunnel was thrown up last winter, having then been driven about 150 feet. The new tunnel begins about midway of the old one, diverging at almost an angle of 40° and is expected to strike ore in 50 feet.

GRASS FLAT.—The Union Con. company have effected a general reduction of 50 cents per day on the wages of all of their employees—superintendents, furnace men, engineers, miners and laborers. So far as we have learned none of the men have quit in consequence.

NEVADA.

NEW LADDER STRUCK.—*Grass Valley Union*, April 25: Harsch and Wiley have struck some very fine rock north of Cincinnati hill, and think they have the main ledge running through that vicinity. The ledge appears to be large and contains good sulphurets, and free gold is visible in the rock. This ledge is near the famous ground called the "Never Sweat," and when this ledge was worked several years ago, Jas. W. P. considered the name Never Sweat not appropriate, but a good burlesque. A great many shafts have been sunk in that vicinity, and found only indications. If Harsch and Wiley are correct about being on the main ledge, they are owning a valuable property.

PLACER.

YOU BET MIXT.—*Dutch Flat Forum*, April 19: The Nece & West and Waloope companies turned off last week and made a general clean-up. The results are reported to be very good. The water has been turned on and washing again resumed. The Nevada company and Hussey company continue to wash under favorable circumstances.

LOWELL HILL.—Work in the Swamp Angel mine is being prosecuted under favorable circumstances. As the mine advances new drifts are being opened, which look and prospect well with an assurance of paying regular dividends.

LITTLE YORK.—The Empire and Christmas Hill companies are making splendid headway in washing. The ditches continue running full.

REMINOTON HILL.—Ground sluicing continues in the Rhode Island mine without abatement. The result is said to be good. Both the Rhode Island and the Wide West mine, the distance between the two now being 170 feet, which block of ground will be left solid, with the exception of connecting air drifts, until the boundary line of the mine is reached, it being a distance of 2,100 feet. The gravel taken therefrom continues to be exceedingly rich. A drift is being opened east of tunnel No. 2, to test the width of the channel, and breasting out of the same will be commenced immediately.

FALL CREEK.—The Wood & Porter claim is located on Fall creek, being one and a half miles west of where the Culbertson grade crosses the stream, and nine miles north of Emigrant Gap. It contains 40 acres of ground, the gravel having an average depth of 70 feet, and has sufficient elevation above the stream to insure its successful working by hydraulic, under which process it will be a remunerative investment. This has been proven by prospecting the gravel by ground sluicing. Fall creek, at this point is quite rich, the gravel being about 10 feet deep, but there is not sufficient grade to work it otherwise than to pick and shovel it into sluices, and as this ground will have to be worked before any hydraulic is done, the same is now progressing under slow but paying circumstances, and will take about one year to complete. Our informant, Mr. Wood, one of the owners, thinks that profits enough will be realized to fit up and put the mine in condition for hydraulic. There are also several other mines in this vicinity, which are thought would pay well if properly worked, as the prospects in several instances are said to be promising.

RATN.—*Dutch Flat Forum*, April 19: Since our last we have been favored with heavy showers of rain, which filled the various ditches to overflowing, and deposited several inches of snow on the mountains. The Baker claim had its shaft plugged by a blast last week, and did not succeed in opening it till yesterday. The extent of the work necessary for accomplishing this object can be better realized when we state that it not only was the 90 feet of shaft filled with gravel, but it was covered over to a depth of 70 feet with gravel and boulders. It is clear now, however, and is expected that nothing will be continuing to work the mine, excepting when it is necessary to turn off to break up boulders and the chunks of cement below. The Star & Union continues washing nights, and removing boulders in the day. The Southern Cross and Polar Star claims are in the same fix as the Baker was. In the latter the tunnel is plugged, and an extra string of pipe is being extended down the incline so as to wash the debris away from below. The Pacific claim is refitting and moving the pipe so as to attack another point of promising gravel. As Gold Run the Big Bonanza, Hogskin, North Star and Illinois claims continue washing. The Cedar claim, belonging to the Gold Run hydraulic mining company, limited, cleaned up on Tuesday, with very satisfactory results, considering the character of the gravel that is available.

AT THE FRANKLIN.—As the work advances, the effect of the new plan can be readily seen. The gravel is thoroughly pulverized, and melts away like snow before the streams directed against it. The large derrick, under the supervision of Mr. J. J. Brady, is kept at work all the time removing the boulders that accumulate. The gravel is improving in appearance, and Mr. Teaff expects a better clean-up this time. In every respect the work at this mine, under the able management of Mr. Teaff, is progressing rapidly in the most favorable manner.

PLUMAS.—*Plumas National*, April 21: Another gang of Chinamen have been put to work in the Golden Enterprise claims, near Spanish ranch, and Mr. Jack informs us that he intends to extend his big flume as fast as the cut is opened. The work is progressing very bravely, and by the last of July will have the head of the flume in pay gravel. As the flume is made double, and as there is always water enough to run one side of it, we shall look for "Uncle Dick" to have his pockets full of "dust" this fall.

QUARTZ.—The recent discovery and sale of the Ellis ledge on Soda creek has caused an excitement on the other side of the range, and many are now coming every day. Everybody has the quartz fever, and old and young are in the mountains from daylight till dark, searching for "croppings." It is said that so strong is the mania that ranchers are expecting trouble to find farm hands. Numerous locations are being made daily, and occasionally one that has much real merit in it. There is no doubt but that some valuable quartz property will be developed, and that the "fever" will bring forth many good results.

SIERRA.

RICH FIND.—*Mountain Messenger*, April 21: On Tuesday last the people of Forest City were electrified by the news of the striking of a rich quartz ledge in the North Fork company's new tunnel. So far as prospecting at this writing, the ledge is about four feet wide, carrying a vein of arsenical sulphurets about six or eight inches wide, besprinkled with free gold. A ton of such rock, as the specimens we have seen would yield probably \$25,000 to the ton, perhaps more. It is confidently anticipated that the company will get enough out of this find to pay all expenses incurred in opening their claim. The lead is a blind one, having a heavy body of cement over it. The foreman, Watson Bayles, said that if the vein continued he could get a ton of the sulphurets out in a day.

SCALE'S DRIFTING.—The Cleveland & Sierra hydraulic company are cleaning up with prospects of good returns. They put up a new and powerful water derrick, but cannot use it this season. Fair play will reap a golden harvest this year. Everybody is at work. This is one of the most prosperous little mining towns in the county. Water season will probably be short.

LOW.—The incline of the Iowa is down about 500 feet. Seventeen men busy outside and underground. Everything is in excellent order. Repairs being made as needed. A contract for 600 cords of wood to be let soon. At foot of incline it is proposed to run a branch tunnel into the hill, a second to the right, some 80 feet, and then off at right angles to the front. We trust that the Iowa boys will soon realize the handsome dividends that should reward their perseverance and hard work. Their efforts will result in the opening of innumerable new adjoining claims, as this is believed to contain one of the most extensive gravel deposits in Sierra county.

GRASS FLAT.—Pioneer company have worked off two large claims this year, and are now cleaning up with prospect of good pay. Employ 15 men.

ST. LOUIS.—Morgan & Donahue's claim will do as well as usual this year, notwithstanding the light snow fall. Cleveland company's contract with the company's contract with W. H. Prosser, Esq., of 100 feet tunnel, nearly completed. Empire company paying larger dividends than ever; working 100 men. The Empire company are daily approaching the ground of the Fashion and Sierra Extension companies, and the latter are much encouraged by their future prospects. Sears Union water company are still plying away at the banks, with fair prospects of doing well.

NEWARK.—No Plus Ultra company are in nearly 3,000 feet. Intend soon letting a contract to extend the tunnel or raise, the supposition of many being there is gravel overhead, with prospect of its being good. North America company are opening double track in 1,700 feet—run mules—150 men employed. Bright prospects of good returns. M. Schofield, Esq., Superintendent. McQuestin still works the gravel, etc. Everything has been rebuilt. Swiftsure company are running a new tunnel above the old, making a connection between the two for air, when they will be taking out pay. Roach & Sayers intend opening their claim soon.

GIBSONVILLE.—Michigan company are completely fitted up—in good gravel, but rather hard upon the main lead of the channel opening out. W. B. Russell, foreman; six men employed. Union company are working 43 men, obtaining 100 cords of gravel in over 3,000 feet of good, soft gravel. F. Salter, foreman. Gravel Hill hydraulic company washed off two claims. Good pay was found last year, and they expect to do as well this season. Eight men employed; more needed soon for cleaning up. Nat Hersom, foreman. Keifer & Emerton are working eight hands; good pay. Chaledon company are employing about 60 hands; tunnel in 2,500 feet; paying well. John Johnson, foreman. The gravel is of good quality and rest, is now enjoying flush times again. About \$10,000 is paid out monthly for wages by the mining companies hereabouts, which makes money very plentiful and times lively. The prospect is that they will continue good for an indefinite period, and also improve very much in the years to come.

PORT WINE.—This place changes less of all the north to the south, and there's no hope, and there may possibly, even with the present gloomy outlook, be a bright future in store for Port Wine. Union company are running a prospect tunnel into Bald hill. Chances favorable. Monte Cristo company are taking out pay. Indian Queen company are realizing wages. Highland Mary company are still running a hard bedrock tunnel, the present length of which is near 700 feet. Pay gravel is supposed to be only a few feet ahead.

TRINITY.—*New River*, Trinity Journal, April 21: We understand that considerable activity is being manifested in this part of the county—water rights located and improvements of a permanent character being made. From the character of the gold found there in former years, it would seem as if the deposits could not have been exhausted by the limited population which found its way over the New River mountains. Fifteen years ago the New River country was a pretty prosperous one. There was a large population, Pony creek, Virgin creek and other branches of the main stream, and "big chunks" abounded. The hard winter of 1861 blocked the roads, and many had to come out where provision could be had, and this was followed by the Indian troubles, which continued for years, and effectually scattered the people of New River. The bed of the stream has been almost wholly given up to Chined of late years, but there are many high banks and bars which would seem ought to pay well for working. No doubt if the improved machinery in use among the miners in this part of the county was introduced in that region and put to work in some of the numerous bars or flats which line the stream, New River would show some claims worth owning.

Nevada.

WASHOE DISTRICT.

BELLISH.—*Gold Hill News*, April 25: The material encountered in the face of the east drift on the 1800-ft level is gradually softening and is of a much more favorable kind.

BEST & BELCHER.—The south cross-cut, No. 3, near the south line, on the 1700-ft level, is in a distance of 230 feet, the face in vein matter. Cross-cut No. 2, near the center of the mine, on the same level, is in 176 feet the average rate of progress of these drifts is about five feet per day.

CALEDONIA.—Sinking the shaft has been resumed. ATLANTIC CON.—The tunnel is being pushed rapidly ahead, following the vein, almost the entire face in ore.

CROWN POINT.—Yesterday afternoon the advance drift in the face of the east drift on the 200-ft level broke through the vein porphyry in a sedimentary formation through which the drift has been running for the past week, and tapped a strong flow of scalding hot water. Knowing the fearful pressure of water likely to be encountered when the ledge was tapped, Superintendent Samuel Jones had taken every precaution to draw the water gradually and prevent the flooding of the mine. Fearing that the fierce current would break through the drill hole, it was at once partially plugged and work in the face of the drift temporarily suspended, until the supply of water began to lessen. The distance between the 2000-ft level and the 1700, the next level above, is 300 feet perpendicularly and nearly one-third more when we take into consideration the inclination of the ledge. This gives a fearful pressure, but the Superintendent having a great deal of experience in the past in this character of work, determined not to let the flood get the best of him if precaution can prevent it. Large sized Cameron pumps are used to hoist the water from the 2000 up to the 1700-ft level, where it is carried in sluices through the Belcher combination pump shaft. The pumps are running this morning at the top of their speed and are keeping the water well under control. Should the water show a gain on the pumps, others ready to insert. The Belcher combination shaft is down 1,970 feet.

BELCHER.—Daily yield, 55 tons of ore. The ore is being crushed as fast as it is extracted, and will yield a net profit which will more than pay the running expenses of the mine during the month. The net bullion production of the mine for March was \$25,000, which amount will be greatly increased by the April returns. The new pumps are now taking the water from the Yellow Jacket, Crown Point and Belcher mines, and handles it with perfect ease.

JEWICK.—Daily yield, 450 tons of ore, keeping the mills crushing to their fullest capacities. The ore stops on the 400, 600, 700 and 800-ft levels are showing finely and yielding good milling ore at all points. The vein matter on the 1150-ft level thus far encountered is of a much livelier character than was that of the levels above as the same distance from the vein.

YELLOW JACKET.—The foundations for a large and permanent building are being laid at the new shaft. This building will be erected so as to entirely inclose the present works.

HALE & NORCROSS.—The pumps have been kept steadily at work at the average rate of six and a half strokes per minute for the past week, and have during that time been making a steady and constant gain on the flow. The temperature of the water at the bottom ranges from 140° to 150° Fah. The temperature of the air in the main incline varies from 96° to 100°.

CON. VIRGINIA.—Daily yield, 450 tons of ore. The ore stops on the 1650-ft level continue to open up finely and are yielding rich ore. The mills are kept steadily running up to their full crushing capacities. The face of the south drift on the 1650-ft level, running to connect with the deep winze, continues in rich ore. The stops on the 1550-ft level continue to yield good ore, and the upraise in that portion of the mine shows the ore prospects to be of a much more favorable and lasting character than has heretofore been expected.

CALIFORNIA.—Daily yield, 500 tons of ore. The mills have all been steadily running during the week, with the exception of the Con. Virginia mill, which was delayed 36 hours by the breakage of the crank of the driving engine. The ore breasts are showing splendidly at all points, and the yield of bullion, notwithstanding the delay of the Consolidated mill, is already in excess of that for March. This insures the payment of the regular dividend in May.

GORT & CONLEY.—The pumps are kept steadily running about 11 hours out of every 24. The machinery is all working splendidly.

OVERMAN.—The south drift on the "1300-ft level" is advancing, the face in a fine character of quartz. Preparations are being made to sink a winze on the ore below that level.

SOUTH COMSTOCK.—Bottom of shaft still in good sinking ground, with encouraging prospects. It is well timbered and in good condition for active work in case the expected good ore developments should be encountered.

OPHIR.—Daily yield 30 tons of ore. The ore is being crushed at the Windfall mill and is yielding about \$40 per ton. An air-connection has just been completed between the 1000 and the 1300-ft level, which greatly facilitates getting at the ore, and will enable an increase of 40 tons per day.

JOHN THOMAS.—The face of the main drift at the 600-ft level shows very good looking vein of low grade ore, which is expected to lead to something better before long.

JULIA.—The main south drift, on the 1800-ft level, is steadily advancing, the face in ore which appears to be gradually widening and increasing in value as the drift progresses. The improvement in the character of this ore is a great encouragement.

MEXICAN.—The upraise from the 1305-ft level is making excellent progress, the entire face in quartz of a fine character.

SOLID SILVER.—The cave mentioned last week in the main adit or drift northward has been properly checked and secured, the debris cleared away, and the upraise to explore the merits of the ore exposed by it above the tunnel is making good progress.

CHOLLAR FORT.—Daily yield 100 tons of ore, the average value of which is \$25 to the ton.

ALTA.—Sinking the shaft is making the best of progress, the ground in the bottom being softer.

SILVER HILL.—The south drift, on the 650-ft level, is showing some fine quartz and ore.

LADY WASHINGTON.—The quartz in the face of the north drift, on the 800-ft level is becoming more concentrated and is of a much more lively and healthy character.

JAY COX.—The north drift on the 1800-ft level is steadily advancing, the face in vein matter mixed with quartz of a lively encouraging quality.

SUTRO TUNNEL.—Total length of tunnel to-day, 16,627 feet. The face of the header is in hard ledge porphyry, with seams of decomposed quartz and clay, which material is difficult and unfavorable for both drilling and blasting.

NORTH CON. VIRGINIA.—Sinking the shaft is being pushed ahead with all possible vigor.

MINT.—The water is being kept down in the shaft by the use of the tanks.

EUREKA DISTRICT.

TUP. BULLWACKER MINE.—*Eureka Sentinel*, April 21: In the early days the Bullwacker was one of the celebrated properties of this district. It has a shaft to the depth of 320 feet besides other improvements. Large quantities of valuable ore were extracted near the surface, but for the last two years it has not yielded much. Lately Geo. W. Farrell, a thoroughly practical miner, took a lease of the mine for nine months. Going down the shaft about 100 feet he discovered what he supposed to be indications of ore, and at this point began operations. He had only proceeded a few feet when he came on what promises to be a regular bonanza. Assays obtained from the ore yesterday gave \$75 in silver and 65 per cent. in lead. This is certainly very encouraging, and if the prospect holds out it will not be long until the Bullwacker again takes rank as among the big things of the great East.

TUSCARORA DISTRICT.

LOCAL NOTES.—*Tuscarora Times*, April 14: The Grand Central will start up in a few days. Peter Nicholson has a contract to sink 100 feet on the Argenta. Work on the Hornet mine will be commenced as soon as the company can get a donkey engine on the ground. Work on the De Fries is progressing most favorably, and the ore body is being exposed. Capt. Williams, Superintendent. Mr. Wm. Hamilton supercedes Mr. Duval as Superintendent of the mill. Mr. Duval is called back to the Leopard mill. Developments in the Grand Prize are very flattering. The future prospects of the mine was never better at any period of its history.

WHITE PINE DISTRICT.

AS RICH AS EBERHARDT.—*White Pine News*, April 21: The old saying of the ancient White Pine is about to be proved in the early times when the famous Eberhardt mine was producing quantities of the richest silver ore the present century has produced, it was common to hear the hardy miner on Treasure hill speak of his last strike as being as rich as Eberhardt. Mr. Sam. Paul has really developed a body of ore to the southward of the original Eberhardt mine, which he has opened since the halcyon days of White Pine, named the Keystone, and on which he has done but assessment work for the last five years, which is the "same old stuff." Mr. Paul and his son are taking out ore that will work at least \$7,000 per ton. Paul is a mill man and a practical miner, who has constantly been working mines and mills since White Pine was discovered, and for years before in California. Who knows but the old times may come again in White Pine district. Nothing so encouraging has happened for some time as the opening of this body of ore in the Keystone mine.

Arizona.

WEAVER DISTRICT.—*Arizona Miner*, April 13: A company of miners are sinking a shaft in Weaver gulch, half a mile south from this town, and have discovered that, what is commonly called "bed-rock" in this district, is nothing more than a cap of slate, from three to seven feet thick; and beneath this slate are, already, layers of gravel and cement. Their shaft is now down about 80

THE ENGINEER.

Problems for Engineers.

Dr. Siemens made an address at the late meeting of the British Iron and Steel Institute, which is one of the most able and interesting we have read for a long time. We propose to quote a paragraph in which he hints at what is within the possibilities of the future in the way of turning to profit the great force of cataracts and transmitting it to distant workshops. He said: "The advantage of utilizing water-power applies chiefly to continental countries, with large elevated plateaus, such as Sweden and the United States of North America, and it is interesting to contemplate the magnitude of power which is now for the most part lost, but which may be, sooner or later, called into requisition."

"Take the falls of Niagara as a familiar example. The amount of water passing over this fall has been estimated at 100,000,000 of tons per hour, and its perpendicular descent may be taken at 150 feet, without counting the rapids, which represent a further fall of 150 feet, making a total fall of 300 feet between lake and lake. But the force represented by the principal fall alone amounts to 16,800,000 horse-power, an amount which, if it had to be produced by steam, would necessitate an expenditure of not less than 266,000,000 tons of coal per annum, taking the consumption of coal at 4 pounds per horse-power. In other words, all the coal raised throughout the world would barely suffice to produce the amount of power that continually runs to waste at this one great fall. It would not be difficult indeed to realize a large portion of the power so wasted, by means of turbines and water-wheels erected on the shores of the deep river below the falls, supplying them from canals cut along the edges. But it would be impossible to utilize the power on the spot, the district being devoid of mineral wealth, or other natural inducements for the establishment of factories. In order practically to render available the force of falling water at this, and the thousands of other places under analogous conditions, we must devise a practicable means of carrying the power to a distance. Sir William Armstrong has taught us how to carry and utilize water-power at a distance, if conveyed in high-pressure mains, and at Schaffhausen, in Switzerland, as well as at some other places on the Continent it is conveyed by means of quick-working steel ropes passing over large pulleys. By these means power may be carried to a distance of one or two miles without difficulty. Time will probably reveal to us effectual means of carrying power to great distances, but I cannot refrain from alluding to one which is, in my opinion, worthy of consideration, viz., the electrical conductor. Suppose water-power to be employed to give motion to a dynamo-electrical machine, a very powerful electrical current is the result. This may be carried to a great distance through a large metallic conductor, and there be made to impart motion to electro-magnetic engines to ignite the carbon points of electric lamps, or to effect the separation of metals from their combinations. A copper rod of three inches in diameter would be capable of transmitting 1,000 horse-power a distance of say 30 miles, an amount sufficient to supply one-quarter of a million candle-power which would suffice to illuminate a moderately-sized town."

"The use of electrical power has sometimes been suggested as a substitute for steam-power, but it should be borne in mind that so long as the electric power depends upon a galvanic battery, it must be much more costly than steam-power, inasmuch as the combustible consumed in the battery is zinc, and a substance necessarily much more expensive than coal; but this question assumes a totally different aspect if in the production of the electric current a natural force is used which could not otherwise be rendered available."

THE ISTHMIAN CANAL.—We read that the construction of this canal work on both sides of Lake Nicaragua will require a total of 20 lift locks of 107 7-10 feet average, which can be distributed advantageously at proper distances apart. A tide-lock is supposed necessary on the Pacific coast, and the indentation of Brito must be made entirely smooth in order to effect a safe entrance or exit from the canal. This coast is so favored by fine weather as to render a harbor for vessels awaiting transit not necessary, but should a harbor be desired, San Juan del Sur is not five marine miles from Brito, and is a good and sufficiently commodious harbor. Commander Lull estimates that the cost of the construction of this work, allowing the usual 25% addition for contingencies, is nearly \$65,000,000. The Commissioners appointed by the President, appreciating the difficulties, delays, and uncertainties that are inseparable from great works, regard \$100,000,000 as a possible expenditure for the completion and effectual working of a ship canal having a depth of 26 feet. Should this sum be sufficient for the construction of the great work, it is plain to all who are conversant with the products of California and Oregon, and their demands from Europe and our Eastern coast, that even with a very low rate of tolls, as compared with the Suez canal, the coasting trade of the products of the United States alone, or the products of both coasts seeking markets abroad, would make an outlay of \$100,000,000 remunerative as soon as the work was constructed.

New Style Suspension Bridge.

There has been a suspension bridge just finished at Pittsburg, Pa., which the *American Manufacturer* says is unlike any other similar structure in the world, and may be briefly described as follows:

The bridge consists of three spans. The center span is 800 feet and the end spans 145 feet each—the total length from back to back of the anchorage being 1,245 feet. The roadway rises from each end, and at the center of the channel is 83 feet above low-water. The saddles on top of the towers, upon which the chains rest, are 180 feet above low-water, and the deflection of the chain is 83 feet. The floor is divided by iron hand-rails into a 21-foot wagon-way, and two six and a half-foot sidewalks. The piers are built of Baden sandstone, laid in cement. The towers consist of four columns 30 inches square, braced together by lattice-work, and are of wrought iron, except the bases of the columns. The saddles on top of the towers are of wrought iron, and are on steel rollers, to allow for changes caused by variations of temperature, etc. There are two chains, one on each side of the bridge. The links are formed of from 11 to 14 bars, 20 feet long and eight inches by two inches to eight inches by one inch in size, and are connected by six-inch pin bolts, the same bolts also connecting the links. The bridge is stiffened by means of rigid chords, which extend (above the chains), at an undeviating angle, from the towers to the center of the middle span, where they are connected by a hinge, to allow for expansion and contraction. The material used: Timber in foundations, 4,442 feet, board measure; masonry in anchor walls, 10,868 cubic yards; masonry in piers, 7,507 cubic yards; iron in foundations, 12 tons; wrought iron in superstructure, 2,084 tons; cast iron in superstructure, 52 tons; steel in superstructure, 32 tons; timber in superstructure, 810,000 feet, board measure; number of links in the chains, 1,832. The cost of the bridge was \$525,000.

SUBMARINE FRESH WATER WELLS.—M. Toselli, of Paris, to whose inventive fertility are due some of the most ingenious apparatus yet contrived for submarine engineering, proposes to utilize the fresh-water springs at the bed of the ocean for the construction of mid-sea watering stations. The apparatus is in effect a portable artesian well, and consists of a heavy bell, sunk inverted over the spring, and carrying one end of an elastic tube, the other end of which passes through a hollow buoy at the sea-level, and delivers the fresh water at a height corresponding to that of the source of the spring. M. Toselli states that when he has been exploring the bed of the sea he has noticed water bubbling up through the sand, and on one occasion, in the harbor of Marseilles, measured the temperature of a thermal spring, over which his *talpa marina* was suspended. At the exhibition that is to be in 1878, M. Toselli will erect, by share-subscription, an immense aquarium, large enough to serve for experimental illustration of the numerous and most ingenious appliances he has devised in aid of this branch of engineering science.

PROPOSED IMPROVEMENTS IN VENICE.—Among the engineering projects of "New Italy," is one of Giovanni Antonio Romano, for restoring, at least in some measure, the commercial prestige of Venice. His plan embraces an extension of the railway to the eastern extremity of the island La Giudecca, the building of moles, embankments, wharves, storehouses, yards, docks, stations for passengers and freight, and the union of the State, the Venetian Commune and the Chamber of Commerce, in joint guarantees of bonds for construction, as well as in equitable division of the revenues. He represents Venice as the most accessible port for Switzerland and Western Germany, while it might treasonably hope to compete successfully for a large part of the commerce of Eastern Germany. If proper arrangements are made for deepening the channels and keeping them clear, the double approach by Malamocco and by S. Nicolò di Lido, will make the harbor one of the most accessible as well as one of the best in the world. Commercial enterprise, combined with a judicious and liberal policy in the removal of restrictions and in furnishing facilities for trading vessels, ought to invite to such a harbor a large traffic with America, Asia, Africa and Central Europe.—*Il Politecnico*.

THE DETROIT RIVER TUNNEL.—The committee, to whom was assigned the duty of receiving and examining plans and proposals for the construction of a tunnel under the Detroit river, reports to the Detroit City Council that four classes of plans or proposals were received: 1. For tunnels excavated by the usual process of drifting. 2. For tunnels excavated wholly or in part by means of caissons. 3. For submerged tubes, placed entire or in sections. 4. For machines for excavating. After a careful examination the committee were unable to recommend as feasible any but the construction by drifting or by caissons. They believe that the method by caissons is impracticable, the great difficulty being to make water-tight connections. As to the location they express no opinion, but recommend that the first step towards the building of the tunnel be the making of careful surveys of the river and tests of its bed. They believe that an immediate commencement would be decidedly in the interest of Detroit.

STEAM ON THE CANAL.—"W. W." writes to the *Inter-Ocean* as follows: "The Illinois boatmen have solved this problem, and practically demonstrated that steam power is far superior to horse power in every respect for canal use. The propeller and barge system has superseded horse-boats, and carry grain and lumber so cheap that the railroads cannot touch it. This great saving in time and cost of transportation is accomplished by running two boats with one crew. The propeller pushes the barge, which is fastened with rigid couplings, and holds the two boats as firm as one boat. In this way there is but one break in the water, and the two, when coupled together, run steady and steer easier than the propeller alone. The propeller and barge clears from \$300 to \$500 per trip, when a horse-boat can't clear a dollar. The propeller and barge are perfectly independent. They help themselves in the canals, rivers and harbors, and the instant they are boarded proceed without looking for teams, tugs and waiting on other captains' orders. The Illinois Canal Commissioners' report of 1876 shows that nearly all the freighting is done with steam canal-boats. They also say that the propeller and barge doubles the capacity of the canal. The tolls on the Erie canal are reduced to only a half mill per 1,000 pounds per mile on all kinds of grain, while the Illinois canal-boatmen must pay two mills per 1,000 per mile on grain."

THE HOOSAC TUNNEL COAL ROUTE.—A dispatch from Scranton, under date of the 8th inst., says: "The joint committee of the Massachusetts Legislature on the Hoosac tunnel, accompanied by C. F. Young, General Manager of the Delaware and Hudson Canal Company, and a number of railroad officials, after a brief glimpse of the anthracite resources of the Lackawanna valley, left Scranton by special train for Binghamton this evening, and will proceed to Buffalo to-morrow over the Erie railway. They speak favorably of the proposed route of the Boston Hoosac tunnel and Western railway, and the prospects are that the project will be carried out at an early day. It will form a new outlet for Scranton coal to Boston and the principal cities of the Merrimack valley, and will connect with the Delaware and Hudson Canal Company's road at Schenectady, affording easy access to all its branches."

TELEGRAPHIC CABLE BETWEEN FRANCE AND ALGERS.—The President of the French republic signed a decree containing his approbation to a treaty passed between the Minister of the Interior and M. d'Erlanger for the establishment of a new telegraphic cable between Marseilles and Algiers. This cable will be placed in position before the Eastern Telegraph Company at the end of April, if the weather permits. This will be the third wire between Algiers and France; the first was laid in 1870 between Marseilles and Bone; the second between Marseilles and Algiers in 1871; the third, that which has been conceded to, will be laid between Marseilles and Bone.

A Rich Old Mill Site.

A few months ago Harrison Gray purchased the wooden shell of the old Union mill, in Gold Hill, opposite the Fountain house, for \$1,000. The mill having been dismantled and the machinery all taken away, the owners thought they were getting a good price for the rotten lumber, and probably laughed in their sleeves at Mr. Gray's greenness. The purchaser immediately put some men to work at the south end of the mill, taking up the flumes and sluices, and came upon the hole in the ground where the waste had been allowed to run when the mill was in operation. This hole had been made at this place because a tunnel was known to pass within a few feet, and the refuse, being in a liquid state, would flow off through the tunnel. The flumes had no sooner been removed than the presence of quicksilver was made apparent. Closer examination revealed the fact that a space of ground, about four by five feet, was permeated with small globules of pure quicksilver, carrying a heavy percentage of gold and silver. This ground was all dug up and sluiced, until a shaft 25 feet deep and six feet wide had been dug, when a connection was made with the tunnel, and a large deposit of quicksilver was found, in such purity that it can be raised to the surface by shovelfuls. The only preliminary work necessary is to carefully skim the surface ground and put it out of the way, when there lies revealed a genuine quicksilver and gold mine. How much of a deposit there is has not been ascertained, as the parties at work there are very reticent, but it is known that between \$8,000 and \$10,000 has already been taken out and sold. A great part of the amalgam carries a higher percentage of gold than of silver, because the mill was running in the early days of mining on the Comstock, when the ores were worked for the gold alone and the silver was allowed to flow off. There is no doubt but that the deposit will be found to continue to the bedrock, which is probably 50 feet deeper than has yet been attained in the tunnel. For about three months there were five men employed there, and the yield was about 60 pounds of amalgam per day, but since connection has been made with the tunnel only two men have been employed, who take out about 40 pounds of quicksilver per day on an average. Parties who are anxious to get old mill sites off their hands will probably be more careful in future and examine them well before disposing of them.—*Virginia Chronicle*.

The Blue Gravel Country.

Last Monday, in company with a friend, we visited the new mines in the neighborhood of Nelson Point. Coming back over the Middle Fork bridge, the trail leads down the river a half mile to the Blue Gravel company's new works. The present company purchased the claim from the original locators last year, and, thoroughly satisfied with the prospects developed by the first tunnel, have since been engaged fitting up the mine. They will do their work from a large shaft, 80 feet in depth, and considerably above the high water-mark of the river. A ditch dug from Willow creek furnishes the necessary power to run a "hurdy wheel," which does the pumping and hoisting. Between 300 and 400 feet above the shaft-house a capacious reservoir has been built, and from this the iron pipe conveys the water to the wheel, the pressure being 180 feet. An inch nozzle is used on the pipe, and with this pressure the little 14-foot wheel "hums like a top." The water is pumped from the bottom of the shaft and empties into a tunnel, which carries it out into the river. It may be well to state that the bottom of the blue-gravel channel is several feet lower than the present river channel, which makes it necessary to work through a shaft. The pump works splendidly, and will clear the mine, at present, in 15 minutes, of the water which comes in a day. The dirt is hoisted into cars, which run on to the "cage," and for a smooth working arrangement in the hoisting line, we never remember to have seen this one equaled. One man is all that is required to manage the machinery and attend to the cars. The touch of a lever sends the cage and car down the shaft, and at the bottom the car is run to the drift for its load and back to the cage. Another touch of the lever, and it comes rapidly up the shaft, stopping just at the right place to join the track to the outside track, and the car is pushed to the dump, which is only a few feet away. By using two cars and two men above, we are assured that the machinery will keep 100 men at work in the mine below. The car brings up 2,500 pounds of gravel at a load. The wash-flume extends down the river from the shaft-house, and a capacious reservoir supplies the water. A waste-flume from the upper reservoir keeps the lower one full. Everything about the works indicates that the company are making arrangements "to stay," and intend to be thoroughly prepared before going into the drifts. The plans were made by Mr. John Porter, and the work has been entirely under his management. He is surely a mechanic, and a good one, and the machinery, although new, runs as regularly and smoothly as a clock. The whole cost of the improvements up to the present time will not exceed \$6,000. Work was to commence in the drifts on Tuesday last, and the force of miners will probably be increased as fast as room is made for them below. We have often spoken of the rich prospects of this mine, and have every faith that the company will prove it to be one of the best in the northern part of the State.

After a couple of hours pleasantly spent in looking over this mine and improvements, we crossed the hill to the adjoining claim, the Franklin. Here we found the Superintendent, Mr. Knapp, who, with an extra man or two, is keeping the water pumped from the shaft, and awaiting orders from headquarters below. The Franklin shaft is now down about 80 feet in the lava cap which covers the blue gravel. They expect to have to sink about 60 feet further to find bedrock. A splendid steam engine furnishes them with pumping and hoisting power, and Mr. Knapp, who is a practical engineer, manages it with the ease which an old-line stage driver would a "mustang." The water raises about eight feet an hour in the shaft when the pump is not running. Everything looks like business around the Franklin works. Several hundred cords of wood are piled up and ready. Mr. Laoy, of San Francisco, one of the principal owners, is expected every day, and the work of sinking will soon commence. There is little doubt but that the gravel will be found, and the company have decidedly good prospects for a very valuable mine. We have an abiding faith in this section of our country, and predict that the two companies now at work will, during the coming summer, demonstrate that the blue-gravel strike at Nelson is the most important gravel discovery ever made in Plumas.—*Plumas National*.

THE SESPE OIL REGION.—Captain Westley Roberts, Superintendent of the Los Angeles and other oil claims located on the Little Sespe in town on Tuesday, and reports everything working smoothly in that section. Work on the road to these claims has been rapidly pushed, and a good wagon road is now completed to the Los Angeles claim, to which the company expect soon to obtain a patent. Several shafts have been sunk on this claim, and a good quality of oil struck. A tunnel is now being run into the side of a mountain, which already yields between two and three barrels of oil per day, of a fair grade. There is now on the ground a tank with a capacity of 500 barrels, and 750 feet of pipe have been put down. We are informed that a complete outfit of drilling apparatus has been ordered by this company at the East, and is now on the way out. The outlook for the speedy development of valuable oil territory in the Sespe region is certainly encouraging.—*Ventura Free Press*.

The Chloriders.

What the early miner, with his pan and rocker, seeking after gold in the shallow gulches or crevices of bedrock laid bare by rushing waters, was to the early days of life in the California mines, so is the chlorider of eastern Nevada to this section, with this possible difference, that the gold was easier to find and required less labor in the seeking than the bright silver concealed and distributed through veins of ore. But there is the same independence of calling, a throwing off of the yoke of daily wage, an element of glorious uncertainty that knows not its ultimate reward, but is ever cheered by seductive hope and a chance to do better than the servile crowd who prefer four dollars per diem and a surety of a pay-day monthly. The chlorider is not at his best, in Kureka, as the character of our ores do not promise great gains without steady and well-directed development, and it takes capital as well as labor to prosecute work to any extent. Still, Prospect mountain furnishes a limited field for the independent miner, and numberless locations are worked, and the accumulation of ore sold to the different smelting furnaces by companies of three or four sturdy fellows who rely on their superior knowledge and capacity for selecting and developing these small properties, and the consequent larger returns for their labor.

There is one district in the county where the chloriders exist *pure et simple*. We refer to Mineral Hill. The deposits in that district are in a limestone formation and occur in nests or cavities in the rock. Outside of the first discovery, which was the largest ever found on the hill, and which paid enormously for a time, there has never been any large deposits met with, although the hill is permeated and honey-combed with small streaks and cavities, containing, when found, masses of decomposed ores and chlorides that assay away up in the hundreds. Here is the chloriders' paradise. Whether he holds ground of his own, or on the other hand, as is the custom to a large extent, leases it for the consideration of a percentage of the net returns to the owners thereof, the process is the same. All that is necessary is the presence or a thin clay seam or a mere stain in the hard limestone to encourage these hardy miners in their labors, for they know that by following it through the rock that it will eventually widen out into a cave that is sure to contain more or less ore, and nine cases out of ten the ore is of so high a grade that even a ton of it will repay for the labor expended. It does not take much ore at from \$1,000 to \$2,000 a ton to pay wages to a couple of men for a year's work, and if, as is sometimes the case, there are eight or ten tons in the deposit, small fortunes are realized. The excitement and uncertainty of this branch of mining is very seductive, but it is a fact that in every instance where it has been followed perseveringly the reward has been greater than could have been realized in any field that unaided muscle could have entered. There are some 75 men engaged in the work at the hill, and we venture to say that a more respectable or intelligent set of miners cannot be found in any part of the world.—*Eureka Sentinel*.

Resources of Eastern Oregon

That eastern Oregon is gradually looming up as one of the best fields in the country for the investment of capital cannot be questioned. Her mines, her soil, the vast extent of rich grazing lands, the forests of fine timber in many sections, with unequalled water-power facilities all combined to make this country one of the most desirable for profitable labor that the sun ever shone upon. In the natural course of events it must be impossible for such a region to remain occupied by a sparse population for any very great length of time. When we reflect upon the fact that in the East and West the army of unemployed men is numbered by hundreds of thousands, and that the number who plod along from year to year and make but a bare livelihood, is still greater, we find no element of comfort in contemplating the existence of that shortsighted policy, dictated by legislative parsimony which is instrumental in keeping these vast unproductive fields in the condition they are at present. With even limited means and a small stake, men of energy could find locations in eastern Oregon and Idaho that with moderate diligence and toil, would, in a few years, place them beyond the reach of want. But the leading source of wealth in that section of the country to which we designed to call attention at the present time is undoubtedly to be found in its magnificent mineral resources which present a most promising and inviting field for the capitalist. With such mines as the Monumental, the Virtue, and those at Connor creek and other parts of eastern Oregon, there is a foundation from which increased wealth, population and prosperity must be an established certainty, if a system of liberal development be pursued. We regard the outlook for that section of the country as most promising. Many of the gentlemen who are interested in these mines seem to be made up of the right kind of material and with their go-ahead instincts the country will soon take a fresh stride forward. The mining interests of eastern Oregon are certainly looking up, and we congratulate all interested upon the near approach of more decided prosperity.—*Owyhee Avalanche*.

USEFUL INFORMATION.

Market for Petroleum.

The fact that the Eastern petroleum producers are making a market for their oil in the East Indies, should remind our oil men that the East Indian demand is theirs by proximity. We find the following in the *Iron Age*: "The steamer *Spartan*, which sailed from New York recently, for various ports in Java, is said to be the first steamer dispatched from New York for the East Indies by way of the Suez canal. The venture is not only novel as to the route, but is otherwise a novelty. Her cargo is nearly 400,000 gallons of refined petroleum; the first cargo exclusively of oil ever loaded in an ocean steamship. It is packed in 10-gallon cases, enclosed in wood. The steamer will stop at Gibraltar and Port Said for coal, and is expected to complete her voyage in 40 or 45 days. There has recently sprung up a lively demand for petroleum in Java. This caused large shipments to be made during January and February in sailing vessels that will require four or five months to complete the voyage around the Cape of Good Hope. The cost of the oil was at that time 35 cents a gallon, and with the freight and insurance it will be landed in Java at 39 to 40 cents. Since then petroleum has declined. The cargo of the *Spartan* cost but 23 cents a gallon, and, although the freight by steamer is much more than by sailing vessel, it can be landed in Java for 29 or 30 cents a gallon. Thus the cost is 10 cents cheaper than the cargoes previously shipped, whilst, if all goes well, the owners of the steamer's cargo expect it to arrive out before the others, and thus reap a large profit. By May 1st the steamer ought to be at Javan ports; but the sailing vessels cannot get there before the middle or close of the month. These facts lend additional interest to the voyage."

TO RENDER PLASTER-CASTS WATER-PROOF.—Mr. R. Jacobsen gives in a German paper, the following method for preparing gypsum molds so that they will permit being washed: "A neutral soap of stearic acid and caustic soda is prepared and dissolved in about ten times its weight of hot water. The molds or objects are either coated with, or immersed in this solution. By this procedure the color or the object is not affected, it is rendered impervious to moisture, and permits the object to be washed, even with lukewarm soap water; since stearate of potassium is only soluble in hot water. Soap water is entirely superfluous for washing gypsum casts; warm water is all that is requisite. Ordinarily, molds, etc., are cleaned of dust and dirt by means of soap water. This removes the dirt, but leaves, in its place, a film of soap, which most readily collects and retains dust. This same difficulty is presented by gypsum that has been impregnated with a solution of alum and stearine. A coating made with a solution of stearate of alumina in benzole behaves in a similar manner. The gypsum can also be made impermeable to water by saturating it with a solution of oleic acid in benzine; this should be but slightly colored and oxidized. This solution is to be applied to the object when cold, and in such quantity as to completely saturate the gypsum. These objects are not to be cleaned with soap water, since this would take up the oleic acid, but should be wiped with a cloth, moistened with the acid. The first described method gives the best results, and is especially to be recommended in voluminous castings."

NEW USES FOR ROCK-CRYSTAL.—In a recent note to the Berlin Chemical Society, says the *Journal of Chemistry*, Herr Stein proposes some new applications of this substance. It is very suitable for balance beams and scales. These should be very light. Now rock-crystal has a sp. gr. of 2.65, and so it is nearly as light as aluminum (2.61). But its superiority to aluminum and other substances lies in its not being attacked either by acids or bases, or by air and its moisture at ordinary temperature. It is rigid, and does not bend with ordinary weighting; the limit of elasticity is near the limit of fracture. Again, divided circular discs for use in telescopes, theodolites, quadrants, and the like, might be made of rock-crystal, which is very unalterable. Rock-crystal may also be used to make an invariable normal thermometer (for which a prize has been offered by a Prussian society). The crystal is bored out and polished, and the open end bored wider for the mercury reservoir; in the outer end is inserted an airtight conical stopper of rock-crystal. By means of a piece of iron in this stopper it is moved with a magnet under the air pump when the thermometer is being filled. In free air, the thermometer remains closed by the air pressure itself. Such an instrument does not alter either in length or width.

EFFECT OF SUNLIGHT ON FLOUR.—It is maintained, says the *Millstone*, that the inferior quality of certain kinds of wheat and rye flour is frequently due to the action of sunlight on the flour; even when in bags or barrels the gluten experiences a change similar to that occasioned by heating in the mill. The tendency thus imparted to it, to become lumpy, and to form dough without toughness, is similar to that of moist grain, or of flour when it is too fresh, or made from grain ground too early, or when adulterated with cheaper barley meal. Such flour can be improved by keeping some weeks.

CLEANING WATCHES.—A perfect cleaning of the pieces of a watch after repairing is an absolute necessity, not only for preserving the parts, but also for preventing the rapid deterioration of the oil, which is the inevitable result of bad cleaning. Several watchmakers have noticed that the oil is preserved intact longer after washing with soap, if well done, than after cleaning with benzines, etc., though in some instances, it may be that the latter process was not properly performed. However, the following is the method adopted for some years by M. A. Bertrand: Dissolve in about a quart of rain-water a piece of Marseilles soap, about one and a half inch square, pared very fine, and add a piece of black soap the size of a hazel nut. Boil, filter through a linen rag, and bottle the liquid. When required for use pour a little into a capsule and place the parts (excepting those fixed with gumlac) in it, boil it slightly, and having put back the liquid in the bottle, pass the parts through rain-water, slightly boiling, and then plunge them in alcohol. On taking them out, dry them with a linen rag. By this means the pieces are much better cleaned than they would be if benzines were used. Should the polished wheels turn a little brown, it may easily be made to disappear by passing lightly over the stained portion, and without touching the steel, a pencil-brush dipped in water mixed with oxalic acid (oxalate of potash, commonly called salts of sorrel), and dipping in water and alcohol, if necessary, it may be touched up with a dry chamois leather.—*Revue Chronometrique*.

SOLVENTS OF INDIA RUBBER.—The following upon the solvents of caoutchouc or india-rubber is very valuable: Of the solvents of caoutchouc, its distillate, caoutchoucine may be placed at the head of the list; the others best known are pure chloroform, carbon disulphide, rosin, oil and coal naphtha, rectified oils of turpentine, gutta percha, tar, lavender, sassafras, ootene, rosemary, amber, ambereupion, terebene, benzine— $C_{10}H_8$ —hydrochlorate of terebene, benzole— $C_{10}H_8$. Anhydrous oil of turpentine dissolves 49% of caoutchouc. A mixture of 6% to 8% of absolute alcohol and 100 of carbon disulphide is an excellent solvent. Sulphuric ether, which alone is but a poor solvent, dissolves rather more if about 5% of anhydrous alcohol be added thereto. Hot alcohol dissolves out about 4.712% of a soft resin. It is sparingly soluble in hot fused oil—hydrate of amyl $C_{10}H_{21}HO$; readily at a gentle heat in melted hog's lard or in very hot whale's oil. After swelling up in oil of turpentine or in naphtha it is soluble in hot linseed oil.

MAKING WOOD STRONGER.—Soaking wood at 80° to 100° C. in linseed oil for two or three days increases its resistance to fracture. Throwing the pieces to be treated into a kettle, in which linseed oil is being boiled, and leaving them in it for a few days, is better still. This is a good remedy when the wood has to be exposed to moisture; when it is to be kept in a dry place, it is better still to soak it in a boiling solution of glue. This penetrating the pores, makes it stronger still.

GOOD HEALTH.

Sprains.

EDITORS PRESS.—An extract from *Hall's Journal of Health*, which appears in your paper on the subject of sprains and how to treat this ailment, brings out this correspondence from one who is not a graduated M. D., but has from his youth given considerable attention to the medical and healing art, and would like to speak of sprains and some other matters pertaining to health, while your correspondent believes that the time has arrived to freely discuss the subjects herein presented. And the writer thinks that he may truly be called a "natural physician," who is the parent to nine very healthy children, and in his own house he has in general been the family doctor. The method of treating sprains, as published, is some respects is well; but I would not advise the application of a stream of cold water to the affected parts, because cold applications often prove very injudicious and injurious to the wounded limb.

In bad cases of sprain about the ankle joints, where dead blood immediately settles, and, of course, swellings inevitable, the part becomes heated and this useless blood must somehow be removed. Hence we advise the patient to keep quiet, remove this collection, guard against fever in the parts, and then the patient is soon out of danger. An application of cold water may reduce a swelling, or relieve pain momentarily, but a reaction usually happens where the cold stimulants are thus applied. Soon after treatment blood centers in those parts which become overheated and dry, the tendons are stretched to their utmost capacity, while fevers and excruciating pains follow.

The patient does not recover until the swellings and pains are removed. Our practice of bathing the parts in water heated to 112° is highly beneficial, and as soon as removed from the bath wipe over, manipulate and dry quick. Then cover with flannel or other bandages, and repeat the process at least three times each day. The cold shower produces heat, while the warm bath and manipulation tends to remove the fever and pains.

Take leaves from the green bark or 'striped

maple' bush, or liberal slices of salt, fat pork, and bind on over the region of pain and swelling. Either application is highly recommended to sweat out the secretions and fever; it removes hard swellings and gathering or pustulation, if applied in season.

After the part has been immersed or showered, either with cold or hot water, it is more beneficial to dry off by the hand movement, passing down or outward. This will restore severe cases to strength and health.

S. W. JEWETT.

Bakersfield, Cal., April 17th, 1877.

HEALTH IMPROVEMENTS IN GREAT CITIES.—On this subject Dr. Richardson, F. R. S., has recently delivered a lecture at the London Institution, in which he gave further illustration of the high views he entertains in regard to house sanitation. He considers that for purposes of health the houses in England require to be rebuilt or remodeled, from Land's End to Hebrides. Dr. Richardson entered into the history of ventilation from the time of Stephen Hales, in 1733, to the present day, and explained the different discoveries that had been made in the various branches of science bearing on the health of towns, all modes of construction were of necessity imperfect. He called attention to the influence of water, dampness, light and darkness, etc. The effects of light deserve special notice. Having got from India some poison of the cobra, on ivory points, he discovered that on some of those which had been exposed to the light, in a glass bottle, the poison had become inert, while on others that had been wrapped in paper, in the same bottle, the poison retained all its deadly activity. He hence argued that, if sunlight exercised such power on the poison of the cobra, it might by analogy destroy the poison of small-pox, scarlet fever and typhoid. He considered that pure air and water, freedom from damp, pure daylight and equal temperature were essential.

DRINK AND DISEASE.—A recent number of the *Lancet* gives some curious calculations which have been made of the proportional amount devoted by the workmen of Birmingham to the support respectively of their liquor saloons and of their hospitals. The figures bear something like the ratio of 30 to one. Fifteen thousand dollars is contributed annually by them to the medical institutions of the town, and \$450,000 is spent in drink. The *Lancet* further asks: "What proportion does the contribution of the workmen bear to the total expenses of the hospitals? and what proportion of the work of these medical institutions is occasioned by the drink on which they spend so much?" Commenting on the state of the case, the writer says: "We remove every obstacle to as free a consumption of liquor as is consistent with the maintenance of equilibrium, and then, with a benevolent appropriateness, we provide hospitals in which the consequences of drink may be recovered from, or ameliorated." The corrective suggested for this state of affairs is, that the drink sold within a certain area should be so taxed as to defray the expenses of skilled treatment for those whom drink has incapacitated for their work.

DOES MILK CURDLE IN THE STOMACH?—The moment milk enters the human stomach the digestive fluids change it into curd. The cheesy part is separated from the whey, or watery part. We often hear mothers say when their infant vomits up curd, that their milk does not agree with it, that its stomach is sour and curdles the milk, and the curd is very hard. The truth is that the milk in the stomach always curdles before it digests. If it did not curdle it would prove that the stomach was weak. Those infants who are fed at regular intervals are less apt to overfeed than those who are fed at irregular periods. We have found that infants nursed at intervals of two hours are much more apt to suffer from indigestion. Some mothers may ask, why is human milk more digestible than cow's? The principal reasons are two: first, the amount of curd is greater in cow's milk; and second, the curd is harder, i. e., the casein from human milk is more porous, and is on this account more easily dissolved and digested.—*Herald of Health*.

FRUIT FOR A SUMMER DIET.—The *Herald of Health* makes the following timely remarks: "Now that the warm season of the year is at hand, it may be worth while to call the attention of our readers to the fact that, if they wish to keep well, they should add as much fruit to their daily food as possible. It will save doctors' bills, and, what is more important, much illness. Of course there are many who cannot, or think they cannot, eat fruit. The cause often is a spoiled stomach. In such cases it takes time and care to habituate this organ to the change, and sometimes it cannot be done at all. Leaving out such cases, we advise the liberal use of fruit from this time on, wherever it can be obtained."

PRECAUTIONS IN SCARLET FEVER.—The funerals of those who die of infectious diseases should be strictly private. Disinfect the clothes, bedding and room by sprinkling them with a solution of commercial carbolic acid, two parts to one hundred parts of water, or other disinfectants may be used in a similar way. Let the door be closed for several days. Sulphur may be burned in the room sufficiently to fill it with sulphur four times a day. Continue this for four or more days. Then strip off the paper, scrape the walls and ceiling, and whitewash them. Scrub the woodwork with strong soda and a solution of carbolic acid.



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SAN FRANCISCO:

Saturday Morning, April 28, 1877.

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OLD NEVADANS.—We have received a card announcing the second re-union of "Old Nevadans," at Badger's park, Oakland, on Saturday, June 9th. The occasion will doubtless be very enjoyable to all of old Nevada memory. Full particulars concerning the re-union can be gained on application to the Secretary, C. C. Leavitt, at the Custom House, San Francisco, or P. O. box 987, San Francisco.

WM. M. DONNELL, an old resident of Kern county and one of the discoverers of the Big Blue mine, died in Inyo county last week. At the time of his death he was constructing the Minnietta mill; he met with an accident some time since by the upsetting of an amalgamating pan, and received internal injuries from which he died. He was at one time a merchant in Tuolumne county.

A TEMPERANCE organization has been formed in Washington under the name of "Mrs. Rutherford B. Hayes Temperance Society." Resolutions were adopted indorsing the sentiments of Mrs. Hayes in regard to the use of intoxicating liquors at State dinners, and similar occasions.

FRANK LESLIE and wife and a party of artists and literary men have arrived in San Francisco. It is the intention to remain in this city and State for some time to photograph, write up and sketch everything of note. They are staying at the Palace.

Blasting in Mines.

There is scarcely a week passes that we do not hear of accidents by blasting, in which loss of life occurs. In nine cases out of ten these accidents are due to carelessness; the men apparently forgetting that they are dealing with a deadly explosive. In tamping, the greatest care should be taken, as it is then that explosions most frequently occur.

With Black Powder.

Let the charge be put into the hole; not all at once, but whilst it is being done settle it down two or three times with the swabstick, and when all in, ram it well down with the same tool—not with the iron ramming bar—and cover it tightly and firmly with a piece of dry clay. This done, at once dip the end of the swabstick in water, or better still into the wet sludge that has been made in the process of boring, and with it free the sides of the hole from the dust of the powder, which must of necessity have adhered to them in pouring the charge, and which if not removed will be likely, by a spark from the ramming bar, to carry fire. Then wipe out the hole well with the wet swabstick.

Having done this, put in a large layer of fine, properly prepared tamping, and swiftly and carefully settle it down and "floor" it with the ramming bar alone, using no hammer for the first layer.

A large layer should be put in, because if the first layer be a small one, it will be more liable to be forced down by the ramming bar and disturb the powder; settle down the first layer of tamping in this way, and then, with impunity, the hammer may be used, taking care at the same time to keep the ramming bar free from the safety fuse. It is more important than many suppose that proper material for tamping should be used.

In Europe when working in hard, fiery ground, careful workmen carry tamping with them from home daily, so as to prevent accident. There seems to be a general idea that tamping needs to be driven with great force with the hammer, so that the mallet is sometimes used; but this has been fatally proved as not necessary, for if the hole be judiciously placed, even the hammer, generally speaking, need scarcely be used. On the first layer of tamping being hammered down, explosions frequently occur, and such accidents are generally fatal.

Thus far we have spoken of common black powder; but as Giant powder is used in the mines on this coast to a great extent it is necessary to refer to that also. In charging the hole with

Giant Powder.

Cut the cartridge into sections two or three inches long, and ram each section well home with a wooden tamping bar. Cut the end of the fuse square, push the cap on it until it reaches the fulminate, and then with a pair of nippers press the edge of the cap into the fuse, and in wet holes rub some grease or wax around the cap to make the same air and water-tight in the fuse. To insure a perfect blast, the cap must be squeezed tight to the fuse, for, if loosely put on, the extension will not be complete. Push the fuse, with the cap attached, down the hole until the latter rests on the powder; then put about one inch of loose powder down the hole and press lightly around the cap, so that the cap and not the fuse is imbedded in the powder. Then fill the hole with water, or sand, or clay, or use no tamping at all, as desirable; or a priming cartridge may be used, which means about one inch of cartridge, smaller in diameter than the bore hole, into which the cap, with the fuse attached, is inserted, the whole tied together with a string, and then let the priming cartridge down the hole until it rests in the powder; when loose powder is used, put down small quantities at a time and ram it well home, and use a tin tube with a funnel mouth, to prevent the powder from adhering to the bore-hole. It is of the greatest importance that only the cap, but never part of the fuse, should be on the powder, as the burning of the fuse ignites the powder and burns all up above the cap, before the explosion takes place. From the great strength of this powder, excellent execution is done without tamping it, for certain kinds of work. Experience shows, however, that when well tamped much more work is done, the amount of power gained being in proportion to the excellence of the tamping. The first four or five inches should be tamped lightly, but with the balance no more than ordinary care need be taken.

Should the fuse fail and a shot not explode, remove the tamping to within four or six inches of the powder, put in a heavy primer, and its explosion will set off the main shot. This item should be properly borne in mind and it will prevent many accidents. On no account ever try to pick out a shot of Giant powder, as it is always attended with danger. The No. 2 Giant, used for bank blasting, coal mines, medium hard rock, etc., is charged the same way as above, with the exception that its explosive properties are weakened when brought in contact with water, therefore greater care should be observed in charging wet holes. However, in wet holes a primer of No. 1 powder will always insure a blast. Another caution which should be im-

pressed on miners, is that they should never, under any circumstances, attempt to pick out a charge of frozen Giant powder from a drill-hole, as it is highly dangerous. If these little matters are well attended to and ordinary care taken, there is no fear of explosion and loss of life; and it seems strange that the miners themselves should be as careless as they are, when their own lives are at stake as well as the property of others. Of course, accidents will sometimes occur in spite of all care; but their number can be materially reduced by proper precautionary measures.

Ancient River Channels.

Theory of their Formation.

In our last issue we gave the result of an interview with Mr. H. S. Jacobs, who has lately made an extended trip in the gravel mining regions of California. Regarding the manner in which the channels of the buried rivers were formed, as well as the character of the streams themselves, and the agencies most active in filling them up, Mr. Jacobs entertains opinions not altogether in accordance with the more commonly accepted theories. The channels of these old rivers, he believes, were eroded by fluvial and not by glacial action. These rivers, though of great magnitude and running swiftly, were not remarkable for their length. They had their sources, like the modern river system, in the valley of the Sacramento, and did not head in the far north, traversing some thousands of miles in their course, as some writers on this subject hold; their theory being that the enormous boulders formed in the channels of these buried rivers could have been brought down only by a vast, swift rushing volume of water, and that they must have come a great distance to have been rounded and polished as we now find them. In the great width of the water-worn bedrock, as disclosed by hydraulic and drift operations, we find, as these theorists alleged, further evidence of the immensity of these pliocene rivers. But as this might have been produced by these streams shifting their channels, it does not conclusively prove for them an extraordinary width.

How the Boulders and Gravel were Produced.

This entire country was once submerged by the sea, as is shown by the marine fossils scattered over it. The volcanic action that produced the Sierra Nevada gradually raised the whole country above the surface of the ocean, after which the ancient rivers began to form, wearing out in course of time their present channels. After these were eroded, volcanic and other dynamic movements ensued, crushing the quartz veins that thickly ribbed the Sierra to its top and grinding them into fragments, accumulated along the mountain sides great masses of this gold-bearing detritus. Some of these convulsions, occurring periodically and with great violence, so tilted up the westerly slope of the mountains that immense quantities of these boulders and this auriferous gravel, rendered smooth and sound by previous commotions, were suddenly swept into the old river channels running not far below, filling them up and forcing the water further over towards the west, where it formed for itself a new channel. Through the repetition of this process the several old river beds, forming an irregular and somewhat complicated system, as we now find them, were produced.

The Outpourings of the Volcanoes.

In the meantime, the volcanoes along the crest of the Sierra for a distance of several hundred miles, belched forth at intervals showers of ashes, which, falling into the torrents along the mountain sides, were carried down and deposited in the channels of the rivers, already partially filled up with gravel, clay and boulders, forming with the alumina and magnesia brought down the masses of pipe clay with which the auriferous material is interstratified or overlaid. Following these outpourings of ashes and this flow of other matter, came floods of lava and conglomerate, which, running down the mountain sides, covered up, above a certain line of elevation, both the pipe clay and the entire country, in many places to a great depth.

Other Examples.

The alumina and magnesia, being the lightest materials in the interior of the earth, would naturally be on top of the boiling mass that filled the volcanic craters, and, hence, the first to flow out. Of this fact, Mr. Jacobs, during a visit to the Sandwich islands, learned from an eye-witness a striking confirmation, which occurred during an eruption of Mauna Loa, in the island of Hawaii, where a stream of this material, forcing an orifice through the lip of the crater, shot out like the arch of a rainbow, and, passing over a number of persons without injuring them, fell upon others further down the mountain side with fatal effect. Mr. Jacobs has examined the gold-bearing gravel deposits of Australia and believes them to be coincident in chronology and to have been formed by the same agencies as were those of California.

It is expected that the Suto tunnel will reach the Comstock lode some time in February next.

Early History of the Eastern Slope—No. 5.

The Pioneer Officials of Nevada—James W. Nye.

The following reminiscences, connected with the history of the early officials of Nevada, Territorial and State, may not be without interest at the present day, as some of these personages have since acted a prominent part in public affairs, while others have earned for themselves a national reputation in the walks of literature, a good many of their number having also passed away.

James W. Nye, first Governor of the Territory, and one of the two Senators first chosen to represent the State in Congress, was a native of the State of New York, where he had always lived until he came to this coast. He was a lawyer by profession, and a politician by every instinct and impulse of his nature. At the bar he stood well as an advocate, more especially in criminal cases, in the conducting of which he was remarkably successful, having been engaged in many legal contests with the ablest criminal lawyers of the State. Numerous anecdotes, illustrative of his astuteness in this branch of practice, are related of him, some of these being equal to the best stories told of the American bar. He could be forcible, humorous or pathetic, as occasion required, his style of oratory, both on the stump and before a jury, being peculiarly happy. He never lost his entire self-control, nor suffered his temper to become in the least ruffled. However much his ire might be excited, he never seemed to be angry. He had a way of illustrating his subject with familiar allusions and anecdotes, often quaint and homely, of which he had always a full supply, and possessed the faculty of relating in a manner that never failed of appreciation, whether uttered before the elite of San Francisco, or the rough miners and bordermen of Nevada.

Nye was appointed to the position of Governor by President Lincoln, with whom he was personally intimate. He was a man of powerful build, bold in speech, and brave as a lion—qualities that Lincoln, though himself a quiet and peace-loving man, greatly admired in others.

About the time of the breaking out of the war, Nye, happening to be in Washington, met at one of the leading hotels there a party of Southerners, one of whom, in the course of a general conversation on politics, made some remarks exceedingly disparaging to the courage of the North. Without making any reply, and almost before the words were out of the fellow's mouth, Nye, who had the arm of a Hercules, drew off and struck him such a blow as knocked him senseless, and, for a time, threatened to prove fatal. The man was surrounded by his friends, all, no doubt, well armed, but they prudently refrained from attacking his assailant, who was not only unarmed, but without an acquaintance in the crowd.

This incident coming to the ears of the President is believed to have had something to do with the appointment of a Governor for the new Territory, known to be full of sympathizers with the Southern cause, many of them open and defiant secessionists and all requiring to be sternly dealt with in order to prevent their precipitating a conflict in a country not only without the presence of United States troops, but enjoying scarcely more than the form of a local government. As subsequent events proved, no better choice for the position could have been made, the spirit of disloyalty, before rampant, having been effectually repressed and the affairs of the new Territory well administered by Mr. Lincoln's appointee. Not only so, but Governor Nye was efficiently active throughout the whole period of the war, arousing and uniting the people by those stirring and eloquent appeals, and those lofty outbursts of patriotism, that, being continued after he took his seat in the Senate, gained for him the appellation of the "Gray Eagle from Nevada;" distinguished members of that body having been known to remark that one of Nye's speeches in the Senate was worth a regiment in the field.

Having represented the State for two terms in the Senate, this able and big-hearted man withdrew from public life, and, going East, spent thereafter most of his time in Washington, until about the year 1875, when a painful malady, affecting both his physical and mental health, compelled him to make his home with an only child, a daughter living near New York. Softening of the brain having soon after supervened, he was placed for a time in an institution especially designed for the treatment of this class of disorders. Experiencing no permanent relief he was taken again to his home, where he remained, tenderly cared for until the early part of the present year, when, at the age of about 60 years, his spirit was, by a peaceful and painless dissolution, released from a body that could no longer entertain it well. With the exception of Baker, the demise of scarcely any public man on this coast has been, by the intelligent masses, more deplored than that of Nye; his talents, intelligence and patriotism, his genial disposition and fine social qualities having gained for him friends and admirers amongst all classes. Thousands, both in California and Nevada, have heard of his death with regret, deepened into sorrow, because of the clouded condition of his brilliant intellect before the close of his earthly career.

That Curious Ore from Arizona.

In a recent issue we mentioned the receipt from a correspondent in Arizona, of some curious ore, which attracted considerable attention there, both from its richness and mineralogical peculiarities. It was micaceous iron ore, containing both gold and silver. As there is a remarkable combination of metals not heretofore found, we turned some of the specimens over to Mr. Henry G. Hanks, the chemist and assayer in this city, knowing that his well known zeal in this direction would cause him to make a thorough examination and analysis of this curious ore. Mr. Hanks thought at first that it was a new mineral, but the microscope has proven differently, as the following letter from Mr. Hanks will explain:

EDITHS PRESS:—The sample of silver ore you placed in my hands for examination is identical with a specimen sent to me from Arizona, by Winslow J. Howard, of Prescott, who, in a letter describing the location and source of the interesting mineral, desired me to give it a thorough examination with a view to determine, if possible, the source of the silver, which it was found to contain in considerable quantities.

No mineralogist, in examining this mineral, would suspect the presence of silver in it, yet the assayers of Arizona—where already have congregated some of the best assayers on the Pacific coast—have united in pronouncing it rich in silver. The following extract from the *Arizona Miner* of February 24th, gives an idea of the mine in which the mineral is found and also the result of the assays referred to:

"The Sumner is better known to the public as the plumbago, stove-polish or micaceous iron mine, than by its proper name, and is situated about a mile south of the Senator gold mine, of S. G. Fredericks & Co., and three-fourths of a mile east of the Davis mine, 15 miles south of Prescott, on the very head of the east fork of the Hassayampa. Messrs. Demoché & Bigelow have been working on the mine for two months past, and have run an open cut into the vein, to cross-cut it at right angles, 50 odd feet in length; the last 26 feet being in the vein, five feet wide and 24 feet deep, and they have not yet reached the hanging wall of the ledge. The whole of the vein matter is permeated with streaks and threads of mineral, all carrying more or less gold and silver, which all run into one well-defined pay streak, which is encased in soft, green soap-stone, and varies in thickness from the surface to the bottom of the cut mentioned from two to 11 inches, the thickest portion of the ore being the richest.

"The following assays are from average samples of the ore as assorted on the dump, calculated per ton: No. 1. Silver, \$296.57; traces of gold. No. 2. Silver, \$122.51; gold, \$1.25—total, \$123.76. No. 3. Silver, \$72.90; gold, \$5.02—total, \$99.27. No. 4. Silver, \$43.98; no gold. No. 5. Silver, \$4.70. No. 6. Silver, \$3.14.

"The above assays were from Mr. Blake, the Nos. 5 and 6 being ore taken from the threads mentioned outside of the pay streak, and the four first from the ore stacked up for reduction, as are the two following by Mr. Kelley: No. 1. Silver, \$113.13. No. 2. Silver, \$181.

"A choice lot of ore was sent to the Pinal company's works at Walnut Grove, from which Mr. Geo. T. Hogle made an assay, which yielded in silver, \$2,252; gold, \$25; total, \$2,277, which is the highest we have heard of from this very peculiar ore.

We are informed that Mr. Kelley has made tests of the ore for the purpose of ascertaining the proper method of working, and has reported that it is not milling ore—a fact rather discouraging to the mine owners, for though the average value of the assays would leave a margin if it could be worked at the Senator or Aztlan mills, near the mine, it will hardly stand transportation 30 miles to the Agua Fria smelting works, and the charge of \$75 per ton for smelting. Specimens of the ore have been sent to San Francisco for analysis."

My first step on receiving the ore was to verify the silver determination of the Arizona assays. The result of my assay from a carefully prepared average showed the presence of 84 ounces to the ton of 2,000 pounds.

A chemical and physical examination shows the mineral to be the variety of hematite known as micaceous iron. This mineral containing silver is, as far as I am informed, unknown to science. A chemical analysis would, no doubt, warrant the announcement of a new mineral species; and I will not deny that I selected the name "Arizonaite" from many others as being both appropriate and euphonious, should the mineral prove to be new; but a microscopic examination showed me at once the source of the silver, and that instead of being a new mineral species, it was only a mechanical mixture of two well known minerals. The plates of specular iron are interstratified with a yellow amorphous mineral, which is probably iodyrite or iodide of silver. The quantity of the silver mineral is in such small quantities that I have not been able to isolate the iodine, but its appearance under the microscope and the indirect reactions obtained leave but little doubt. When larger quantities of the mineral can be obtained it will be interesting to determine the silver mineral with certainty. A better example of the importance of the microscope in the determination of mineral could scarcely occur. Iodide of silver has been found in the Cerro Colorado mine in Arizona, as stated in "Dana's Mineralogy."

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

There is still a heavy flow of water from the 650-foot south level in the Comanche, and also in the stopes and breasts.

The Hale & Norcross, Savage and Gould & Curry are still fighting the water.

They expect the 1750-foot level station in the C. & C. shaft to be set in about the 1st of May.

The cross-cut in the bottom of the winze of the Modoc now shows the ore to-day to be 17 feet wide, with the face still in fine ore. Work is slow as they have to hoist the ore 108 feet by hand.

The drifts in the 1700-foot level of Best & Belcher are being pushed ahead as fast as possible.

They are hoisting 250 tons of ore per day from the 1650-foot level of the Con. Virginia and expect soon to increase this amount.

In the Gila mine the shaft has passed through the porphyry and is now in the red conglomerate which overlies the lime.

The Golden Chariot is running on custom ore until the road will admit of hauling. Developments in the 6th cross-drift of the mine promise an extensive body of ore.

The face of the main drift 2900-foot level of the Crown Point mine is in low grade ore.

Last clean-up of the Eureka (G. V.) mine was 230 ounces of amalgam.

The ore body in the Electric is still 20 inches wide.

On the 22d inst. they had 35 feet to sink in the Ophir main incline to reach the 1900-foot level.

The indications for ore in the Eureka Con. mine continue encouraging.

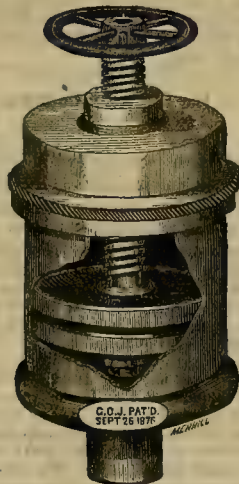
In the Justice the 700 and 750-foot levels, the lateral drifts, present their usual fine appearance as well as the ore-producing stopes from 400 to 800-foot level.

The Belcher is taking out the usual amount of ore, which will pay a little more than the whole expenses of the mine.

They have 250 tons of ore at the mill and 150 tons on the dump at the Grand Prize mine.

Improved Lubricating Cup.

The accompanying cut shows Johnson's patent lubricating cup for journal boxes. The lubricator consists of a cylinder truly bored, to which is fitted a piston. The piston is forced



JOHNSON'S LUBRICATING CUP.

downward by means of a threaded stem passing through a removable cover or cap, with a hand-wheel on the outside. The lower end of the stem is made conical and fits a conical seat in the piston. The conical end is longer than the thickness of the piston and projects a short distance below it, thereby allowing the piston to drop if by any means the journal should become heated; an air hole in the cover, in that case, allowing air to pass through the piston.

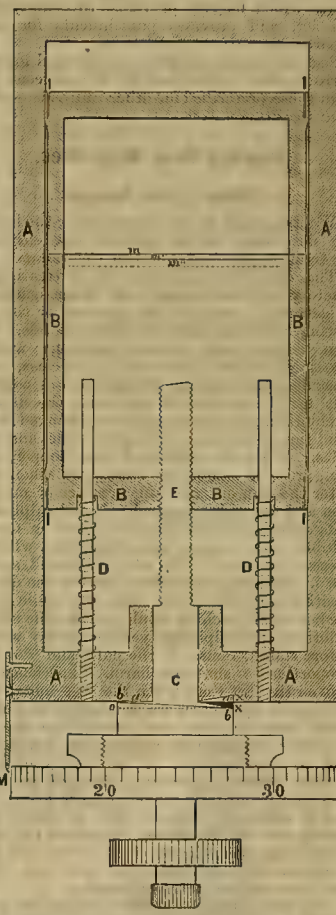
These lubricators are neat, compact and well made. To apply these lubricators a thread is cut on the nipple and screwed into the cover of the journal. Before opening the cup for filling, the piston should be withdrawn to the top of the cup, then remove the cover, fill the cup, replace the cover, set down the piston by means of the hand-wheel until there is a pressure on the grease. Any kind of grease or compound of proper density can be used. It is a well known fact that by using any compound that by its density is retained on the journal, a large percentage of the cost of lubrication can be saved. By using these lubricators, a denser and cheaper compound can be used, than can be made to feed automatically. These lubricators are not claimed to be automatic feeders; the hand-wheel has to be moved downward, and no rule can be given as to the length of the intervals, as that depends upon the amount of friction and quality of the compound used. The engineer or person using the cups can easily regulate that according to circumstances. The lubricators are made and sold by the inventor, Geo. C. Johnson, Bracket street, Portland, Me.

Mechanical Defects in Micrometers.

(Read before the California Academy of Sciences, by Prof. George Davidson, U. S. Coast Survey.)

Some years since, I detected an apparent irregularity in the value of different parts of each revolution of the micrometer screw, and the irregularity or error was sensibly the same for each and every revolution. This peculiarity can be detected in regular astronomical observations by observing upon an object, for instance a close circumpolar star, with the micrometer placed systematically at different parts of each turn or revolution of the screw. It cannot be shown at observations at the whole turn only. It may not be shown by observations upon each half turn; but when observations are made at each fourth or fifth of each turn through a series of turns, the peculiarity of error is developed.

One or two hypotheses has been proposed to account for the error, but they were unsatisfactory, and I am led to the main source of error by careful examination, experiment and study. I found other sources of error, but none that gave a periodicity similar to that which I am about to describe. For example: the frame moved by the micrometer screw and carrying the micrometer thread, did not move smoothly and regularly in the micrometer box, $A A A A$, so that I saw a split in the frame at each angle, and thus formed the four light springs, $I I I I$. These press sufficiently against the sides of the



IMPROVED MICROMETER.

micrometer box to insure steady motion forward and backward.

In my examination of the working parts of the micrometer, the bearing, $a a'$, showed clearly that the shoulder, $b b'$, of the micrometer screw touched it in one place extending through an arc of not over 40° . Now it is evident that, notwithstanding such a projection as x may exist on the bearing, $a a'$, yet if the shoulder, $b b'$, were in all its parts a plane at right angles to the axis, c , as indicated by $b c$, and also if C fitted perfectly into $A A$, then the movement of the frame, $B B$, by the turning of the micrometer screw would, *cateribus paribus*, move uniformly throughout every part of each revolution.

But with such a projection as x existing, and likewise any inequalities existing in the plane of the shoulder, $b c$; and also, if the plane of the shoulder, as in the line, $b b'$, not at right angles to the axis of C ; then irregular movements of the micrometer thread, m , will take place, and these irregularities will be systematic for each and every turn.

If instead of the elevation, x , on the bearing surface, $a a'$, a depression existed under conditions analogous to those specified, then irregular movements of the micrometer will also take place. With a projection, x , on the bearing surface, $a a'$, suppose the plane of the shoulder is $b b'$, not at right angles to the axis of the micrometer screw and that for illustration, it stands as in the drawing, whilst the micrometer thread is standing at m . Now revolve the micrometer to the right one-half turn, until b' is placed over x . Did no projection, x , exist, the

micrometer frame would have been drawn downwards one-half the distance, a part of the threads of the micrometer screw, and the micrometer thread, m , would have been brought to m' ; under such conditions, the transit of a star over the thread at m and m' would have given the value of one-half revolution of the micrometer screw.

But the projection, x , existing, and the half turn being made, the part of the shoulder at b' is brought over x , and the micrometer screw, E , together with the micrometer frame, $B B$, is brought down bodily a distance equal to the height of x , so that the micrometer thread is not moved simply from m to m' , but from m to m'' , and the transit of a star over the thread at m and then at m'' would have given an erroneous value of the half-turn of the micrometer screw.

And similarly we might follow the movement of the micrometer through the other half of the turn, and in fact through every part of the turn. Also, we could trace the analogous action had there existed a depression, x' , instead of the elevation, x . The case I have presented is the simplest exhibition of this mechanical defect. It becomes complicated when a series of irregularities exist on the bearing surface, $a a'$, and in the shoulder, $b c$, of the micrometer screw. This examination and this explanation of one fertile source of irregularity in the value of the micrometer divisions in every turn suggests that the shoulder, $b c$, should be larger than ordinarily exists, and that in the final touches to the micrometer by the maker, the shoulder $b c$, should be ground upon the bearing surface, $a a'$, when the screw is in the position it will occupy when at work. Ordinarily the bearing surface is brass and the shoulder steel; but it appears to me that the bearing should be agate and the shoulders of steel.

It also suggests the idea that in all slow motion screws and in all tangent screws this source of error is more than likely to exist.

It will exhibit itself in tangent screws by the unequal and irregular action so frequently experienced by the observer when making the final touches to the delicate pointing upon a very small and sharply defined object.

In some observations upon *Ursa Minoris* to determine the arc value of the micrometer divisions, the time of the star's passage across the micrometer thread was noted when the screw was at the zero of each turn at the 25th, the 50th, and the 75th division. The following results were obtained from means of nearly 38 transits.

From the 0 division to the 25th, 44.2 sec.; from the 25th to the 50th division, 45.4 sec.; from the 50th to the 75th division, 39.2 sec.; from the 75th division to zero, 35.0 sec.

As the value of one revolution of the micrometer screw represented nearly 45° of arc, this time interval reduced in the proportion to the whole time interval would represent an arc, the following values:

From zero to the 25th division, 12°
From the 25th to the 50th division, 12.5
From the 50th to the 75th division, 18.8
From the 75th to zero, 9.7

With these data, and knowing the number of threads of the screw to the inch, we can readily compute the height of the irregularity. In other cases it was about the 1-2,600th of an inch.

Were it practicable to observe every eighth of a turn of the micrometer, still more accurate results could be derived for the proper correction necessary at any given reading from 0 to 100 in each turn.

But I suggest a much simpler, more available and probably a more satisfactory method by adjusting the micrometer over a finely ruled glass plate, and making a series of readings upon each line of the plate with the micrometer. These will not give absolute values of the error in the screw, but they will afford relative values throughout, and these relative values can then be applied to the absolute value obtained by astronomical methods for each whole turn.

It is not overlooked in this method of determination that the micrometer movement used to make the original rulings upon the glass plate may itself have a systematic error depending upon similar causes.

But upon making measures upon different parts of the ruled plate, its consistency may be determined, and, if found perfect, the method is open to no objection. It is a possibility, but barely a probability, that the micrometer screws may have the same systematic error, and the value of the telescope micrometer thus appear uniform. This may, however, be tested by reversing the ruled plate and making the measurement as before.

Asbestos is now used for a great many purposes, and nature seems to have formed it to be specially adapted to man's necessities. For steam pipe and boiler coverings it is unexcelled, and as a roofing material it is found a first-class article. It is used also as a base for paint, and the paint manufactured from it has a permanency of color and beauty of finish which is surprising. These paints are placed on the market ready prepared for the brush, in all shades. Asbestos is the best non-conductor in use and is made into covering for hot air and steam pipes, boilers, etc. Thompson & Upson advertise in another column a variety of asbestos materials.

It is generally believed that the great mining suit between the Richmond and Eureka Con. mining companies is in process of compromise.

The Proposed Ohio Bridge Law.

The Joint Committee of the two houses of the Ohio Legislature, appointed to investigate the Ashtabula accident, has reported a bill "to secure greater safety for public travel over bridges," which imposes certain restrictions on the construction of bridges, and gives directions concerning their inspection thereafter, such as have never been established by law in this country heretofore, we believe. The first section provides that all railroad bridges on standard-gauge roads shall be proportioned to carry the following loads per lineal foot for each track, in addition to their own weight:

Span.	Load per ft.
7 1/2 ft. (or less).....	9,000 lbs.
10 to 10 1/2 ft.....	7,500 "
10 1/2 to 12 1/2 ft.....	6,700 "
12 1/2 to 15 ft.....	6,000 "
15 to 20 ft.....	5,000 "
20 to 30 ft.....	4,300 "
30 to 40 ft.....	3,700 "
40 to 50 ft.....	3,300 "
50 to 75 ft.....	3,200 "
75 to 100 ft.....	3,100 "
100 to 150 ft.....	3,000 "
150 to 200 ft.....	2,900 "
200 to 300 ft.....	2,800 "
300 to 400 ft.....	2,700 "
400 to 500 ft.....	2,600 "

In all bridge trusses, of whatever length, the several members in each panel shall be so proportioned as to sustain, in addition to its share of the uniform load, as above stated, such concentrated panel load as is provided by the bill for a bridge of a length equal to the length of the panel.

Section two provides that every railroad bridge shall be so constructed as to be capable of carrying on each track, in addition to its own weight, two locomotives coupled together, each weighing 91,200 pounds on the drivers, within a space of 12 1/2 feet for each locomotive, followed by cars weighing 2,250 pounds per lineal foot covering the remainder of the span. The loads named in Section one must not strain any part of the material beyond one-fifth of its ultimate strength.

Section three prescribes that all highway bridges shall be constructed to carry the following loads per square foot:

Span.	For heavy traffic.	Other bridges.
30 ft. (and less).....	110 lbs.	100 lbs.
30 to 50 ft.....	100 "	90 "
50 to 75 ft.....	90 "	80 "
75 to 100 ft.....	80 "	75 "
100 to 200 ft.....	75 "	70 "
200 to 400 ft.....	65 "	50 "

The floor-beam strength of each floor-beam for each wagon way of bridges in cities and near large manufactories shall be not less than 13,500 pounds; for other bridges, not less than 11,250 pounds.

Section four provides that the stress on the best quality of wrought iron used in bridges shall not exceed, in tension, 10,000 pounds per square inch for long bars or rods, and 8,000 pounds for short lengths; and against shearing, 7,500 pounds. For the best quality of wrought iron in beams, the strains must not exceed, in compression, the following:

Length in diameters.	Minimum strain.
	Square ends. Round ends.
10.....	10,000 lbs. 7,000 lbs.
10 to 15.....	9,000 " 6,500 "
15 to 20.....	8,000 " 6,000 "
20 to 25.....	7,500 " 5,500 "
25 to 30.....	6,500 " 5,000 "
30 to 35.....	6,000 " 4,500 "
35 to 40.....	5,500 " 4,000 "
40 to 50.....	5,000 " 3,500 "
50 to 60.....	4,500 " 3,000 "

If iron of inferior quality be used, the stress shall be proportionately less.

Section five directs that cast iron be used in compression only, and in lengths not exceeding 20 diameters, with the same stress as prescribed for wrought iron in the act: "In shapes other than square or cylindrical, whether wrought or cast iron be used, the stresses shall vary accordingly."

The greatest allowable strains per square inch on wood in bridges is given in Section six as 1,200 pounds for oak and 1,000 pounds for pine, in tension; and for these woods in compression, according to their lengths in diameters, as follows:

Diameters.	Strain in Compression.
	Oak. Pine.
10.....	1,000 lbs. 800 lbs.
10 to 20.....	800 " 700 "
20 to 30.....	600 " 500 "
30 to 40.....	400 " 300 "

Section seven makes it the duty of railroad companies or other corporations erecting a bridge for public travel, by contract or otherwise, to keep on the spot a competent engineer with power to reject any piece of material which may have been injured or may be imperfect from any cause.

Section eight provides that all bridges used for public travel, of more than 15 feet span, or having a truss shall be inspected monthly by some competent person in the employ of the corporation owning the bridge, "for the purpose of seeing that all iron posts are in order, and all rivets screwed home, that there are no loose rivets, that iron rails are in line and without wide joints, that the abutments and piers are in good condition, that the track rails are smooth, and that all wooden parts of the structure are sound and in proper condition, and that the bridge is safe and sound in every respect." This inspector is to report once in two months.

Section nine provides for the inspection of highway bridges.

Section ten requires that all railroads in the State, within 60 days after the act goes into effect, shall report to the Railroad Commissioner a detailed statement of all bridges on their lines of more than 15 feet span, or having a truss.

Section eleven directs that the Governor, on the nomination of the Railroad Commissioner, shall appoint "some competent expert, at a salary not exceeding \$3,000 a year, who shall have cognizance of the construction and maintenance of every bridge intended for public travel in this State, and who shall hold his office for the period of five years, unless sooner dismissed by order of the Governor for reasons affecting his efficiency, in which case such reasons shall be given in writing by the Governor." This expert must pass an examination as to his competency before a committee of three members of the American Society of Civil Engineers. He will be subject to the direction of the Railroad Commissioner.

Section 13 directs that all persons having in charge the letting of a contract for a bridge of more than 35 feet span, shall submit to this expert a strain sheet and drawings of the proposed structure before work on it is begun, and the expert "shall certify its correctness, if correct, and make such alterations as may be necessary, if faulty in design or scanty in materials, according to the standard prescribed in this act; and on the completion of such bridge, said expert shall critically examine the work in all its details, comparing and verifying the sections on the strain sheet with those of the actual structure, and if these last are insufficient, forbid the use of the work till the bridge is made sufficiently safe and strong."

Section 15 directs that there may be an appeal from the decision of the expert to the Railroad Commissioner.

Section 16 provides that the Railroad Commissioner shall stop the running of trains on railroads which neglect or refuse to comply with the act, and provides punishments for false reports, etc.

Section 17 provides that the standard loads of narrow-gauge roads may be 30 per cent. less than those prescribed for other railroads.—*Railroad Gazette.*

Treating Base Metal Ores.

"Stewart's New Process."

We take from the *Colorado Miner* the following description of the process now employed for treating base metal ores in Colorado:

The difficulties encountered in treating refractory or "base metal" ores by amalgamation is generally owing to the presence of the following minerals, termed "base metals," viz.: iron, copper, lead, zinc and antimony; and, in roasting gold and silver ores of this class, as ordinarily conducted by the addition of common salt for the purpose of converting the silver to a chloride, the base metals are changed to the condition of sulphates, sulphates, oxides and chlorides. While the oxides of iron, copper, zinc, etc., are not soluble in water, yet when they enter the pan or barrel in presence of metallic iron and the undecomposed salt and sulphate of soda coming from the furnace, there is formed soluble iron, copper, zinc, lead, etc., which in presence of metallic iron are precipitated, and assist in sickening the mercury and in the decomposition and loss of the same, and while a simple hot water leaching would remove the soluble chlorides and sulphates, yet the oxides will, as before stated, remain in the pulp and do their proportionate share of harm. Experience has proven the fact that, when the base metal salts are kept in solution, or are thoroughly and effectively removed from the roasted ore, the gold or silver amalgamate readily and completely; and as amalgamation is the most economical method known of gathering the gold and silver in a convenient form for reducing to metal, it is not a matter of surprise that so much time, money and skill have been devoted to the object of amalgamating closely; that is, to extract the noble metals to within a close per cent. of the ore contents, by means of mercury.

The Hunt, Douglas & Stewart bath of protochloride of iron and chloride of sodium, when used in wooden vessels and at a temperature of 160° to 180° Fah., (and with or without the use of sulphurous acid or fumes, according to the nature of the ore,) acts upon the oxides of iron, copper, zinc, etc., converting them to soluble chlorides. The oxychloride and dichloride of copper, which are insoluble in water, are also attacked by the bath and rendered soluble. The chloride of lead which is soluble in water, is also soluble in the bath. So that not only all the base metal salts which are soluble in water, but also those which are not, are by the bath converted to soluble salts and are held in solution during the amalgamation of the silver or gold, and are afterward readily removed from the ore. Not only this advantage is gained, but the oxychloride and dichloride of copper, which are so destructive to the mercury and a hindrance to the amalgamation of the gold and silver where water and metallic iron are used, are, by the use of the bath, made to do good service, as the copper, salts and mercury decompose the sulphides and sulphates of silver, and chloridizes the same, increasing the yield of the silver above the furnace chlorination; also the copper is saved at an expense of a little more than the cost of old scrap iron.

The mechanical appliances employed, and recommended by Mr. Stewart, are as follows. A store tank for holding the bath. Purvine wooden pans and settler, a large filter tub for filtering out the chlorides, sodium included, some precipitating tubs, an evaporator and a washing pan for gathering the mercury, before allowing the pulp to pass into the creek.

The roasted ore (containing copper either naturally or artificially mixed) if brought to the

pans, and charged with a supply of the bath from the store tank, the pans being in motion, no water as in ordinary amalgamation, is used. About two hours is allowed for heating and chloridizing, the mercury is then added, and in six hours the whole is discharged into the settler. If the pulp is not thin enough in the settler, more of the bath liquor is added. In about seven hours the mercury and amalgam is drawn off and put into straining sacks, while the pulp and liquor is put into the filter tubs. From these filter tubs all the soluble base metals are filtered out by the addition of more bath liquor. Hot water is then added which filters out the salt. The liquors from the filter tubs are conducted through tubs for precipitating the copper, etc., then to the evaporator and store tanks for use again, while the ore or pulp from the filter tubs, after being thus cleansed of copper, soluble base metals and salt, is discharged into the washing pan for gathering the remaining mercury and is then run into the creek as worthless.

In the application of this process to amalgamation it will be observed that two very important results are secured, which renders amalgamation a perfect success either on raw or roasted ores, while without it, amalgamation cannot be so considered. First: The Hunt, Douglas & Stewart bath of protochloride of iron and chloride of sodium, used at from 15° to 20° Baume, or over, dissolves and holds in solution the base metals, while nothing but the silver and gold are precipitated by the metallic copper and mercury, hence the mercury is not decomposed or floured by the base metals, and a saving is thereby effected; also the silver and gold are nearly pure. Second: When the liquor and pulp are discharged from the settler into the filter tub, the base metals (including the copper) are filtered out, and also the chloride of sodium, all of which are saved by precipitation; the copper in its place, and the chloride of sodium, iron, zinc, etc., in their places, and these chlorides are used again for chloridizing fresh charges of ore; so that a close extraction of the silver, gold and copper is obtained, the loss of mercury is reduced, and a great saving of salt is effected.

The extra expense for labor over ordinary amalgamation will not exceed one dollar and a half per ton of ore, which is compensated by the copper, salt, mercury and additional amount of gold and silver obtained; sufficient in many cases to pay the whole expense of reduction as ordinarily conducted. The process has been used with gratifying results in this city, and is being applied at other places. The right to use the same will be granted at reasonable prices, and purchasers will be provided with complete specifications and plans of the plant required, and full instructions for working the process. Any intelligent workman can learn it in a short time, as it is exceedingly simple, and but little machinery used.

The Big Horn Country.

There seems to be no longer any doubt that the Big Horn country will be fully explored the coming summer, as expeditions are already fitting at Rawlins, Laramie, Corinne, Omaha, Grand Island and Sidney to go to the headwaters of the Big Horn river and prospect the country. It was Father DeSmet, we believe, who first told of gold deposits in the Big Horn country, and from that day to the present moment that region has been looked upon as fabulously rich in gold and silver. Numberless expeditions have been fitted out having for their objective point the Big Horn mountains, but none of them ever found the promised land. Like the fable of Captain Kidd's buried treasures, the failure of one party only makes others more anxious to discover the truth or falsity of the supposed gold fields. We trust that all of these parties will succeed in reaching the enchanted region, and that the Indians may not give them any excuse for leaving until the character of the country and its value are fully established. The discovery of really rich mines in the Black Hills gives much encouragement to the belief that the wonderful tales told by the Indians and old trappers are not idle boasts. It is probable that the soldiers will keep the Indians so busily employed in looking after their own safety that they will have little time to devote to scalping prospectors, and once in the mountains the danger would be a great measure lessened. These expeditions may not find gold, but it will be the means of opening up the country to settlement, for where a country presents the agricultural and pastoral advantages that the Upper Big Horn valley is known to possess it cannot long remain unoccupied. So that whatever may be the result of the expeditions now forming for exploring that region, the final result will be beneficial to Montana, as the settlement of the Big Horn would open up a new and short thoroughfare from Montana to the Union Pacific which would shorten the distance to the East at least 500 miles over the present route by Corinne, and that, too, over a much better country. If good mines are discovered it would be the best thing that could possibly happen to our Territory, as a railroad would be certainly built from Cheyenne to the mines, and there would be a good prospect of its being continued to the business centers of Montana.—*Helena Independent.*

It is said that Victor Hugo looks hale and strong, and attributes his health to his love of cold water and open windows.

The Soap Mine.

A correspondent of the *Ventura Free Press* gives the following concerning the operations of the Rock Soap Company, whose mine is in that county: The company commenced the year under embarrassing circumstances, having contracted previously to ship the rock to a second party in San Francisco, who was to manufacture and sell the article independent of the company. Under their contract, the amount of crude rock to be supplied was limited to one ton per month. The company took the manufacture of the article into its own hands some time in June and used in the first three months over four tons of the rock. The shipments for the last three months amount to 14 tons—an actual increase in the shipments of nearly four tons per month. The sales the past 10 months aggregate nearly 40 tons. The company have not only advanced by their enterprise the commercial interests of our county, but they have made improvements at the mine and in the facilities for getting out the rock. They have constructed a good wagon road two and one-half miles over a rough mountain region from the coast, at considerable expense, so that now the rock is hauled direct from the mine to the wharf. They formerly packed it down to the stage road on donkeys.

Notwithstanding the prospects of a dry year, the company are confident the manufacture and sale of their soap will continue to increase even more rapidly than last year. Agencies have been established in England, France and Germany, and the shipping at San Francisco is accepting it as the finest salt water soap in use.

The future of our county will be greatly brightened by the development of this one interest. The inexhaustible mountains of the material, and the hauling, the shipping and the quarrying will afford employment and business for all time. This, with our oil wells, will most certainly aid in the rapid settlement and permanent development of the county and southern California.

The Curry Pumps.

The pumps of the Gould & Curry are at work and behave like veritable old-stagers. They were first run on one-foot, then on two-foot strokes, and so on to the full stroke of eight feet. These strokes were made at first only once in two minutes, then faster and faster, up to eight strokes per minute. They are capable of being run to 12, but will not be required, unless more water is encountered, to run more than two or three per minute. The pumps are 14 inches in diameter and eight-foot stroke, and therefore capable of discharging between 60 and 70 gallons per stroke, and if run to their full capacity, can hoist from the 1700-foot level 750,000 gallons every 24 hours. The engine is a compound horizontal, with an initial cylinder of 27 inches in diameter and an expansion cylinder 48 inches in diameter. These cylinders are both attached to one piston rod, from which connection is made directly to the bishop-head of the bob, thus doing away with all the friction and liability to break of intermediate gearing. The engine is controlled by the Davy differential valve, whereby it can be made to make one stroke in ten minutes or 12 strokes in one minute, or any required number of strokes between these two extremes. The economy of the construction of engines in this manner will be apparent when it is considered that the engine consumes no steam when not in motion, and makes the stroke just as quickly when running slow as when running fast. The engine has been constructed and put in place under the supervision of W. H. Patton of this city, civil and mechanical engineer, and constructing engineer of the Consolidated Virginia, California, Belcher, Savage, and other mines, who has put up several similar engines on the Comstock, every one of which works admirably.—*Virginia Enterprise.*

A NEW DISTRICT.—The *Los Angeles Express* says: A valuable discovery of rich ores has been made on the backbone between the Colorado desert and the valley of that name. The first discovery in the district was made four years ago by John Bullock, the discoverer of the celebrated Castle Dome mines on the Colorado. The name of the district which was organized about two months ago, is the "Southern Pacific Railroad District." Nat. Small, an old Comstock miner, station keeper at Canyon springs, has been a leading spirit in the opening of this district, together with Hank Brown, a veteran stage man and freighter between Southern California and Arizona. The situation, etc., of the principal mines is as follows: Nineteen miles northeast from Canyon springs station, and 35 miles from Dos Palmas station, on the Southern Pacific railroad. A salubrious situation, not more than a hundred degrees average range of thermometer, 2,512 feet above the level of the sea. A good road leads from the railroad station at Dos Palmas to the mines. It is six or seven miles from the mines to the springs on the "bench," where a large flow of water is obtained—a sufficiency of wood is to be had for mining purposes to a considerable extent. All the ledges show a slate and granite formation, and have footwalls of the same.

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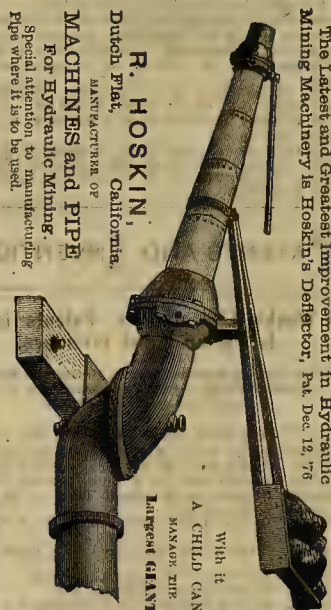
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San Francisco, 1877.

The Triumph of Art in Railroad Travel.

Year by year we note the footsteps of progress in many directions. In no direction is progress more palpable than in the facilities offered the railroad traveler of the present day. Looking back but a few years, we can see the toiling mail-like advance made day by day by the emigrant's wagon, as it was slowly but surely drawn toward sundown by the patient ox, or the slowly moving farm horse; then came the old-fashioned stage coach; following closely, we had the canal packet; then the steamer on the lakes and rivers; then the locomotive engine and the stage, like car. Now! the palatial coach, and more than palatial drawing room and sleeping car. Yet, not satisfied with these, that marvel of mammoth Western corporations, the Chicago & North-Western Railway, as we stated some weeks ago, has developed hotel cars that will, for elegance, usefulness and real comfort, eclipse everything of the kind that has been hitherto placed in service on any road. Some of our readers seem to have some doubts about the merits of hotel cars, or their superiority over the so-called dining car, that is run for a few miles on some roads. "I am not so sure about that," said one of our friends, as he had finished reading our first article about these hotel coaches that are to be run on the Omaha and California line of the Chicago & North-Western Railway, "I am not so sure I would care to take my dinner in any car, no matter how much like a palace, while running at the rate of 40 miles an hour." It is a saying, "that the faster you run the safer." Why, last June it will be remembered, that this road hauled from Chicago to Council Bluffs, in less than ten hours, the now celebrated "Jarrett and Palmer Train." On that train was a hotel car, not as large, with less wheels under it, poorer springs, and in no way as strong and easy for riding in as these new cars are to be, and yet, Mr. Jarrett said "while on the Chicago & North-Western line, running at an average rate of 50 miles an hour, we took our breakfast as comfortably as we would at Delmonico's, in New York."

It is well known that the Chicago & North-Western Railway is built over the most favorable line as to grades that could be found between Chicago and the Missouri river, with but few curves; its track is mostly of heavy steel rail, gravel ballasted, with wide roadway, giving it permanence and solidity—it is as smooth as a floor; all its cars strong; with plenty of wheels under them, and with springs so adjusted that the usual "bouncing" and oscillation is reduced to the minimum. We observed in an ordinary car the side motion and rising and falling of the car was less than half an inch, and sometimes scarcely perceptible. We believe it will be found that a person will sit in these hotel cars and eat or write as comfortably as he could at his desk or table at home; thus we choose to call the triumph of art in railway travel.

We learn that this new line of hotel cars is being pushed to completion as fast as the full force of workmen in the Pullman shops can do it. We shall be certain to see them in a few weeks.—Cedar Rapids Republican, Feb., 1877.

Canadian Patents for U. S. Inventors and Patentees.

It is only recently that the Canadian Government has granted patents to United States citizens. In consequence hereof the many immensely valuable inventions patented in this country are now patented in Canada. Patents are much sought for and are readily disposed of at fair cash prices. In our country about three-fourths of all manufacturing is based upon patents, especially in the New England States no manufacturing business of any consequence is started without being protected by such. Our neighbors across the border have not been slow in observing and learning that inventions and patents are the foundation of all prosperity in manufacturing purposes. Hence all our patents for labor saving and agricultural machinery and innumerable improvements in home comforts meet a ready market in Canada. Inventors and Patentees should therefore not delay to secure their patents in Canada; many good inventions are already pirated by Canadians, who, against law and right, appropriate United States inventions and have them patented in their own name. After a patent is granted it is extremely difficult to prove who is the first and original inventor. Therefore, inventors and patentees to be safe, you will have to secure your patents in Canada without delay. We have facilities for securing Canadian patents second to none. Our charges for securing Canadian patents are only \$65, which is from \$10 to \$20 lower than other solicitors. A model is required.

Inventors and patentees! do not delay and lose your opportunity. Things may change. With model and description of your invention send us \$25, and we will prepare all drawings and documents and forward them to you for signature. In about 30 to 50 days we can return your Canadian patent.

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(SQUARE—No. 3.)	
The Golden Piano, \$800	\$450
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We invite our readers who wish to look at Pianos for themselves or friends, for immediate or future purchase, to call and examine our samples.

Those who cannot call will be supplied with further descriptions and recommendations by sending to this office.

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Mining and Other Companies.

California and Arizona Mining Company—

Location of principal place of business, 507 Montgomery Street, San Francisco, California. Location of works, Mohave County, Territory of Arizona.
Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of April, 1877, an assessment (No. 2) of two cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, 507 Montgomery Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid, on the thirtieth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fourth day of June, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, T. E. JEWELL, Secretary.
Office, 507 Montgomery Street, San Francisco, California.

California Fruit Growing Association.—

Location of principal place of business, San Francisco, California. Location of property, El Dorado county, Cal.
Notice is hereby given that at a meeting of the Board of Directors, held on the 14th day of April, 1877, an assessment, No. 4, of \$2.00 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, 331 Sansome Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the 21st day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold on Saturday the 9th day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, HORACE JONES, Secretary.
Office, 331 Sansome Street, San Francisco, Cal.

Consolidated Bonanza Silver Mining Co.—

Principal place of business San Francisco, California. Location of works in Eagle and Washoe Valley Mining District, Ormsby county, State of Nevada.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 19th day of April, A. D. 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on Tuesday the 29th day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday the 5th day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, WM. MARTIN, Secretary.
Office No. 19 First Street, San Francisco, Cal.

Dolores Consolidated Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.
Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:
Name. No. Certificate. No. Shares. Amount.
Blasdel, H. G., Trustee..... 16 10,000 \$1,000 00
Blasdel, H. G., Trustee..... 17 5,000 500 00
Blasdel, H. G., Trustee..... 18 5,000 500 00
Blasdel, H. G., Trustee..... 19 5,000 500 00
Drexler, L. P. & Co., Trustee... 8 25,000 2,500 00
Fry, J. D., Trustee..... 7 10,000 1,000 00
Keene, J. R., Trustee..... 9 10,000 1,000 00
Talbot, W. C., Trustee..... 3 100 10 00
And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, p. m. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.
J. W. CLARK, Secretary.
Office, 418 California street, San Francisco, California.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of April, 1877, to the 16th day of May, 1877, and will then take place at the same hour and place as above named. By order of the Board of Directors. J. W. CLARK, Secretary.

Excelsior Silver Mining Company—Prin-

cipal place of business, San Francisco, Cal. Location of works, El Dorado District, Lincoln County, Nevada.
Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-fourth day of April, 1877, an assessment of ten cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold and silver coin, to the Secretary, at the office of the company, 305 Post Street.
Any stock upon which this assessment shall remain unpaid on the twenty-fifth day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the eighteenth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
W. A. KOLLMYER, Secretary.
Office, 305 Post Street, San Francisco, Cal.

Mariposa Land and Mining Company of

California—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 28th day of March, 1877, an assessment (No. 1) of one dollar per share was levied upon the capital stock of the corporation, payable immediately in United States currency, to the Secretary, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California, or to the Assistant Secretary, at the office, No. 8 New York Street, New York.
Any stock upon which this assessment shall remain unpaid on the Thirtieth day of April, 1877, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Twenty-eighth day of May, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
LEANDER LEAVITT, Secretary.
Office, Room 33, Nevada Block, No. 309 Montgomery St., San Francisco, California.

Taylor Mill and Mining Company.—Prin-

cipal place of business, City and County of San Francisco, State of California. Location of works, Garden Valley Mining District, El Dorado County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-ninth day of March, 1877, an assessment of Twenty cents per share was levied upon the capital stock of the company, payable immediately in United States gold and silver coin, to the Secretary at his office, No. 607 Montgomery Street, in the City and County of San Francisco.
Any stock upon which this assessment shall remain unpaid on the ninth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the twenty-fifth day of May, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
SAMUEL S. MURPHY, Secretary.
Office, No. 607 Montgomery Street, San Francisco, Cal.

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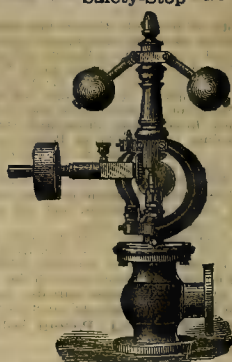
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We also furnish Steel Plates for Blake and other Ore Crushers, Steel Gut Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

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H. W. JOHNS' PATENT

ASBESTOS ROOFING AND ASBESTOS PAINTS,

ASBESTOS CEMENT FOR LEAKY ROOFS

Asbestos Roof Paints for Leaky Roofs,

ASBESTOS BOILER AND PIPE COVERINGS



FOR SALE BY ALL COUNTRY MERCHANTS.

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Reducing and Concentration Machinery.

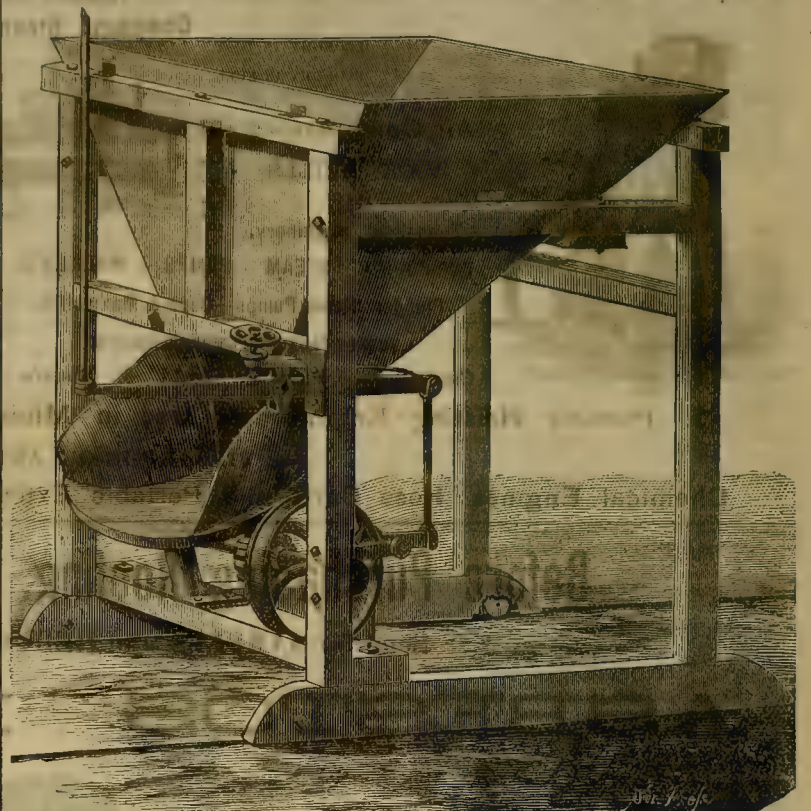
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SUCCESSIONS TO FARRER & CO. MFG. CO.
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It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

REFERENCES.

A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them."—A letter from Mr. C. G. Belding, of Amador County, speaks in the highest terms of them.—Two of the machines were shipped to the Bunker Hill Mill, also Gover Mill, Amador County.—Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen.—Soulsby Mill, Tuolumne County.—California Company, Nevada City.—Omaha Gold Mining Company, Grass Valley.—St. Patrick Mill, Placer County.

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We warrant the machines to give perfect satisfaction, and to be a better and more durable Feeder than any other in the market, and will sell them as cheap as any other of its class.

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For Steam Boilers, Pipes, etc. Best non-conductor of heat in use. It effects a LARGE SAVING OF FUEL, LASTS AS LONG AS THE IRON to which it is applied, and is reasonable in cost.

REFERENCES: United States Government Buildings and the principal manufacturing establishments in the East and on the Pacific Coast; the principal mines and mills in Nevada, etc., etc.

United States and Foreign

SALAMANDER FELTING COMPANY.

PACIFIC BRANCH,

(Patents issued September 4, 1869; October 5, 1869; October 4, 1870; May 9, 1871.)

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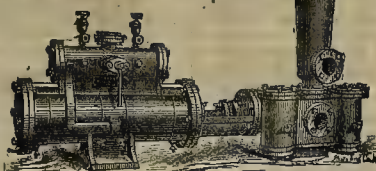
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WALKER'S PATENT Compound Steam Pump.

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ECONOMY IN FUEL.

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SIMPLICITY AND DURABILITY.

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Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

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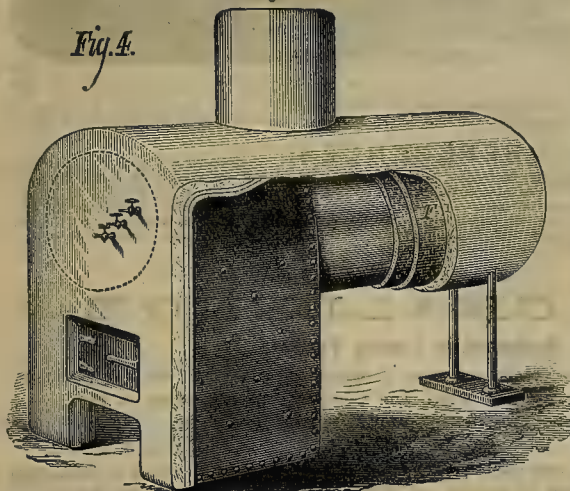
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ASBESTOS MATERIALS.

Fig. 4.



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REFERENCES.

Having been established on the Pacific Coast but four months, we annex the names of the following who have our goods in use:
Steamer El Capitán..... San Francisco, Cal.
do Yosemite..... do do
do City of Stockton..... do do
do Centennial..... do do
do San Joaquin, No. 2..... do do
do Constance..... do do
A. A. Bennett, Architect..... do do

P. R. Schmidt, Architect..... San Francisco, Cal.
Mr. Hoffman..... do do
S. P. Gas Light Co..... do do
S. P. R. Co..... do do
Central Planing Mill..... do do
California Planing Mill..... do do
Ransom Iron Works..... do do
Palace Hotel..... do do
West Coast Furniture Co..... do do
Hobbs, Poweroy & Co..... do do
E. K. Howe & Co..... do do
Wells, Fargo & Co..... do do
Eureka Brewery..... do do

Chicago Brewery..... San Francisco, Cal.
A. L. Fish & Co..... do do
Capitol Mills..... do do
Sutter Street R. R..... do do
Cal. Sugar Refinery..... do do
Jno. Lochhead..... do do
L. C. Hill..... do do
Cal. Transportation Co..... do do
M. C. Hawley & Co..... do do
A. Washburn..... do do
Jno. Furnace..... do do
W. E. Hoyt..... do do
Geo. Roland, Eng..... do do
O. B. Fenner..... do do

State Prison..... San Quentin, Cal.
B. R. Norton..... Alameda, Cal.
Guadalupe Mining Co..... San Jose, Cal.
New Almaden Mining Co..... do do
Joseph Enwright, Machine Shop..... do do
Albert Lake, Box Factory..... do do
Steamer City of Lakeport..... Clear Lake, Cal.
Steamer Gov. Stanford..... Lake Tahoe, Cal.
San Jose Mining Co..... Nevada.
Belmont Mining Co..... do do
Ural Mining Co..... do do
Exchequer Mining Co..... do do
New Coso Mining Co..... do do

B. F. Sawyer & Co..... Napa, Cal.
Tide Land Reclamation Co. Grand Island.
A. J. Stevens, G. M. M., C.
P. R. R..... Sacramento, Cal.
S. W. Kemble..... Reno, Nev.
Hayford, Hines & Co..... Colfax, Nev.
Castle & Cook..... Honolulu.
J. V. De Laveaga..... Mazatlan.
C. F. Hillman, Gov't R. R. Santiago, Chile.
J. W. Milstead..... Yokohama, Japan.
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MAY 5, 1877.

VOLUME XXXIV.
Number 18.

Walker's Compound Steam Pump.

We give on this page, engravings illustrating the Walker patent compound steam pump, recently introduced on this coast by Parke & Lacy, agents. This pump delivers a constant stream, and can be worked either with steam or compressed air, having many special advantages over ordinary pumps. The sectional view is that of an ordinary piston pump. The other engraving represents a new pattern, plunger pump, arranged especially for underground mine work, in dirty water. Messrs. Parke & Lacy have had the pattern pump made especially for mining purposes to meet the requirements on this coast.

The mechanism of this compound pump can readily be understood from the sectional view. The elongated piston has two ends provided with packing, and has a cylindrical portion of a lesser diameter, extending between the two ends, the said portion being fitted to work steam-tight in a central partition in the cylinder; two annular chambers are thus formed into which steam is admitted to act upon the smaller areas of the piston ends, and it is afterward expanded into the spaces between the piston ends and the cylinder covers, to act upon the larger areas of the said piston; a double cylindrical valve regulates the movements of the steam, each half of it being formed with a passage to connect two ports through which steam passes from the annular space to the space between the piston and the cylinder head, and also with a passage which connects the larger steam space with the exhaust passage. Steam is admitted into a space between the two parts of this valve, and finds its way by suitable openings into the end spaces between the said valve ends and the valve box covers; the said end spaces are connected by passages with ports formed in the aforementioned partition, and as the piston moves to and fro, passages formed in the said piston establish a communication between the said ports and a port leading into the exhaust passage, thus relieving the valve from pressure on one end and causing it to be quickly pushed in that direction by the steam at the opposite end; the parts are all so arranged as to provide effectually for sufficient steam to cushion both the piston and valve so as to prevent striking under any circumstances.

The indicator diagram shown on this page was taken from one of these compound cylinders, and a study of it will demonstrate the economy of such a pumping engine. Experts will also notice the very short passage-ways for live steam between the valve and the high-pressure piston, insuring a small waste of steam from steam passages. Messrs. Parke & Lacy, agents for the Burleigh rock drills, air compressors and other mining machinery, 417 Market street, will furnish further information concerning this pump to those desiring it.

MINT COINAGE.—The U. S. Branch Mint, in this city coined in April 3,062,000 pieces of money, valued at \$4,326,000. The sum of \$2,880,000 of the amount was in twenty-dollar pieces.

ADVICES from Ohio state that 400 coal miners at New Straitsville, struck on Monday against a reduction in the price of mining to 30 cents per ton. Some trouble is expected.

MINING SUIT.—In the Twelfth District Court, H. S. Moore has brought suit against Isaac Yoakum, Sr., to recover possession of mining property in the Long Town mining district, Kern county, together with \$50,000 damages. The property consists of 1,500 feet of the Isabella vein, situated in section 22, township 27 south, range 29 east, and called the Isabella quartz mine. It is alleged that the defendant unlawfully ousted the plaintiff from the property in August, 1876. Before that time the plaintiff and one Henry Burdett were the owners of the

DECISION IN THE EMMA MINE SUIT.—The suit of the English owners of the Emma mine against Trenor W. Park and others, to recover the \$5,000,000 paid for it, alleging that there was fraud and misrepresentation of the mine, resulted in a verdict for the defendants. The verdict was received with demonstrations of delight, which, however, were speedily checked by Crittenden, counsel for the defence. Trenor W. Park, the principal defendant, sat in his chair almost powerless with emotion and the tears burst from his eyes. Having recovered himself

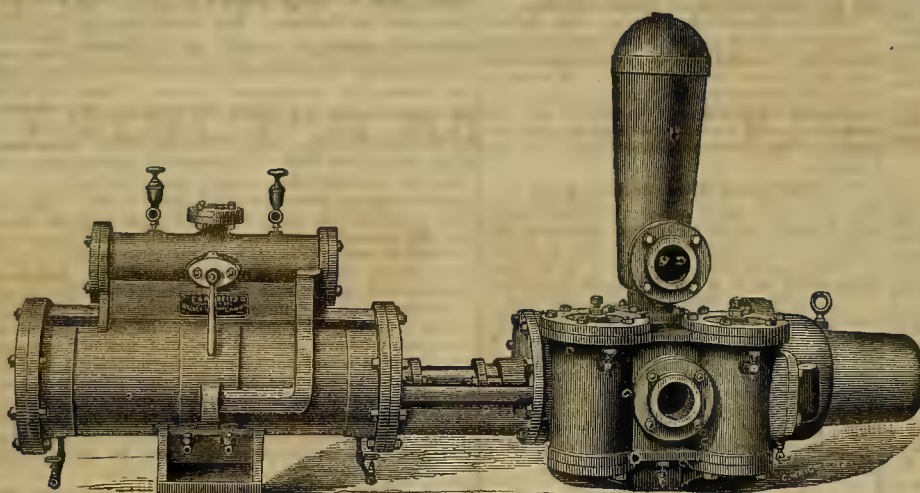
The Mining and Scientific Press.

We consider it nothing more than proper occasionally to call the attention of our readers and others to the merits of the MINING AND SCIENTIFIC PRESS. It is our endeavor to furnish as good a journal as possible to the industrial classes of the Pacific coast, and we are happy to feel that our endeavors are appreciated. The Press has a good circulation in every mining camp and town on the coast, and is looked upon as a necessity in the cabin of every intelligent miner who wishes to progress in his business. No issue is ever printed that does not contain some hint of value which can be profitably applied in the duties of every day life. We gather all the current mining news of the day and arrange it in such a shape that it is easy of reference and in a condensed form. All the new laws and decisions that are of interest to the mining community are published in this journal; and all the new processes in metallurgy and new systems in mining are fully described. In fact everything that will be of interest or value to the miner or mechanic is carefully looked after and furnished.

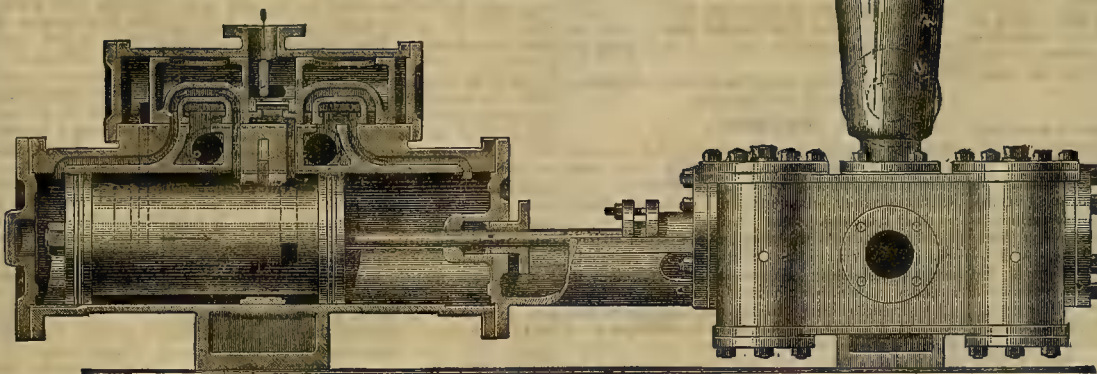
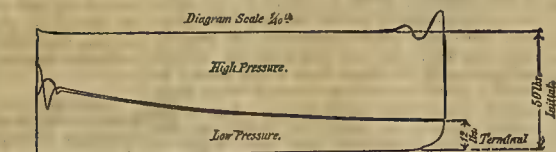
The Press is the only paper of its class published on this coast, and no miner or mechanic can afford to be without it. We take care to glean from foreign publications anything of use or value to Pacific coast readers, and keep track of all new inventions that will be likely to be serviceable to the intelligent and progressive readers of this coast. The Press has now been published so long that its proprietors and editors are fully aware of the needs of the community which it represents, and therefore everything is given in as condensed form as possible to suit a busy people who have no time to read a column when the information could be conveyed in a paragraph.

All our old subscribers who know the advantages of having the Press at hand and are familiar with its merits should take occasion to urge upon others the propriety of encouraging a first-class home industrial journal. There are many persons not now subscribers of the Press who would be benefited by weekly reading its columns. The attention of many of these, needs only to be called to the subject by some one familiar with the paper to induce them to subscribe. An illustrated journal of this character is an expensive one to publish, and all who are engaged in industrial pursuits on this coast should do their share towards maintaining a first-class paper devoted to their interests. Those familiar with the merits of the Press can do much to assist us in our work, with very little trouble, by calling the attention of their friends to it and occasionally writing for us. There are many things which come under the observation of the practical every day worker which would be to the advantage of others to know in the same business. To aid in the diffusion of knowledge is one of the duties of the citizens of our republic, and if such things are sent to us we will be pleased to do our share in the good work. Fine writing is by no means necessary; if the facts are sent we will arrange the matter for publication.

The present daily ore yield of the mines is as follows: Consolidated Virginia, 450 tons; California, 500; Justice, 450; Chollar-Potosi, 120; Ophir, 30, Belcher, 85. Total, 1735 tons per day.



SECTION OF WALKER'S COMPOUND STEAM PUMP.



SPECIAL COMPOUND STEAM PLUNGER PUMP FOR UNDERGROUND WORK.

suit, therefore, is to decide the ownership rights of the parties.

New gold diggings are reported in the Takon country, Alaska Territory, that will pay \$5 to \$10 to the hand. It is a pretty hard country up there though, unsettled, rough and expensive to live in. The miners can only work a few months in the year.

SECRETARY SCHURZ has appointed H. H. Bates, B. R. Catlin and B. C. Tiffany to the grade of principal examiners of patents.

with a notice of two more suits against him for alleged fraud in connection with the Emma mine company claims, in each an aggregate of nearly a million dollars, and one of them is brought, it is stated, by one of the witnesses of Park in the trial which has just closed.

THE last issue of the Oroville Mercury states that since there is no snow in the mountains the miners are turning their attention to the river. Doubtless more river mining will be done this year than during many previous years.

CORRESPONDENCE.

Mining in Elko County, Nevada.

[From Our Traveling Correspondent.]

(Continued.)

Brief allusions have been made from time to time to the value to be derived from good, cheap and convenient facilities for the reduction of the ores of our mines. Mills are everywhere in demand. More would have been built but for the chariness of capital in taking risks. This is not surprising. When chances are taken it is perfectly natural that the charges for reduction, or the price paid for the ore, should be somewhat in the ratio with the risks to be run. In the absence, too, of competition, it is a well established law that money has a tendency to take all the advantages wielded by the power it commands, within the bounds of what is believed, at any rate, to be promotive of its true interests or its further accumulation. On the other hand, labor is often suspicious. It is too ready to charge capital with exacting exorbitant rates, of not giving full returns, or not paying for ores purchased in accordance with their true value. In consequence of this war between conflicting forces many good mines go unworked, much valuable ore lies unsold on the dump, and the progress of many an excellent district is greatly retarded. Let the miner throw away his unjust suspicions and unreasonable expectations. Let the millman be satisfied to take some chances with the miner, allowing him an equal or proportionate share of the profits—if need be, securing some interests of his own, that he may not be at the mercy of the mine owner—and a new and powerful impulse would be given to the entire mining interests of the coast. It would be felt from California to Colorado, and from Montana to Arizona. A good custom mill seems to be much needed at

Cornucopia.

Had this want been in time supplied she would long since have turned out her rich ores, as the name implies, in great abundance. As now, with stocks at the lowest ebb, it may be aptly as well as literally translated with a little pardonable erring, plenty—in a horn; for as the shares of the principal mines are held largely at home, the depression is as sensibly felt and as plainly visible here as its gloomier counterpart on your more crowded streets.

The Main Mineral Belt

Extends two miles or more, from north to south, through porphyry, flanked east and west by a hard, ferri-ferrous syenitic rock, not unlike, in appearance, the dolerite in the vicinity of the Comstock. The main north and south lode, on which the Leopard and Hussey are located, hugs the western side of the belt, in close proximity to the syenite, while that occupied by the Panther and Tiger (names, by the way, a little too suggestive of the wild species of the genus feline), is, nevertheless, believed to be a true fissure, cutting across the porphyry at right angles with the general trend of the Leopard vein and the main mineral belt. On the surface ground, more particularly of the last named mine, the quartz and porphyry are almost a *fac simile* of those found on the Comstock. Here the yellow porphyry gradually changes as depth is attained to that peculiar blueish cast, so characteristic of the same as everywhere seen on the dumps of Gold Hill and Virginia City, coming up from the lower levels; while the quartz passes from the same well-known color of the surface rock to a fine white, except when it is streaked and shaded, as there, by the dark tints imparted by the black silver-bearing sulphurets. Other parallelisms might be drawn, but little less striking. The facts are thought worthy of mention, as nowhere in the State, or elsewhere on the line of our travels, has a similar co-incident likeness been observed. The ore croppings of

The Leopard

Are 300 feet in length and from two to seven feet in width, while the porphyry described, somewhat peculiar to this lode, is from 150 to 200 feet across. It is probably well known that the mine paid well from the very surface, having had many dividends with but few assessments. As it is the leading mine of the district, a little more of the usual detail as to workings will be allowable. The greatest depth by shaft is 600 feet. On the 200-foot level the ore commenced 75 feet north of the shaft, and was followed all the way south by a drift 380 feet, all of which has been mined. The ore was found on the 300-foot level opposite the shaft and a drift run of 180 feet. On the 400-foot level a drift of 232 feet has been run, the ore being reached at the distance of 75 feet south of the shaft, and still seen in the face of the drift. A drift south on the 500-foot level of 225 feet, struck the ore body 127 feet from the shaft, which is found pitching west. From this drift about 700 tons have been stoped. On the 600-foot a drift has been extended south from the foot of shaft 250 feet. A cross-cut, from a point 100 feet south of shaft, has been driven west 150 feet, and another cross-cut of 34 feet run west from a point 200 feet south of shaft. The east wall of ledge is supposed to have been cut on the 500-foot level, 70 feet east of shaft, but has not been

found at the greatest depth on 600-foot level. It is thought that the cross-cut of 100 feet on the lowest level is within 25 feet of the ore chimney, as some bunches of fine rock have been passed through—the quartz in the cross-cut assaying from \$144 to \$785 per ton.

Since Mr. F. F. Coffin, the present Superintendent, took charge last August, nearly 6,000 tons of ore have been extracted, giving sample assays of \$143 per ton.

The explorations leave large bodies in sight with indications of soon reaching a larger and richer bonanza than any yet discovered. Such at any rate is the hope. In connection with the property there is a fine 20-stamp mill for dry crushing, provided with one of White's roasting furnaces, the usual complement of pans and other required equipments.

The South Leopard,

Adjoining, Mr. J. A. Norton, Superintendent, has put up steam hoisting works. A shaft for prospecting the mine has reached the depth of 125 feet. Having passed some 60 feet through the iron syenite, it is now sinking in the porphyry, with a fair prospect of finding ore by going deep enough, or drifting far enough east and west, as the location is on the general line of the lode.

The Hussey,

Lying north of the Leopard on the same lode, has reached the depth of 500 feet, and is at present taking out a considerable amount of ore, with probably 300 tons on the dump. In the temporary absence of Mr. C. C. Perkins, the Superintendent, but few facts could be gathered—a matter to be regretted, as it probably stands next in importance to the Leopard, in view both of the extent of developments and the quantity and value of ore, hitherto extracted or in sight. The different classes of ore from the two mines are in most respects similar.

Fifty tons worked in February last yielded from \$130 to \$140 per ton, which may be taken probably as something like an average of the ore as it comes from the mine. Whether a sufficient quantity can be supplied to justify the erection of a mill was not learned. If not, the deficiency could doubtless be made up from the Panther, Fissure and other mines of the vicinity.

The Fissure Mine, (Hogle & Co.)

On Silver hill, nearly opposite the South Leopard hoisting works, has been opened on the surface at several points, and at one place for 50 feet in length and to the depth of 15 feet, from which ore is at present being extracted. The developments show a six foot vein with a direction northerly and southerly with the general course of the belt. The ore assays in silver from \$45 to \$210 per ton—the highest assay running \$18 in gold. A tunnel has already been driven 210 feet. An extension of 175 feet further will tap the ledge at 300 feet from the surface. The enterprise is looked upon as big with promise, with scarcely a shadow of doubt hanging over the result.

The O. K. Mine,

Owned by Messrs. John Campbell, M. Bisheoff and others is admirably situated for working on the crest of the mountain, 3,000 feet south of the Leopard and Fissure and on the same great mineral belt, as the formation, as well as the quartz is very similar in character. A tunnel cuts the vein at 55 feet from the surface, and two shafts of 50 feet are sunk on the croppings and lode from six to 12 feet. The south shaft struck a chimney of good ore near the surface. It is estimated to work from \$60 to \$75 per ton, and appears to have held out in value as far as followed. A new shaft is about to be lowered on the vein from the end of the tunnel to the depth of 100 feet and a drift run thence south along the lode with the double purpose of further developing the mine and at the same time prospecting the ground of the Winnemucca adjoining in that direction.

The last mentioned claim belongs to Messrs. Ottenheimer and Sullivan of Cornucopia, and has already been opened sufficiently to show a four foot vein of good looking quartz, with as beautiful a foot wall as one could well wish to see.

Returning to the more immediate neighborhood of the Hussey and Leopard,

The Panther

May be seen on a ridge which it follows to a considerable elevation from the west to the east for the distance of 1,500 feet. Powder has evidently not been burnt in vain. Many an effective shot has been heard.

At a point near the west end a shaft of 40 feet was sunk from which 30 tons were shipped, netting \$650 each. At the depth of 175 feet it appears to be a well defined fissure vein from six to 18 inches in width, the ore assaying in this part of the mine from \$200 to \$500 per ton. Considerable work has been done here in winzes and drifts. The vein has widened in places to two feet, and the ore at this (175 feet) level has changed from a chloride to a sulphuret of silver. As further sinking with windlass was impracticable at this point, work has been discontinued pending the erection of hoisting works.

The ore body developed at this end of the mine is 230 feet long, 135 feet deep and from six to 18 inches wide, giving an average for the quartz of \$75 per ton as it comes from the vein. The cost for extracting need not exceed \$6 per ton.

The openings in the east end are still more favorable, showing a vein of ore from 14 inches to four feet, assaying from \$145 to \$292, 40 tons from this quarter having milled \$220 per

ton. Drifting and sinking are being vigorously pushed in this locality, under the superintendence of Frank P. Willard, Esq., a good ore body being already developed here to the depth of 75 feet, the full length of drift as far as it has extended.

The Tiger,

Lying east of the Panther on the same lode, shows a width, where opened, of from four to five feet. Work will soon be resumed both upon it and the Constitution, a neighboring claim and each looked upon as promising. The Beaver, the Black Diamond, the Republic and several others in the vicinity, although at present idle, are also represented as giving flattering prospects. As not more than a half dozen claims are now worked in the entire district and but a comparatively small force on each, Cornucopia may be said to be rather quiet. The Leopard mill is in readiness to start up, and spring is fairly upon them. A much livelier time may be expected.

This is by far the best developed district in northeastern Nevada, and gives the finest indications for permanence and prosperity in the future.

Mr. T. J. Harlan, assayer for the Blue Jacket mill and mine, the property of Mr. Thos. H. Blithe, of your city, reports that the mill started up on the 1st inst., (April,) and has been running on a much higher grade ore than formerly. A pretty fair supply is in sight, and the outlook for the season good. A. C. K.

Montana Quartz Mines.

The Helena *Independent* has a very sensible article on Montana's quartz mines, and raises the question why there is so little bullion produced from the large number of rich lodes throughout the Territory. It is the old story of re-enacted operations, carried on by Eastern capital through inexperienced Superintendents and thoroughly incompetent persons. There are monuments of this species of folly scattered all over the country. Mills have been erected at a cost of hundreds of thousands of dollars where no mines of value existed, simply on the representation of parties who had "feet" to sell. This thing has been done time and again, and the only wonder is that these capitalists should continue to make the same mistakes after once being fooled. The fault is not in the machinery that the mills are not successful, but in the locations chosen and the incompetency of those in charge of them. To a great extent the cause for so many failures in the reduction of ores in this Territory is being overcome. The mills are getting into the hands of competent and energetic men who have lived in the country for years, taking note of the reasons for failure in others and profiting thereby. These men first find out whether there is plenty of ore to be had in the locality chosen before erecting a mill. If the millman has quartz property of his own, he first develops his lead sufficient, at least, to disclose an amount of ore to keep the works supplied for a length of time that will repay the cost of putting up the mill. And this is the true principle to go upon. The old maxim, "be sure you are right, and then go ahead," might be well applied to this subject, by changing the sentence to, "be sure you have the quartz and then put up your mill."

Take the mills of this camp as an illustration of this principle: of the four mills in operation, two were put up by parties owning lead property, with the express intention of treating their own ores. In both instances the owners had previously developed their mines enough to reveal a quantity of ore that would secure them against loss in their construction. Assays and milling tests of the ores were made and the value per ton ascertained, that there might be no cause for failure in this respect. The result is that the Burlington and Davis mills are running steadily, the latter not having shut down, only to clean up its boiler, since starting up three months ago. The yield of bullion is not positively known, further than that the owner seems to be perfectly satisfied, and continues to make improvements in and about the mill, and is pushing developments on his mine rapidly. Not a ton of ore has been crushed except from the Lexington lode. The Burlington mill, erected by Messrs. Young & Roubesh, to treat the ore from their claim on the Burlington lode, has done equally well since the works were completed. They made a couple of trial runs before the mill was wholly finished, and of course, made some stoppages during the time. For the past month, however, the mill has run steadily day and night, crushing from four to five tons every 24 hours, and saving a high per cent. of the assay value of the ore. All of the quartz crushed is taken from one claim on the Burlington lode.

The Dexter or Farlin mill, was built with the original intention of treating the ores from the Travona and Black Chief lodes, the property of Mr. Farlin. Owing to financial embarrassments, however, this mill was completed and started up under the control of W. A. Clark, treating ores of all grades of value and baseness. With what success these works have been run may be judged from the regular shipments of bullion made. Occasional breakages of machinery have occurred, causing short and temporary stoppages, but other than this the mill has been in operation steadily for 10 months. The Centennial mill was put up to do custom work, treating all classes of milling ore

found in this camp, and several lots from outside districts. These works were started and have since been kept in operation under many disadvantages, but have been in the main successful in the treatment of ores. With a few improvements and the financial affairs of the owner properly adjusted, the property would be, and is now, valuable. Owing to some contention between the managers and mine owners, there has been a scarcity of ore recently, but the works are now in operation, and giving fair satisfaction. Referring to the *Independent's* article, we endorse what it says in relation to mill-men and miners working together with harmony, and trust the advice will be heeded. We quote:

At the present time there are a number of really good mills in operation in the Territory and plenty of men who have already learned to treat the various ores in a practical manner, and to the profit of all concerned. It is the duty, therefore, of those who have lodes that can be worked with the outlay of limited capital, to keep these mills supplied with all the ores they can reduce. By doing this, mill-men can and will reduce the price of reduction to about one-half that now charged. They will do so because they can make money at low figures if their mills are kept constantly employed—nothing, if they remain idle half the time. Aside from this, the steady flow of bullion from the country will, in a short time, attract capitalists who are ever on the alert for a good investment, but a few bars every week or two will not have any effect upon them, and the closing of a mill, even temporarily, is bound to have a chilling effect upon any person who may have thoughts of investing in mines or mining machinery. The unceasing clatter of the mills and an uninterrupted flow of bullion, is the only argument that will induce capitalists to seek this remote region for the investment of their surplus funds. Therefore, every person in the Territory should put forth their best exertions to accomplish this object, and not, as is frequently the case, throw obstructions in the way of those who are doing all in their power to develop the country. Mill-men and miners should work together harmoniously, for whenever one prospers the other is certain to do the same.—*Butte Miner*.

ARIZONA.—We had the pleasure of meeting Mr. Dougherty, a very pleasant and well-informed gentleman and an old resident of Pioche, to which town he is now on his way. Mr. Dougherty and party left Pioche for Arizona fifteen months ago with a complete prospecting outfit and have examined the most of the mines in the territory since that time. He gives a very graphic and lucid exposition of its mineral resources, although somewhat skeptical as to the immense wealth that has been generally accredited to it. The party had a very thorough outfit, carrying with them a small chemical laboratory and testing all evidences of mineral deposits. They spent the most of their time in the Chiricahua mountains and have made some very good locations, rejecting anything that assayed under sixty dollars per ton. Mr. Dougherty explains that nothing can be promised as to the future of Arizona, from the fact that all the work done, as yet, is mere scratching on the surface, no mine having been explored to the depth of three hundred feet. If the deposits prove permanent it will be a very rich country, but in its present undeveloped state he is emphatic in his advice to the miner, mechanic and laborer to stay away from there. The most of the mining and manual labor is performed by the Mexicans, who are satisfied with a stipend varying from fifty to seventy-five cents per day.—*Eureka Sentinel*.

MINERAL GROUND IN DISPUTE.—The Loyal Lead mining company, whose property is situated near the town of New Chicago, in that rich mineral region known as the Lava Beds, after putting up a mill and doing some prospecting, quit work, and the ground remained idle for a number of years. Later, when the wealth of the Lava Beds was ascertained by actual working by outside parties, the Loyal Lead owners again figured on the scene, and secured an injunction enjoining the miners from working the ground. They next started work in running a tunnel towards the North Gover claim. A short time only elapsed before the workmen struck a quartz ledge five or six feet wide. And now comes the North Gover owners and claim the ground, commencing suit in the District Court for its possession. Some 50 injunctions were issued and served last week against the Loyal company and unknown claimants, and the place that 10 days back was alive with miners, is to-day silent and deserted, pending the result of litigation.—*Amador Ledger*.

IMPROVEMENT IN CAR SPRINGS.—According to a Newcastle, England, paper, the craft of railway spring makers is threatened with a very serious competition. A new circular spring has been invented; it is made entirely by machinery, and is said to be free from many defects of the present hand-made springs. The new springs are made of solid round bars of steel, highly polished, cut and bent into elliptical forms and bound together in sets to form springs. Four or five bars form the top and bottom of each spring; and it is intended as a further improvement to have a spiral spring, also machine made, to be placed at the centre between the top and bottom set of springs. This would act as a duplicate; in case of accident it would support the entire weight of the carriage.

MECHANICAL PROGRESS.

A New Military Invention.

The German General, Berdan, has devised a new distance calculator, or, in military language, "range-finder." When closed up ready for moving, says *Iron*, it looks like a sort of primitive chariot, mounted on two large light wheels and drawn by one horse. Two men ride upon the comfortable seat, the driver and the operator, and for the latter, so simple is the instrument that no special training is necessary, however desirable it may be that he should also understand the principle of trigonometrical science. When the range of any point is to be taken, before a battery begins to play, for instance, or a regiment to fire, the horse is slipped out of the shafts, and the body of the "chariot" then turned completely over on its axle. The frame, on which is built the seat, then serves as a firm and steady support for the instrument. The body of the vehicle is revealed as a box or case one meter wide, nearly two long and about a foot deep; and when its two opposite ends are thrown open, the instrument is ready for use. This consists, loosely described, of two parallel telescopes, about one and a half meters long, and very powerful, affixed to a frame which swings on a common pivot. The sight ends are just one meter apart, and this, of course, the best line of the calculation. One of these telescopes, the one at the right hand, is movable only with the frame, of which both form a part. This is first sighted on the object, and the frame is made fast, the first step being thus completed. The other telescope is adjustable further, on a pivot of its own, and by means of a small wheel is turned to the right angle of convergence with its companion—that is to say, until it covers the object. Now, having the base line and the angle of convergence, any surveyor could, of course, calculate the distance. But in General Berdan's instrument the wheel which adjusts the second telescope is marked off into meters, centimeters and milimeters, is covered by a little hand or pointer, and when the object is brought within the focus the pointer indicates exactly the distance. This is absolutely all there is of it. In two minutes the instrument can be unlimbered, put into readiness, and a distance found, less time therefore than a gun or battery is made ready. Then the two ends are closed, the body swung around into its place, the horse put into the shafts, the driver and operator mount the box, and away they dash to some other point.

OPPOSITION TO MACHINERY.—We are informed, says *Capital and Labor*, that in an eminent coach-building establishment, a short time ago, the principals desired to introduce an American machine for making the wheels. These, of course, have to be prepared and fitted together with the utmost accuracy; and the machine in question secured this so that any number of wheels could be turned out strictly to gauge. Some of the men engaged in this department were ready enough to work the machine, by which their own labor was lightened, and higher wages were secured to them. But as the use of the machine was contrary to the Trade Union rules, the men were ordered to desist. The machinery was therefore put aside. Since that time wheels made by similar mechanism have been imported from America, this being the only way by which the public requirements for light and strong wheels could be met. It is a curious fact that some of the English carriages exhibited at Philadelphia last year were mounted upon American wheels, which had been sent over from the United States to England, painted, and then returned with the body of the carriage for exhibition. We understand that large numbers of wheels are thus imported, which might have been made in England but for the insensate opposition to the use of machinery.

A BULLET-PROOF CAR.—There has just been completed at the car shops in York, Pa., says the *American Manufacturer*, the first bullet-proof car ever manufactured in the United States. The car is 31 feet long, eight feet high and furnished with all the latest improvements in ventilation, etc. The body below the windows is covered with three-eighth-inch iron manufactured at the Paxton rolling mill, Harrisburg, and the body above them is covered with three-tenth-inch steel. The windows can be closed with steel slides, and when they are shut down the entire car is bullet-proof. The interior is richly ornamented, and in appearance, inside and out, resembles a first-class passenger coach. It weighs about 6,500 pounds and was ordered by the Spanish government for use in Cuba.

WINDMILLS in Holland are about as high as an average church steeple. The arms or fans are of an enormous length, and carry 3,000 feet of canvas. And this is the machine that literally makes Holland. It pumps out the ocean when the ocean gets in. It saws and grinds. It does the lifting and the lowering. A family lives in the mill. In Holland there are full 10,000 of these mammoth structures. Some are built of brick, others of stone, many of wood. They turn slowly, but with great power; and there is seldom a serious or long continued lack of wind.

Iron Railroad Cross-Ties.

An interesting paper on the substitution of iron for wooden cross-ties, by L. S. Weyers, of Brussels, was communicated to the annual meeting of the British Iron and Steel Institute, March, 1877, and published in the *Iron and Coal Trades Review*. The writer gives some details in relation to the practical feasibility of promptly realizing this radical transformation, which, sooner or later, as the forests of the world disappear, will undoubtedly impose itself upon all nations.

He describes several kinds of iron ties that have been suggested, and finally decides upon one possessing these special advantages: 1. It does away with the use of wood in the construction of railroads. 2. It is easy of application everywhere, and can be adapted without special workmen. 3. The rails can be reversed at any time without difficulty. 4. The stability of the rail is great from the number of points of contact which exist between it and the chair. 5. The drainage of the middle track is as perfect as possible. 6. Repairs and renewals are of the easiest and simplest kind. 7. Transportation of material is facilitated, as only one sort of cross-tie is used for either straight or road. 8. The system adapts itself equally well to any section of rail actually in use. 9. Solidarity of parts is obtained without any excess of rigidity. 10. The number of various parts of the appliance is limited to a minimum, as it comprises only one cross-tie, one jawbone chair, two small washers and two bolts. 11. The economy in the laying and maintenance of the track as compared with other systems.

Blasting by Electricity.

The *Colliery Guardian* says: Last week a new phase of mining was introduced at the Houghton main colliery company's extensive works, near Barnsley, where two 15-foot shafts are being sunk in strata, which was yielding a great quantity of water, the greater part of which is now tubbed off. Dynamite is the explosive used here; a number of holes being exploded with the best time fuses at nearly the same time as possible; but the necessity of some more perfect arrangement of simultaneous blasting has long been apparent, the uncertainty of the time fuse even with the most perfect arrangements being very great. It was with this object in view that experiments were made with a new patent electric blasting machine, in connection with Captain Brain's electric fuses, these experiments being conducted by Messrs. F. W. T. Brain and T. Sleeman, on behalf of the Electric Blasting Apparatus Company, Cinderford, Gloucestershire. Most astonishing and successful results were obtained with this simultaneously firing nine holes in the bottom of the shaft, these being arranged in most practical form by Mr. Walker, the colliery company's manager, on a somewhat similar plan to that published by the Electric Blasting Apparatus Company. The output, which from this number of shots fired with the time fuse, had never exceeded 11 tubs, now yielded 47, and all the managers and others who were present concurred in the opinion that the great advantage accruing from the use of this simple apparatus could not be over-estimated. The experiments were witnessed by Mr. Thompson, General Manager of the company, Mr. Walker, the Resident Manager, and other gentlemen interested in mining matters.

RUSSIAN BOUNTY TO HOME MANUFACTURERS.—The *American Manufacturer* says: The Russian government, with a view to the encouragement of native industry, has passed an order that no contracts for railway carriages, locomotives or tenders shall be placed abroad beyond the number of the latter specified in the title deeds of certain companies. Premiums are to be paid to the machinists for the production of locomotives varying from 2,400 roubles to 3,000 roubles, according to the size. These premiums are to be payable for five years, but can only be claimed by firms which produce at least 30 locomotives per annum. During this period the makers will also be allowed to import steel, etc., duty free. The scale of prices for locomotives will be fixed by government, on the basis that the cost price of the Russian machines shall equal the price of similar machines abroad, plus the import duty, the premium not being taken into consideration in the calculation.

MINING THROUGH WATER.—One of the most interesting papers read at the meeting of the Iron and Steel Institute was that on the Chaudron method of piercing water surfaces in order to get at the minerals below them. By an ingenious arrangement of metal casing the effect of something like water-tight compartments is attained, the walls of the shaft are made impervious to the surrounding currents, and access is obtained through the midst of a layer of gravel permeated by water down to the layer beneath, rich in mineral formations.

CENTER DUMP CARS.—The Missouri, Fort Scott and Gulf road contemplate building some iron center dump cars for coal transportation in winter, and grain in summer. When used for the latter purpose they are to have tarpaulin covers. The model of their construction is similar to some cars of this class on the Baltimore and Ohio road.

A BILL has been introduced in the lower house of the Ohio Legislature to compel railroad companies to use self-extinguishing stoves on passenger cars.

SCIENTIFIC PROGRESS.

Origin of the Zodiacal Light.

Prof. Fairchild writes for the *Phrenological Journal* as follows: This vexed astronomical question has been recently reopened by one of our American physicists, who contends that the cone of illumination visible in the advance and recession of the sun, is caused by a section of the earth's atmosphere acting as a tremendous plano-convex lens condensing the solar rays in the form of a pyramid. This cone, as is well known, appears in this latitude most frequently in the spring and fall, when the atmosphere is extremely clear, and may be seen from eight to nine o'clock in the evening, and from three to five in the morning. That it is a phenomenon of solar action, is evident from the fact that its axis is always nearly parallel with a line drawn from the sun's center, in the same manner as the axis of the cone of light produced by a condenser, such as is used for microscope work, is nearly parallel with a line drawn from the light to the point or object illuminated. Its breadth at the base is usually about that of the tropical belt of the earth's atmosphere, and its apparent height is exactly such as would be anticipated under our theorist's view of the case. Of course, the surface of the earth reflects a vast amount of light at all hours in the day, and luminous results of this reflection may be rendered experimentally visible very readily, by observing it against a dark background, which, in the instance of the zodiacal light, is supplied by the shadow of the earth. The reader who is curious to calculate this problem more closely, may remember that the earth's diameter is to the sun's diameter about as 1 to 110, and the sun's diameter to the distance between the two bodies as 1 to 110—an odd coincidence in the figures merely. The length of the shadow cast by the earth at midnight can thus be easily ascertained, since it is simply the axis of an isosceles triangle, the base and angles of which are known. The zodiacal cones of light, one in the east, the other in the west, occupy the base of the conical shadow cast into space by our globe. The reader will readily see how this happens. The earth's atmosphere being about forty miles deep, an oblique section of it, in the form of a huge plano-convex lens, is the seat of all those gorgeous light and color effects that come on just after sunset and just previous to the sun's rising. In addition to prismatic or color effects, due to clouds and to varying densities, the whole atmospheric section transmitting the sun's rays obliquely has, according to our author, an action exactly similar to that illustrated by holding a convex lens near a dark screen, with the axis of the lens presented obliquely to the light. The theory is an ingenious one, and fully accounts for the phenomenon; but on account of a single yet unascertained point, opinion must be for the present suspended. It has been stated, not demonstrated, by spectroscopists, that the zodiacal light is not reflected sun light; and if this statement is verifiable, such an explanation as that just offered is, of course, inadmissible. The proposed new view is, however, so simple and so thoroughly in accord with the ascertained laws of optics, besides offering such a complete exposition of all the phenomena involved in the problem, that one would almost regret to find the statement of the single spectroscopist, who has ever tested the question, verified by subsequent investigation.

MUSICAL SOUNDS IN WOODS.—M. Decharme experimented a short time ago on the musical sounds given by metallic bars of different metals having the same dimensions. He has made similar experiments on different kinds of wood. Notwithstanding the diversity of the kinds of wood examined (38 species and 14 varieties), they were all found to give sounds comprised in the interval of an octave. The most grave sound is m_{14} , given by box; the highest m_{15} , given by Northern fir. M. Decharme gives a list of the sounds emitted by different woods between the two extremes. The range of sounds from the metals extended from 690 vibrations for lead to 2,762 vibrations for aluminum. Sounds from wood are comprised between those for brass, 1303.62, and aluminum, 2762. This is no doubt partly accounted for by the much less range of densities in woods than in metals. Still there are anomalies. Thus, the willow, which, after the poplar and certain firs, was the lightest of the woods experimented on, gives the same note (sol_4) as ebony, which is the heaviest after the the' and the palisander. It was difficult to appreciate the intensity and the duration of the sounds, but palisander, logwood, walnut, acacia were in the front rank in this respect. (The durations of the sounds did not exceed the fraction of a second 0.5, to 0.7, for the most sonorous palisander.) Northern fir and poplar had the clearest timber.

THE FACE OF VENUS.—Mr. Brett has been occupying a good deal of attention lately with a theory that the surface of Venus reflects light specularly, like a polished globe. It is curious that an idea so completely at variance with all the observed facts should have elicited so much discussion. It is easy to show that, if Venus did reflect in this manner, like a thermometer bulb, the image of the sun, which would be formed by the reflection, would be visible only in the most powerful telescopes, if at all.

CURIOUS EXPERIMENTS WITH A RAT'S TAIL.—In a paper read the other day to the French Academy, M. Bert tells how he has been trying to clear up some points in the transmission of excitations along sensitive nerves. The *Journal of Chemistry* says: He takes a young rat, skins a little piece at the end of the tail, and inserts the skinned part into a hole made in the subcutaneous tissue of the animal's back. The connection is completed with the aid of sutures and time, and the rat reconciles itself as best it may to wearing its tail like the handle of a teapot. After eight months the "handle" is cut in two. On pinching the part left in the back, the rat evidently feels pain, and tries to escape. It is thus satisfactorily shown that an excitation has traveled along sensitive nerves in the dorsal part of the tail, in a direction opposite to the normal, those nerves having united with dorsal nerves leading into the spinal cord. This sensibility in the dorsal stump of the tail disappeared in a day or two, and the nerves were found to be in a state of degeneration, owing to separation from their trophic centers. It might have been otherwise, it is thought, had the new connection been prolonged. The experiment, then, is supposed to prove that an excitation at a point of a sensitive nerve is propagated at once in both directions, centrifugal and centripetal; and the same holds probably for motor nerves.

THE TELEPHONE.—There is another claimant in the field for the honor of inventing the telephone. Dr. James Davis of Salisbury, N. C., writes to the *Raleigh Observer*, stating that his "phonetic telegraph," invented ten years ago, anticipated the discoveries of Messrs. Bell, Gray and others. Dr. Davis says that he made pen-and-ink drawings at that time, fully illustrating his invention, and that he described his apparatus to persons whom he names. He declares that his device covered the changing of air vibrations into those of electricity, and restoring the air waves after transmission; that his apparatus was more perfect than that which the present inventors exhibit, and that it could write or register the sounds in a distinct language. Dr. Davis is evidently under the impression that the telephones exhibited have not accomplished the last mentioned fact, but Mr. Gray described an addition for this purpose to his apparatus in the specifications of his English patent, and Prof. Bell is understood to have contrived something of the sort in connection with his sounding diaphragm at the receiving station.

LECTURE EXPERIMENTS.—Two neat and simple lecture experiments are described in foreign journals. F. C. G. Muller, to show that air has weight, proceeds as follows: A small quantity of water is boiled in a flask till the vapor wholly expels the air. A stopper, containing a small tube drawn to a point, is then fitted closely into the flask. The whole contrivance is then placed on a scale and exactly counterbalanced by weights. The lecturer then breaks off the point of the tube and puts the broken pieces back on the scale. By this time the flask is cooled, and as the air rushes in, the scale descends. Victor Meyer illustrates the increase of weight that occurs in combustion by means of a short candle balanced on a scale pan along with the following accessories: a small lamp cylinder surrounds the candle, so close that it will nearly touch its flame. In the cylinder there is a piece of wire gauze, which supports several pieces of caustic soda. The scale is evenly balanced when the candle is lighted, but after burning a while the oxygen absorbed in the formation of sodium carbonate causes the scale to descend.

ANOTHER NEW METAL.—This metal has been named Lavesium by its discoverer, M. Prat, in honor of Lavoisier. In color it resembles silver; it is fusible and malleable. Its crystals are colorless, and its distinctive characteristics, according to M. Prat, are—its silver color, the nature of its spectrum, the solubility of its oxide in ammonia, the peculiar color of its combinations with the ferro-cyanide of potassium, and with sulphureted hydrogen. With the spectroscopic metal gives twenty-three lines, several of which coincide with those of copper, whence M. Prat conjectures that copper may contain the new metal.—*Medical Examiner*.

CHEMICAL RESPIRATOR.—As an improvement upon the numerous respirators hitherto proposed for enabling the wearer to penetrate carbonic oxide, and other gases, left in cellars after explosions of fire-damp, Mr. W. H. Watson, F. C. S., of Beckermest, suggests a respirator containing solution of caustic potash in a tube, as devised by Mitscherlich and modified by De Koninck. Air containing a dangerous proportion of carbonic oxide is fit for respiration after passing through the potash solution. He thinks a valve arrangement might be used, to ensure inspiration of the cleansed air through the mouth, and expiration through the nose.

TRANSIT MEASUREMENTS.—The measurements of the transit of Venus photographs by Prof. Harkness, at Washington, are approaching completion. The reductions of star observations for time and latitude are nearly finished, and in all respects the work is in such a state of progress that it is hoped that the results of the American observations may be published before the end of the year. The work of the English, French, and Germans seems to be nearly in the same stage of forwardness. As to the Russians, we hear nothing yet.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Apr. 12.	Week Ending Apr. 19.	Week Ending Apr. 26.	Week Ending May 3.
Alph.	124	11	143	121
Alfa.	1,75	1,65	11	14
Andes.	800	850	650	800
Baltimore Con.	450	400	300	100
Belcher.	60	5	4	5
Belmont.	11	1	1	1
Best & Belcher.	24	20	212	191
Bullion.	101	81	9	6
Caledonia.	5	3,40	3	2,65
California.	44	38	33	34
Challenger.	11	11	1	800
Chollar-Potosi.	450	38	39	34
Confidence.	1,20	1,01	51	34
Con Imperial.	40	34	30	32
Crown Point.	61	4,90	81	61
Coso Con.	100	100	100	100
Dayton.	500	200	100	100
DeFreese.	4	1	1	1
Exchequer.	44	31	3,40	2,65
Geddes & Bertrand.	250	300	1,50	3,20
Gen Thomas.	4	3,90	4,25	3,85
Grand Prize.	4	3,90	4,25	3,85
Globe Con.	2,05	13	21	21
Golden Chariot.	100	84	91	71
Gould & Curry.	91	3	3,15	1,65
Hale & Norcross.	2,80	2	1,90	1,65
Hussey.	10	9	104	74
Julia.	2,80	2	1,90	1,65
Justice.	10	9	104	74
Kentuck.	5	4	6	31
Knickerbocker.	300	250	150	50
Kossuth.	250	250	150	50
Lady Bryan.	2,05	13	21	21
Leads.	2,05	13	21	21
Leviathan.	500	100	400	300
Leeds.	2,05	13	21	21
Manhattan.	61	2	2	71
Meadow Valley.	500	450	250	71
Mexican.	100	100	100	100
Northern Belle.	231	211	16	16
Northern Con.	4,20	3,80	3,40	3
Occidental.	17	124	16	14
Ophir.	46	23	201	154
Overman.	8	71	61	41
Pacific.	5	71	61	41
Phil Sheridan.	400	200	300	250
Panther.	400	200	300	250
Poorman.	400	200	300	250
Prospect.	400	200	300	250
Raymond & Ely.	400	200	300	250
Rock Island.	200	150	100	150
Savage.	4,95	41	3,65	21
Seg Belcher.	300	30	25	31
Sierra Nevada.	44	3,70	4,40	31
Silver Hill.	100	100	100	100
South Chariot.	500	200	400	300
Succor.	650	600	600	600
Trojan.	100	100	100	100
Union Con.	100	100	100	100
Wells-Fargo.	200	200	200	200
Woodville.	500	400	300	200
Yellow Jacket.	9	71	61	41

Sales at S. F. Stock Exchange.

FRIDAY, A. M., APR. 27.	10	Leopard.	2,40
370 Alpha.	12@124	325 Mexican.	84@81
1335 Best & Belcher.	19@181	940 Modoc.	2,85@2,95
940 Belcher.	41@45	155 Manhattan.	71@74
1335 Baltimore Con.	45@40	605 Morning Star.	31@34
1500 Con Imperial.	55@51	385 Northern Belle.	15
1100 Crown Point.	6@54	150 New Coso.	4
1405 California.	331@331	240 Overman.	171@181
1815 Con Virginia.	14@13	305 Ophir.	134@144
355 Chollar.	36@35	400 Prospect.	134@144
50 Confidence.	4	135 Raymond & Ely.	30
75 Caledonia.	2,60@23	140 Sierra Nevada.	31
100 Challenger.	900	160 Silver Hill.	75@80
305 Chollar & Curry.	31@33	300 Seg Belcher.	30
1395 Hale & Nor.	1,95@22	140 Union Con.	44@41
645 California.	14@13	100 Yellow Jacket.	9@10
745 Julia.	1,65@161	MONDAY, A. M., APR. 28.	
25 Kentuck.	4@31	250 Alpha.	111@111
1095 Mexican.	71@61	400 Andes.	45@35
350 New York.	250	500 Baltimore Con.	100
1500 Ophir.	18@17	290 Belcher.	43@41
235 Overman.	18@17	130 Bullion.	57
100 Occidental.	750	150 Con Imperial.	1@95
100 Phil Sheridan.	51	300 Con Imperial.	241
945 Savage.	1,50	200 Challenger.	341
755 Sierra Nevada.	3,50@3,50	200 Chollar.	351@341
40 Seg Belcher.	20	135 Chollar.	351@341
710 Union Con.	44@41	135 Con Virginia.	351@341
215 Utah.	100@91	1255 Crown Point.	51@51
305 Wells-Fargo.	30	190 Caledonia.	2,10@2,10
410 Yellow Jacket.	61@61	35 Confidence.	5
AFTERNOON SESSION.		200 Dayton.	50
100 Advance.	34	350 Exchequer.	2,90@2,95
300 Andes.	160	520 Gould & Curry.	71
620 Belmont.	160	145 Justice.	80
610 Best & Belcher.	20@19	670 Julia.	11@90
610 Con Virginia.	34@34	200 Kossuth.	50
70 Chollar.	37	100 Leviathan.	350
1450 California.	31@31	305 Mexican.	81@80
585 Con Imperial.	1,05@1	105 Ophir.	131
620 DeFreese.	1,25	1065 Overman.	171@181
275 DeFreese.	1,25	100 Silver Hill.	75
300 Empire Id.	150	190 Savage.	31@31
800 Grand Prize.	3,90@3,95	140 Seg Belcher.	16
250 Gould & Curry.	71@71	1445 Sierra Nevada.	31@31
100 Hale & Nor.	2,10	100 Utah.	91
755 Hussey.	1,20	550 Union Con.	44@41
100 Justice.	81	780 Yellow Jacket.	43@41
750 Leopard.	21@21	AFTERNOON SESSION.	
500 Leeds.	1,85	1430 Best & Belcher.	161@171
200 Lady Washington.	2	150 Belmont.	171
1000 Manhattan.	71@71	1025 California.	33@31
160 Mexican.	81@81	100 Chollar.	31@31
160 Morning Star.	31	185 Con Virginia.	331@331
130 Northern Belle.	14	390 Crown Point.	41@41
500 New Coso.	4@4	340 DeFreese.	1,40
100 North Con Virginia.	200	260 Empire Id.	181@181
360 Ophir.	141@141	400 Eureka Con.	181@181
140 Overman.	181@181	200 Golden Chariot.	13
1000 Prospect.	100	270 Grand Prize.	3,90
1795 Rye Patch.	21@21	535 Hale & Nor.	1,60@1,61
570 Savage.	21@21	100 Hussey.	100
425 Sierra Nevada.	3,40@3,40	250 Jackson.	150
8 A. T. DAY, A. M., APR. 28.		100 Jefferson.	150
390 Alpha.	111@111	110 Leopard.	21@21
300 Andes.	50@50	450 Mexican.	71@71
400 Advance.	34	475 Modoc.	21@21
1335 Best & Belcher.	20@20	1400 Modoc.	2,85@2,85
130 Belcher.	41	365 Northern Belle.	151@151
355 Bullion.	61@61	450 Overman.	171@181
1000 Baltimore Con.	100	140 Ophir.	121@121
705 California.	341@341	100 Rye Patch.	21@21
100 Crown Point.	51@51	480 Sierra Nevada.	3,35@3,35
1050 Con Virginia.	341@341	190 Yellow Jacket.	51@51
280 Chollar.	36@36	TUESDAY, A. M., MAY 1.	
745 Con Imperial.	1,05@1	555 Alpha.	91@91
165 Caledonia.	21@21	145 Belcher.	43@41
15 Challenge.	300	11370 Best & Belcher.	161@151
45 DeFreese.	1,25	1370 Con Virginia.	31@31
200 Dayton.	50	2525 Con Imperial.	70@60
400 Exchequer.	31@31	1680 California.	31@31
495 Gould & Curry.	71@71	260 Chollar.	29@30
520 Grand Prize.	3,90	100 Confidence.	21
550 Golden Chariot.	21@21	300 Crown Point.	41@41
880 Hale & Norcross.	2,62@2,65	100 Exchequer.	1,90@1,95
475 Julia.	1,10	2630 Gould & Curry.	71@71
245 Justice.	81	615 Hale & Nor.	1,1@1,1
100 Jackson.	31	4175 Julia.	70@71
30 Kentuck.	41	615 Justice.	81@81
400 Leviathan.	350		

910 Mexican.	61@51	1750 Gould & Curry.	40@31
815 Ophir.	12@11	500 Hale & Nor.	1,05@1,15
1255 Overman.	12@10	535 Justice.	81@81
885 Savage.	31	95 Kentuck.	43@41
1500 Sierra Nevada.	31@31	1205 Mexican.	51@51
130 Seg Belcher.	12	775 Ophir.	91@91
10 Utah.	3@71	1035 Overman.	171@181
1460 Union Con.	24@25	530 Savage.	24@25
1170 Yellow Jacket.	51@49	100 Seg Belcher.	11@10
AFTERNOON SESSION.		940 Sierra Nevada.	21@21
100 Alta.	900	535 Utah.	50@51
310 Alpha.	31@31	1005 Union Con.	21@21
335 Andes.	800	1000 Yellow Jacket.	43@41
1300 Baltimore Con.	50	AFTERNOON SESSION.	
200 Belmont.	1	275 Alpha.	91
1005 Best & Belcher.	151@151	300 Advance.	34
1130 California.	30@29	350 Andes.	55@55
30 Challenger.	50	590 Best & Belcher.	131@131
1250 Con Virginia.	31@30	385 Bullion.	21
1020 Crown Point.	51	625 Crown Point.	50@49
295 Con Imperial.	70@75	35 Chollar.	31@31
1020 Caledonia.	14@13	135 Caledonia.	21@21
200 Dayton.	50	1395 California.	21@21
250 De Freese.	1,20	350 Challenger.	55@55
140 Eureka Con.	181@171	1050 Con Virginia.	271@271
150 Gila.	250	375 Exchequer.	1,80@1,90
845 Gould & Curry.	41@41	295 Eureka Con.	161@161
490 Grand Prize.	3,90	400 Gila.	150
750 Hale & Nor.	1,1@1,1	550 Grand Prize.	3,90@3,90
305 Hussey.	100	260 Golden Chariot.	13@13
630 Leopard.	21@21	805 Gould & Curry.	31@31
500 Leviathan.	400	785 Hale & Nor.	1,20@1,20
325 Manhattan.	21@21	1170 Julia.	30@31
310 Modoc.	21@21	250 Northern Belle.	151@151
170 Morning Star.	31	315 Justice.	81@81
175 Northern Belle.	151@141	100 Leeds.	1,15
300 New Coso.	31	740 Leopard.	11@10
30 New York.	100	100 Leviathan.	350
485 North Con Vir.	100	150 Modoc.	21@21
415 Overman.	100	585 Manhattan.	61@61
755 Ophir.	10@91	835 Mexican.	51@51
535 Prospect.	35@35	60 Morning Star.	31
860 Savage.	24@27	100 New Coso.	31@31
955 Silver Hill.	71	100 New York.	100
1100 Trojan.	50@40	575 Northern Belle.	131@141
260 Yellow Jacket.	41@41	50 North Con Virginia.	50
WEDNESDAY, A. M., MAY 2.		100 Occidental.	50
310 Alpha.	31@31	875 Ophir.	91@91
150 Andes.	75@75	200 Overman.	111@111
1165 Best & Belcher.	13@13	200 Prospect.	52
1245 Bullion.	2,95@2,95	250 Raymond & Ely.	36@31
1810 California.	28@28	210 Trojan.	21@21
100 Chollar.	31	755 Union Con.	21@21
110 Confidence.	21	140 Utah.	5
2580 Con Imperial.	70@65	125 Ward.	5
1360 Con Virginia.	261@261	170 Yellow Jacket.	50@51
115 Crown Point.	4,90@4,90	170 Yellow Jacket.	50@51
880 Exchequer.	1,60@1,60	170 Yellow Jacket.	50@51
THURSDAY, A. M., MAY 3.		THURSDAY, A. M., MAY 3.	
390 Alpha.	111@111	400 Alpha.	91@91
100 Andes.	50	955 California.	21@21
100 Baltimore Con.	100	985 Best & Belcher.	111@111
460 Best & Belcher.	191	560 Belcher.	40@41
1080 Belcher.	61@51	1400 Bullion.	1,40@1,40
1680 Crown Point.	51	350 Con Imperial.	21@21
1283 Con Imperial.	61@51	475 Chollar.	29@29
145 Confidence.	4	200 Con Virginia.	271@271
40 Chollar.	35@34	1240 Caledonia.	14@14
645 California.	331@331	425 Caledonia.	21@21
265 Challenger.	55	915 Crown Point.	50@51
245 Caledonia.	2,60	835 Confidence.	21
70 Challenge.	800	830 Exchequer.	1,1
350 Dayton.	10@50	2245 Gould & Curry.	3,20@3,20
50 Exchequer.	3,45	615 Hale & Nor.	1,20@1,20
625 Gould & Curry.	41	2000 Julia.	200@200
140 Hale & Norcross.	2,10	1305 Justice.	81@81
235 Justice.	81@81	1305 Justice.	81@81
900 Julia.	1,10@1,15	220 Kentuck.	41
140 Mexican.	140	490 Mexican.	4,90@4,90
270 Leviathan.	350@350	490 New York.	100
270 Mexican.	81	101 Overman.	101@101
250 New York.	200	575 Ophir.	91@91
450 North Con Virginia.	200	500 Prospect.	300
145 Savage.	1,21	475 Savage.	1,21
250 Overman.	181@181	1115 Sierra Nevada.	3,02@3,02
7350 Prospect.	40@35	70 Seg Belcher.	121@121
100 Phil Sheridan.	51	100 Silver Hill.	150@150
120 Silver Hill.	150	230 Trojan.	21
30 Seg Belcher.	181@181	400 Utah.	51@51
320 Savage.	2,60@2,60	560 Union Con.	2,70@2,70
450 Sierra Nevada.	3,00@3,00	1335 Yellow Jacket.	31@31
525 Union Con.	21	AFTERNOON SESSION.	
500 Yellow Jacket.	7	170 Alpha.	111@111
270 Yellow Jacket.	7	275 Best & Belcher.	131@141
20 Belcher.	44	560 Bullion.	2,20@2,20
1250 Con Imperial.	750@750	300 Con Imperial.	21@21
975 California.	28@28	975 California.	28@28
400 Crown Point.	51@51	400 Crown Point.	51@51
650 Caledonia.	1,51@1,51	650 Caledonia.	1,51@1,51
235 DeFreese.	1,30@1,30	235 DeFreese.	1,30@1,30
500 Eureka Con.	151	835 Exchequer.	2,02@2,02
325 Exchequer.	2,02@2,02	325 Exchequer.	2,02@2,02
780 Grand Prize.	3,90@3,90	780 Grand Prize.	3,90@3,90
680 Gould & Curry.	41	2680 Gould & Curry.	41
1230 Hale & Nor.	1,40@1,40	1230 Hale & Nor.	1,40@1,40
1230 Justice.	81	1230 Justice.	81
100 Leopard.	90@91	100 Leopard.	90@91
300 Leeds.	1,15@1,15	300 Leeds.	1,15@1,15
1550 Modoc.	2,10@2,10	1550 Modoc.	2,10@2,10
200 Eureka Con.	181@181	200 Eureka Con.	181@181
200 Mexican.	81@81	200 Mexican.	81@81
200 New Coso.	31	200 New Coso.	31
475 Northern Belle.	141@141	475 Northern Belle.	141@141
910 Ophir.	111@111	910 Ophir.	111@111
430 Northern Light.	43	430 Northern Light.	43
210 Raymond & Ely.	31@31	210 Raymond & Ely.	31@31
315 Sierra Nevada.	21@21	315 Sierra Nevada.	21@21
135 Savage.	31@31	135 Savage.	31@31
200 Southern Star.		200 Southern Star.	

The Society Islands.

We gave a few months ago a view of Tahiti, the largest of the Society Islands, with some notes concerning its soil and productions. We propose at this time to give little views of some of the other islands of the group. Such mention is just now timely from the fact that the first of the season's imports of Tahiti oranges arrived last week, and several cargoes are now due and daily arriving. These little islands, which do us the good service of sending fresh fruits to our markets at the time when our crop is nearly out of the way must possess much interest to all California readers.

The group of the Society islands lies in the South Pacific ocean (lat. 16° 18' S; lon. 148° 155' W), and is formed of two clusters of islands, one of which lies about 70 miles northwest of the other. They were formerly, and by some geographers still are, distinguished by the separate designations of the Society islands proper, and the Tahiti or Georgian islands. The latter are under the French protectorate and the former are independent. The French islands have an area of 453 square miles and a population of about 14,000, of whom 1,000 are immigrants, 400 soldiers and 600 foreign residents. The independent islands have an area of 213 square miles and a population of about 4,000. The islands are all surrounded by belts of coral reefs of various widths and extending from a few yards to five miles from the shores. There are many openings for the passage of canoes, and some large enough to admit ships giving good anchorage inside the reefs. There are small lakes and lagoons in some of the islands and all are watered by numerous streams upon the banks of which, or along the shores,

verdure even to the loftiest summits. The island, surrounded by a reef like Tahiti and others of the group, possesses many ports and good water in abundance. In the interior there is a lake which is navigable, which enables the traveler to explore the island easily. The land lies in slopes and contains many valleys which need only slight culture to be very productive. The mountains rise gently to the north of the island and the foothills are among the most fertile parts of the country. Below these are plains which are bordered by the productive regions. The general soil of the island is vegetable mold mingled with the alluvium washed down from the mountains and abounds in material for plant growth.

Working Low Grade Ores.

In 1875, H. Augustus Taylor & Son, conceived the idea of building a mill, in Georgetown, for the purpose of utilizing the low grade ores of this locality, which had for years been regarded as useless. The idea was not original, for the Terrible company had already demonstrated its feasibility, by erecting a mill and profitably manipulating the low grade ores from its own mine. The Silver Plume concentrating company had also taken steps in the same direction. Taylor & Son secured a desirable mill site in the upper part of Georgetown, just where the south branch of Clear creek comes dashing down through a narrow gorge. The water power secured by them had a fall of 300 feet—200 feet of which is now utilized. The Krom concentrator was selected by them as in their judgment the best machine, and the building and machinery was put up by a man who had the advantage of five years' practical experience in handling the Krom machine. We

Naturally all this raises a dust, and dust is known to contain infinitesimal particles of silver. But the dust is not lost; over each ore bin there is a gigantic pipe with a mammoth hopper turned upside down, and the dust naturally "goes up the spout," landing in a labyrinth of crooked passages, in which a succession of yawning bins are to be passed and into each of which innocent particles of the ore are liable to tumble. These great bins are four in number. The first catches the weighty characters in the confused crowd, the next those of a less substantial cast, and so on, until the poor dust, which escapes through the lattice-work in the tower is about as near worthless as can be.

Since this mill was built about 4,000 tons of nearly worthless rock have been handled, and the valuable ore scattered through it saved. When it began to grind and raise a dust, ore containing 50 ozs. per ton was worth \$3 per ton—it is now worth \$21.

But while this mill did good work, making good wages for itself, and helping the country, there was still a vast accumulation of dust and low grade zinc ore, which, while it contained a large amount of silver in the aggregate, was practically valueless, because none would buy and no process was ready to reduce the worthless truck or extricate the silver.

In this emergency the idea of a leaching mill occurred—a mill which would extract the silver from the low grade ore and make a profit in doing so. To carry out this idea involved an expense equal to that of the great mill already in operation, but the men who compose the Clear company thought they could see through it and did not hesitate.

The Leaching Mill

Stands just below the one above alluded to,

of a syphon, and transferred to the first of a row of eight tubs placed on an inclined plane, or rather steps, six inches high, and is allowed to flow through all, each being supplied by its next neighbor above. In these tubs copper plates are placed, which precipitate the silver, leaving it in a metallic form, ready for melting. There are three additional tubs filled with scrap iron, and here the copper is caught and the liquor passes into a well, from whence it is pumped up into the store-tanks and is ready for use again.

This ends the operation, with the exception of melting the silver, selling the copper as it is, and spending the money.

We should say that tailings, before being dumped in the creek, are thoroughly washed, and any residue of value saved.

This mill is in charge of Mr. S. H. Woodward, and from personal tests made at all the different stages of the operation, we feel satisfied that he is doing good work. He is assisted by eight men, can handle 10 tons of ore per day, and can profitably treat as low as 25-ounce ore. The mill is practically supplied from the waste of the concentrating mill, as the bulk of the ore treated has no market value.

The company also have

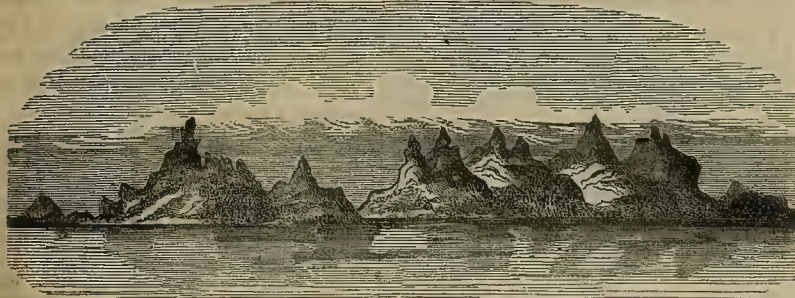
Sampling Works

And an ore market attached to the upper mill, and under the charge of Mr. R. G. Seymour.

Mr. W. B. Walters has charge of the

Concentration Department.

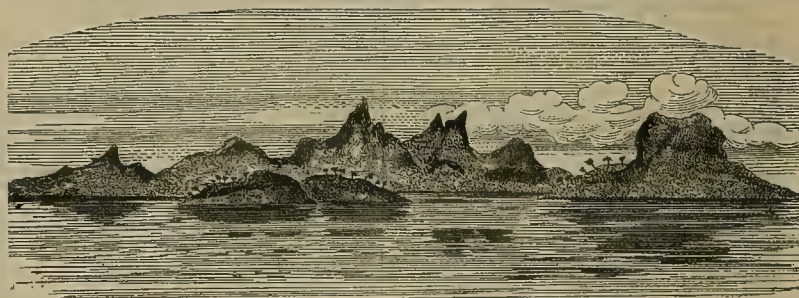
And from many years experience in Nevada and here, understands thoroughly the Krom machine. Mr. T. G. Negus has a general supervision of all three of the departments. He is a clear-headed, prudent man, enjoying the con-



Emeo.



Tahaa.



Ulan.



Borabora.

VIEWS OF THE SOCIETY ISLANDS.

the inhabitants dwell. There is considerable variety of soil, the sides of the mountains being frequently covered with a thin layer of light earth. The summits of many of the hills have a thick stratum of red ochre or yellow marl, whilst the soil of the level tracts along the shores is a rich alluvial deposit, mixed with vegetable mold and is exceeding fertile. The climate is healthful and very mild, the range of the thermometer being inconsiderable throughout the year. Besides the breadfruit these islands produce almost every tropical vegetable and fruit, including some peculiar to the group. A few fruits and vegetables have been introduced from the temperate zone. The guava shrub, introduced from Norfolk, is now common and bears a profusion of fruit, upon which pigs and cattle feed with avidity. Garden produce is little cultivated and agriculture is very backward. A botanic garden, established by the French, offers seeds to colonists and natives; but there is but little demand for them and prizes offered to stimulate production were withdrawn in 1865 as useless. The spontaneous production of fruits seems sufficient for the natives.

Our illustrations show views of four of the islands as the names beneath the engraving signify. There is of course much uniformity among them all because of their similarity of origin and the remarks above apply to all of the group. The largest of the islands, next to Tahiti or Otaheite, which we described upon a former occasion, is Emeo. Concerning this island we shall add a note, translated from the writings of a French traveler:

The island of Emeo is, if possible, more wonderful in natural beauties and adaptations than Tahiti. To the one who approaches the islands from afar there appear rugged mountains with broken sides, but as one comes nearer the enchantment of the scenery increases. The mountains, of various heights, are mantled with

will not now give an elaborate description of this mill, as it has already appeared in the *Miner*, but merely remarking that it is designed to separate the valuable ore from worthless rock by means of machinery, and that the agent employed is wind instead of water—the specific gravity of the various particles of finely granulated ore acting quite naturally, causing all the good to be gathered into the granary, while the chaff is scattered to the four winds of heaven, or dumped into the creek. A casual glance suggests the following unscientific account, however.

Concentration.

The mill is built with a special view to the economical handling of the ore. The receiving floor is the third, and the work is chiefly done in the two stories below. The ore arriving on wagons or pack animals is dumped on this floor, and is afterwards led into a Blake crusher, passed through an automatic drier and landed in a hopper which feeds a powerful pair of modified Cornish rollers, landing in the basement, whence it is carried in an endless succession of little tin cups attached to a long leather belt, to the very top of the mill—six stories high—landing in a screen, just like an old-fashioned mill bolt. Three other screens exactly similar in shape are located below it, each of which gives a separate size, the general product being four grades of ore, ranging in a granular size from a bird shot down. Now, the ore is ready for the wind work, and all the individual particles start out with nearly equal advantage as to size. Four sets of machines are ready to receive it—each composed of three—two for preliminary and one for final separation.

This ends the process. The clean, valuable, heavy ore finds its way to the lower story, where it is carefully sewed up in canvas bags—and sold. The light, worthless rock and dirt wastes itself in the waters of Clear creek, or is hauled off to make sidewalks or street crossings.

and its machinery is propelled by a part of the same power used to run the upper mill. That is, the great pipe (which, with a diameter of 19 inches at the top and 12 at the bottom, and 200 feet fall, is able to take in nearly the whole creek), is divided and abundance of power supplied to both mills. Besides this another six inch pipe is taken from it for the benefit of the town in case of fire, and this additional pressure enables the Georgetown Water Company to "squirt" over the biggest block, as there is a plug at each corner.

The ore from the concentrating mill is conveyed to the leaching mill by means of a tramway, and is dumped on the drier close by the battery. Ten stamps, each running 120 drops to the minute, soon reduces it to an impalpable powder, and a conveyor and elevator silently deposit it in a big hopper at the top of the mill. On the floor below this there are four smaller hoppers, each immediately above a Bruckner cylinder, and so, by a twist of the wrist, each of these are charged with from 4,000 to 5,000 pounds of ore, and no one hurt. Zinc ore takes from 15 to 20 hours to desulphurize and chloridize. When this has been accomplished the ore is dumped into an iron car, which conveys it to the cooling floor. After cooling it is again taken upstairs by means of an elevator, and is deposited in a large hopper from whence it is taken to the agitators in batches of from 2,400 to 3,000 pounds. The agitator is a large tub, nine feet in diameter and six feet high, and contains 1,200 gallons hot Hunt, Douglas & Stewart liquor (or a modification of that patent medicine), and there it is tumbled about for five or six hours, all the time being kept hot by pipes conveying steam from a boiler in the adjoining room below.

The liquor now holds the silver in solution and the agitator is discharged into a similar tub below, called a settler. From this the clear liquor containing the silver is drawn by means

fidence of the company and the esteem of the general public. Mr. F. M. Taylor is commander-in-chief, and while he has a difficult task to perform, he seems to be perfectly master of the situation. Each of the three separate departments he keeps separate and distinct from the others. The concentrating mill is charged with all the ore it receives, and credited with what it prepares for market. Every ounce of silver which goes to the leaching mill is properly charged, and the bullion produced placed to its credit; so, also, with the sampling works.

The Clear Creek company have been a benefit to our town and a credit to the district. They have spent \$115,000 in building, and have given constant employment to a good many men. —*Colorado Miner*.

A NEW FRUIT SHIPPING COMPANY. —*The Call* says: "The newly organized Western Refrigerator Car Company, of San Francisco has elected the following officers: A. T. Spotts, President, Robert Williamson, Vice President; Bank of California, Treasurer; Bernard Lane, Secretary. Two cars belonging to the company, may be seen at the railroad depot, on Townsend street. They differ somewhat from those used by the Grangers. The shell of the car is about six inches thick. There then is an inch of felt lining, and, in addition, a four-inch padding of charcoal and an inner envelope of galvanized iron. The ventilation is through the roof, and it can be regulated at will. The ice-box is suspended and so arranged that air cannot enter to thaw the contents. Each chest has a capacity of one ton, enough for four days' service, and the temperature maintained ranges from 34° to 40°. One of the cars, grape-laden, was dispatched from Sacramento on 27th of Oct. last, and arrived in St. Louis, its destination, on 2d of Nov. Fruit was allowed to remain in the car until Dec. 7th, and when taken out was in as good condition as if newly taken from the vine."

Oil Fuels.

The discovery of large petroleum supplies on this coast render plans for turning it to practical account of wide interest. At a recent meeting of the Scientific and Mechanical Society, at Manchester, England, a paper on the "Combustion of Oils for the Generation of Steam," was read by Mr. Wm. Gadd, who said: "My special object is to describe to you an apparatus, which I believe successfully accomplishes the purpose, and from the use of which I hope to render the combustion of oils for the generation of steam a practical reality."

"The means employed in this method are of almost the simplest character possible, and consist of, first, an open vessel, by preference flat shaped, composed of fire-clay, or any other suitable material, which is placed upon, and covers, the fire-bars in an ordinary furnace. In and upon this vessel are formed projections, of a conical or other shape, as many as are found to be necessary; which projections have holes passing completely through them, so as to allow of a free passage of atmosphere for the supporting of combustion in all parts of the fire or flame. A range of steam pipes of small dimensions (half-inch gas pipes are quite sufficient) is laid along the bottom of this vessel, having fine holes pierced therein, at the required intervals, for the emission of numerous small jets of steam. This range of pipes is put in communication with the boiler, and regulated by means of a valve or stop tap. Another pipe is in communication with the cistern or reservoir of oil, and another with the water supply. The oil supply is made self-acting by means of a ball tap, which gives at once mechanical stocking of the simplest and most perfect character possible."

"Upon proceeding to start this apparatus, I first let into the vessel a little water, and then as much oil as will nearly bring the liquid to the top of the range of steam pipes, or, in other words, to the depth of three-eighths or half an inch, but either a greater or less depth will act about equally as well. I then light the oil, and when it is fairly started I turn on the steam; and according to the force and quantity will be the intensity of the flame produced, giving a very perfect combustion at all pressures. Of course, in starting a boiler when cold, it becomes necessary to borrow steam from another boiler for a short time, or to raise a few pounds of steam at the expense of a little smoke. The use of the water, which to some may seem strange, is of great service with the very heavy hydro-carbons, in assisting to produce perfect combustion, and act, as far so I can ascertain from prolonged observation and thought, in this way. The oil being the heaviest substance the water rises to the top, and thus retards the combustion of the oil, until it escapes through the water in the form of gas, or at any rate, until it assumes a much lighter form than it originally had; furthermore, the constant influx of atmosphere to all parts of the flame, produced by the action of the steam, has such a cooling effect on the surface of the liquid as to prevent the same from boiling, no matter how hot it is above. The retardation, I believe, assists very much the economical consumption of the fuel. But with some oils the water is not needed. In fact, the particular details of this method may be varied according to the character of the oils desired to be used. Thus I find it capable of adaptation to the light, as well as the heavy hydro-carbons."

A SALT MINING EXPERIMENT.—The *Reese River Revueille* says that the mining of salt from Spalding's salt marsh, in Smoky valley, will have taken a new departure, if an experiment now in progress proves successful. The salt is deposited on the surface of the marsh by evaporation, it is supposed. There is no water on the surface of the marsh, but at a depth of about four feet the saline water exists, and in the spring of the year the salt forms on the surface in a thin scale, which, being removed, another scale soon forms. The obtaining of the salt by waiting for the formation of these crusts is necessarily slow and tedious, and only admits of a yield of salt during the spring and summer months; and to obviate this, so that salt can be obtained at all seasons, the experiment is being tried. Several hundred feet distant from the salt marsh, there is a flat surface of clay that will hold water, and on this a boiler and pump have been set up. The pump is connected by an iron pipe with a reservoir dug in the marsh, the said reservoir being fed by ditches dug in the marsh to the level of the saline water. From the reservoir and through the pipe it is proposed to pump the water into the clay-bottomed receptacle, and there allow it to evaporate; and it is thought that the salt can thus be obtained much more cheaply and expeditiously than by the slow process heretofore employed.

SULPHUR CREEK MINES.—A Sulphur creek correspondent says: The Manzanita gold mine has been incorporated, and is at present reducing number one ore. There has been considerable prospecting going on lately. Tucker & Golding have taken up a claim, and are doing better than they expected. Wm. McCune has also located a claim on the old Sulphur works ground, and has good prospects. Wm. Cherry cleaned up his sluice boxes last Saturday, and netted in amalgam about \$200 for one week's sluicing. Considerable excitement is shown among the old settlers on the creek. Time will show that we have been working over good mines, not knowing their value.—*Columbia Sun.*

USEFUL INFORMATION.

Hints to Firemen.

The *Mechanical Journal* notes some good points in firing for steam boilers, which, although they may not strike the reader as new, may be of assistance to some amateur stokers: "An engineer should allow his fire to burn gradually when commencing to get up steam from cold water, as, by allowing the fuel to burn very rapidly some parts of the boiler become expanded to their utmost limits while other parts are nearly cold. Of course a great deal depends upon the time in which he has to raise his steam. An engineer should regulate his fire at a uniform thickness, and not allow any bare places or accumulations of ashes or dead coals in the corners of the furnace, as these places admit great quantities of cold air into the furnace and render the combustion very imperfect. An engineer should avoid excessive firing as much as possible, as it is attended with more or less danger, because the intense heat repels the water from the surface of the iron and allows the boiler to be burned. He should keep about three inches of anthracite coal and about five inches of soft coal on his fires, but he should regulate the thickness of the fire according to the capacity of the boiler. If the boiler is too small for the engine the fire should be kept thin, the coal supplied in small quantities and distributed evenly over the grate, and the grate kept as free as possible from ashes and cinders; but if the boiler is extra large for the engine, the thickness of the fire makes but little difference. If the fire becomes very low, he should neither poke nor disturb it, as that would have a tendency to put it entirely out; but he should place shavings, sawdust, wood or greasy waste on the bare places, with a thin covering of coal; then, by opening the draft to its full extent, the fire will soon come up. If it should become necessary to burn wood on a coal fire, it is always best to make an opening through the coal to the grate bars, so that the air from the bottom of the furnace can act directly on the wood and increase the combustion. He should give great attention to the regulation of the draft in the furnace, as it is one of the most important parts of an engineer's duties, for in fact it is next in importance to the regulation of the water in the boiler."

American Pottery.

The report of the Centennial Committee appointed by the United States Pottery Association contains some very pertinent observations, of which the following are selections:

It was remarked by many that no industry had made more rapid strides than American pottery, comparatively a new one in this country, and it will henceforth rank favorably with other manufacturing industries, and especially be looked upon as the most interesting of all. The porcelain exhibited by the Union porcelain works has been thoroughly tested and closely compared with French and German manufactures, and it has been conceded that the quality of this ware is not excelled by any, and second to none. The same is the case with stone china or white granite, and it may be safely stated that you have proven your ware to be superior to the English, so far as quality and color is concerned. Shapes also are, as a general thing, more uniform and suitable for the American market. The value of the display no one can estimate at present. This, however, is certain, no potter need hereafter sail under false colors, but proudly choose his own trade mark of American design. Agents of English potteries admit freely that the display of American crockery has damaged their trade considerably. Dealers generally becoming posted on this class of goods and knowing that at any time they can replenish their stocks, it is difficult to obtain orders for importation in advance. The ware has kept pretty free from crazing, and, with the exception of some cracked ware, an imitation of the celebrated Satsuma ware, and taken in mistake for crazed ware, stood the test well, and the jury on ceramics were obliged to change their views in reference to this matter. The Secretary at the same time took the liberty of exposing to the jury on ceramics crazed pieces of ware from all the leading potteries in England, thus proving that no manufacturer can prevent wares from crazing occasionally.

Artificial Ivory.

Two parts of caoutchouc are dissolved in 36 parts of chloroform, and the solution is saturated with pure ammonia gas. The chloroform is then distilled off at a temperature of 85° C. The residuum is mixed with phosphate of lime or carbonate of zinc, pressed in a mold and dried. When the phosphate of lime is used, the product possesses the nature of the natural ivory; this composition possesses the proper proportions of lime and of phosphate, and the caoutchouc takes the place of the organic material of the ivory; the other parts of the natural product are of little importance.

Our contemporary, *Les Mondes*, speaks of an artificial ivory manufactured in France, by M. Dupre, who uses simply a paste of papier mache and gelatine. Billiard balls composed of this material are much cheaper than those of ivory, and are sufficiently hard and elastic to with-

stand the most severe blow of the cue. They can be dropped from the top of a house, or struck with a hammer, without breaking. This same material can be used for many other purposes. Stucco work of the most complicated design, and the capitals of columns made of this material, can be colored to imitate the most precious marbles.—*La Nature.*

Influence of Pressure on Combustion.

M. Wartha has observed the burning of six stearine candles in free air, and in an iron case under a pressure of 1.95 atmospheres. They burned under this pressure with a flame nine to twelve cm. long, and gave much smoke; their luminous power diminished, while the flame assumed a yellowish-red color. The decrease of weight after one hour of burning was found to be less than in burning in free air. This last result is opposed to the observations of Frankland, who has affirmed that the consumption of the burning material of a candle, or the like, is not perceptibly dependent on the pressure of the medium in which the combustion occurs. It is supposed that the difference of pressure in Frankland's experiments (on Mount Blanc and at Chamouny) was not sufficiently great to give a distinct difference in consumption of the burning matter. M. Wartha further put a candle to burn under an air pump receiver, with special apertures, and, with increasing rarefaction, the flame was seen to enlarge, and its luminous power to diminish. At a pressure of 90 cm., the greatest rarefaction produced, the luminous power was quite gone, and the flame, which now assumed three-fold size, appeared to consist of three parts, an inner bluish-green cone with a violet sheath, and a weakly violet mantle. The diminution of the luminous power in this case M. Wartha explains by the fact that under less pressure less of the products of combustion are separated in the form of soot.—*Nature.*

A FRENCH INDUSTRY.—A peculiar industry has recently come to grief in Paris. An establishment was organized for the purpose of breeding maggots. The means by which the "god, kissing carrion" was encouraged in the process were very simple. Over the soil there were spread large quantities of stale fish, dead lobsters, odoriferous poultry, and other refuse of the markets, as much as half a ton of large fish being taken on the premises in a single day. This stuff was soon attacked by the maggots, which in turn were carefully picked out and packed in casks of galvanized iron, and finally were sold for fish bait and chicken feed. The remaining refuse was converted into manure. It may well be supposed that the neighbors objected to the smells from the establishment. Moreover, the production of maggots was not confined to the premises; the flies roamed around and deposited the larvae upon any exposed food in the vicinity. There was a little doubt as to whether the flies came within the scope of the sanitary laws, but at last the authorities ordered in the police and stopped the manufacture.

GOOD HEALTH.

Diseases Spread by Tailors.

We read in an English exchange that the other day a delegation from the Amalgamated Society of Tailors waited upon the British government in the person of Under Secretary Cross. Their object was to lay before him some facts in connection with what was called the "sweating system." One of the delegation said he had seen instances in which garments were lying on a bed in which fever patients were suffering. There were a great many instances in which such things had taken place. They considered that if an employer got people to take work home, he should be bound to get the place to which it was taken registered, and hoped Mr. Cross could see his way clear to make it imperative that every house used as a tailor's workshop should be so registered by the employer. A delegate from Manchester gave the results of visits to 1,000 homes where this work was carried on, and stated that the condition of things was something deplorable. In some cases four or five persons were in a room nine feet by 12 feet. Sometimes people were making these garments in the midst of their domestic arrangements. From the facts that had come under his knowledge, he had no hesitation in saying that the state of things required alteration, and that the people engaged were in a most unhealthy condition. They found somewhere near 1,300 people engaged in this way, and all the surroundings of the place were such as would foster and spread disease. Another delegate said in some instances in London a man and woman would be at work in a small room at the top of a house in which they lived and slept. This people occupied in this were so crowded together that the places could not fail to foster and spread disease. While people went to large shops with showy fronts, they did not know that the clothes they purchased were made in close and unhealthy rooms. He knew a case in which, while the body of a child, who had died from small-pox, lay dead on the table, and two other children lay sick with the disease; the man and wife were at work in the same room, and 12 fashionable coats were in the room, which would be sent all over the town. Mr. Cross said he would introduce a bill after Easter to cover the case.

Mental Influences on Health.

Novice writes to the *Phrenological Journal* as follows: Probably there is no hygienic means that has a greater sanitary influence than that of a cheerful and well-tempered mind; and perhaps nothing exhausts the vital energies and disorders the bodily functions so effectually as a fretful and irritable mentality. Let the passions be our servants, and it is well; but let them be our masters, and they will not only rule, but ruin us. The moral and intellectual faculties have a powerful sustaining and preserving influence over the life forces. All who have ever felt the holy influence of love, and the blighting tendency of hatred, cannot fail to appreciate this part of our subject. The passions should be regulated and controlled. They are not to be abhorred, nor an attempt made to annihilate them. There is no faculty or propensity given us that will not contribute to our good when properly used. The use of every human endowment is good; their abuse is evil. A reasonable exercise of the emotions has a beneficial effect. Fame, wealth and power, may honorably command our aspirations. When such is the case, the exertion of the mind and exercise of the body necessary for their attainment are generally rewarded with energy, spirit and health. Let it be known that the legitimate use of all our powers, whether of body or of mind, is conducive not only to our health, but also to our highest good.

Those who have been blessed with health almost all of their lives may think the regard enjoined here to special precautions and directions is puerile. But if health is maintained, a good of the highest value is secured.

Health is the instrument by which wealth, intellectual culture, and fame are attained; the essential to any positive and beneficial work. Health is the chain that unites us to friends, and makes our companionship a source of pleasure and profit. Health enables us to meet the ills, trials, and disappointments of life with fortitude and serenity; to worry not over the past, but to improve the living present with zeal and earnestness. Health enables us to be useful and happy.

With such incentives to the maintenance of health, surely none but the indifferent would be careless in respect to the employment of those means that are likely to guard them against sickness.

Cold Feet.

Cold feet usually result from unequal circulation. The *Phrenological Journal* gives the following hints for avoiding them:

The feet should be washed in tepid water every day or two; but do not put them into water so hot as to make them tender. In concluding the bath, dip them into quite cold water, which closes the pores naturally, and then wipe and rub them entirely dry and warm.

Wear broad, heavy-soled, capacious boots with a loose insole. The foot appears smaller and more genteel in a boot quite large for it than in one in which the compression compels the sides to over-jut the sole and look tight over the instep or toes. Ladies should remember this fact, which is so well known to fashionable shoemakers. A stylish dealer was lately complimented about his small feet and nicely-fitting boots; a compliment which his wife also shared among her lady friends. The secret was they never pinched his feet. He wore number eight, while his wife wore the unpopular size of five. He could put on a six or his wife a four or perhaps a three. By wearing boots of the form of their feet, of ample size, the boots remained in graceful shape. The gentleman's boots were nearly number nines in length, to lend proportion, and add comfort in walking.

Change your boots often. In use they absorb moisture from within and without and by frequent change and drying will be much warmer. If you have not two pairs, remove the insoles and dry them thoroughly with the boots each night. The patent-covered cork insole is a nice thing for those who can afford them, if they do not sweat the feet. But the smooth, stiff-leather insole is the best for all people, and one good pair will wear out several pairs of boots.

If your feet sweat easily and then chill from the dampness, wear light cotton stockings with your wool socks over them. Just try this expedient and see how nice and warm your feet feel. Ladies who ride will find a large pair of socks, over shoe and all, a great comfort.

FRAUDS IN OPIUM ANTIDOTES.—The opium antidote business has been sharply called upon to halt by the Cumberland Medical Society, of Maine. They have caused a quantitative analysis of certain of these nostrums to be made, and report the results widely among the profession. One specimen, manufactured by Mrs. J. A. Drollinger, of La Porte, Indiana, was analyzed by Walz & Stillwell, New York City, who found it to consist of glycerine, colored with aniline red, and to contain in solution 1.383% by weight of the sulphate of morphia—about seven grains to the ounce. The second was the preparation of "Dr. S. B. Collins; the great Narcologist of the Age," also of La Porte. The analysis of this was made by Dr. Henry Carmichael, Assayer of the State of Maine, and differed from the preceding only in the amount of the sulphate of morphia shown to be present, namely, 3.2%. A teaspoonful (a dose frequently prescribed by the proprietor), would contain almost two grains of morphia—nearly 12 times the ordinary medicinal dose.



W. B. EWER, SENIOR EDITOR.

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SAN FRANCISCO:
 Saturday Morning, May 5, 1877.

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SOUTHERN PACIFIC RAILROAD.—The comple-
 tion of the Southern Pacific railroad to the Colo-
 rado river, is announced from the General
 Superintendent's office. The following new
 stations are specified. The last two are not
 yet opened. Frink's Spring, distant from San
 Francisco 641.8 miles; Flowing Well, distant
 from San Francisco, 658.5 miles; Pilot Knob, 710
 miles from San Francisco; Colorado River, Cal.,
 718.2 miles from San Francisco; Yuma, Arizona,
 719.2 miles from San Francisco. Yuma will be
 opened early in May, as a regular agency sta-
 tion, and will then become, until further notice,
 the terminal or connecting station for prominent
 points in Arizona and New Mexico. The daily
 trains with sleeping cars attached, will make
 the following time: Leaving San Francisco at 4
 P. M.; leaving Sacramento at 10:45 A. M.; leav-
 ing Lathrop at 8:15 P. M.; arrive at the "Loop"
 (next day) at 7:15 A. M.; arrive at Los Angeles
 (next day) at 1:55 P. M.; leave Los Angeles
 (next day) at 2:25 P. M.; arrive at Colton (next
 day) at 6:10 P. M.; arrive at Pilot Knob (second
 day) at 6:25 A. M.

BULLION SHIPMENTS.—Since our last issue
 shipments of bullion from prominent mines have
 been as follows: Manhattan, April 24th, \$18,-
 665.84; Con. Virginia, 26th, \$140,623.16;
 Northern Belle, 24th, \$5,107.25; Comanche,
 24th, \$8,522.67; California, 26th, \$215,923.07—
 total to date, \$1,215,991.34; Northern Belle,
 26th, \$8,953.82; California, 28th, \$101,442.58
 —total to date, \$1,317,433.92; Con. Virginia,
 28th, \$93,778.27—total to date, \$601,330.54;
 Tybo Con., 26th, \$15,190.37—total to date,
 \$84,356.39; Modoc, 27th, \$5,948.80—total to
 date, \$76,635; Northern Belle, 29th, \$11,255.-
 16; California, May 1st, \$241,288.52; total for
 April account, \$1,558,722.44; Tybo Con., 30th,
 \$6,794.91; total to date, \$93,151.30.

Large Fees for Lawyers

The St. Louis *Globe* says: "In the Dancer
 will case there are said to be 80 lawyers, and
 \$450,000 to fight over. This is only \$15,000 to
 each lawyer. The Bar Association should protest."

This sarcastic paragraph will be appreciated
 by nearly everybody except the lawyers them-
 selves. It has become so much the custom to
 charge heavy fees in cases of any importance,
 that lawyers of very limited ability have the as-
 surance to place their services at outrageous
 figures in every case where a large amount is
 involved. In contested will cases in particular
 the practice has become so notorious that peo-
 ple always expect to be mulcted of a large sum,
 and executors consider it necessary or expedient
 to take a good slice of the estate either for a
 compromise or to defend it. In either case the
 lawyers get the larger share, and the heirs are
 more or less at the mercy of the legal fraternity.

The principle, pretty well agreed upon among
 lawyers, that the fees should be in proportion
 to the value of the property involved, rather
 than to the extent or value of services rendered,
 is a very bad one, and calculated to bring dis-
 grace upon the profession. In a recent promi-
 nent suit in this city, the witnesses for a law-
 yer who charged an exorbitant fee, all lawyers
 themselves, seemed to agree in the principle
 mentioned, although the community at large
 held a very different view of the subject. The
 idea that a man must have half or two-thirds of
 a large estate simply because he is agent for a
 client who claims it is preposterous. These cir-
 cumstances have happened so frequently of late,
 however, that people are getting their eyes open
 to the abuse with a view to remedy it. People
 who employ lawyers in cases where large prop-
 erty is involved, will do well to have written
 agreements as to fees before anything is done,
 and refuse peremptorily to accede to any exor-
 bitant demands, out of proportion to the services
 rendered.

In the legal profession of course considerable
 study and practice is necessary, and to be a
 good lawyer even the most brilliant intellect
 must have special training and extended prac-
 tice; so that good lawyers expect good pay.
 Still this is no excuse for charging extortionate
 fees. People in other professions and trades
 also require special training and study, but the
 compensation in no other profession equals that
 expected, and often received, by the legal fran-
 ternity. The abuses in this direction, for a long
 time tolerated, call for speedy remedy, and if
 not corrected by the more far-seeing of the pro-
 fession must be by the people themselves. It
 is hardly worth while for a man to work hard
 and accumulate wealth for certain persons, and
 have it distributed around at his death among
 a lot of lawyers who he never saw or heard of.

To some extent it is the fault of the people
 themselves that such heavy fees are paid, as
 when contesting a will, for instance, people are
 willing to pay pretty heavily to get even a
 small share, especially as such cases are fre-
 quently taken on a contingent fee—that is, they
 get nothing unless they win.

If persons who had disputes would submit to
 arbitration instead of going to law, they would
 be better off in nine cases out of ten. Get one,
 two or three fair-minded men to listen to the
 cause of grievance on both sides and let them
 decide. The only trouble about this is that those
 who lose are apt to want to go to law
 afterwards; but if a written agreement not to
 do so were drawn up in the first place this could
 be obviated.

Again, people disputing over property can
 sometimes come to an understanding among
 themselves if the right spirit is manifested. A
 case of this kind occurred in Colorado last week.
 An old discovery on Red Elephant mountain
 owned by Gen. Marshall and others, was taken
 possession of by Wheeler, Thomson and others,
 under the jumping law, about three months
 ago, and worked steadily up to the present
 time. A large body of valuable mineral having
 recently been found in the mine, and great ex-
 citement following, the contending parties were
 in imminent danger of coming to blows, each
 claiming the title to the entire property. On
 the 16th ult., however, the parties in ques-
 tion met and agreed upon an equitable division
 of the property, thus dispensing with pistols,
 lawyers or courts, and involving no expense
 whatever.

DEPARTED.—John Newstead, who died of
 consumption, near Fruitvale, April 26th, com-
 menced the printing trade in this office at the
 age of 12 years, in 1867. He was an intelligent,
 active and faithful lad. Employers and fellow-
 workmen universally esteemed him for his good
 conduct, and all sincerely regret his early de-
 mise. His kind and manly virtues will long
 remain in our memory.

PERSONAL.—Wm. J. Lawrie (or his alias).
 Description—American, probably of Irish pa-
 rentage; age, 25 or 26; height, about five feet
 six inches; weight, about 130 pounds; complex-
 ion dark; hair black and small dark mustache.
 Was in Marin and Sonoma counties last Febru-
 ary. Information of his whereabouts wanted
 by Dewey & Co., San Francisco.

Items of Interest from the Mines.

We give below items of interest from promi-
 nent mines, most of which are collated from
 letters of the respective Superintendents on file
 at the offices in this city:

The last clean-up of the Eureka (G. V.) was
 325 ounces of amalgam.

In the Eureka Consolidated the ninth level
 drift has been extended west 39 feet, and is now
 193 feet from Bell shaft, and looks very well in
 face of drift, with very good indications of ore.
 The seventh level prospects continue about the
 same, bunches of ore showing along the drift.

The stopes above the 650-foot south level of
 the Comanche are getting small and will not
 yield much ore; the 450-foot north level is more
 favorable for ore.

The ore stopes in the California are all look-
 ing well and yielding very rich ore.

On the 1650-foot level of the Con. Virginia
 the stopes are yielding rich ore.

On the 1150-foot level of the Utah they have
 explored the west drift a distance of 407 feet
 from the shaft, and find nothing but hard rocky
 formation. Work is now suspended in this west
 drift.

Mr. W. Williams, formerly connected with
 the Ophir, is now Superintendent of the Defrees
 mine. He has made an estimate of the amount
 of ore in sight in the stopes from the level sev-
 enty-three feet below the tunnel level to sur-
 face; that level being opened up on the lead
 349 feet in length. Allowing fifteen cubic feet
 to the ton the estimate shows over 6,000 tons
 above that level, the ore assaying \$125 to \$300
 per ton. Another level will be opened as soon
 as hoisting machinery (already ordered) can be
 got ready to work. The shaft is now 63 feet
 below the present level, but owing to the
 pressure of considerable water work has been
 suspended upon it pending the arrival of the
 machinery. This mine is about 1,000 feet from
 the Grand Prize, and now has about 600 tons of
 assorted ore in the dump, besides a quantity of
 unsorted ore.

The Justice is shipping the usual amount of
 ore to the mill.

The Martin White M. Co. have got out of
 their financial difficulties and an entire reorgan-
 ization of the company has taken place. Tues-
 day the following officers and Trustees were
 elected: President, Annis Merrill; Treasurer,
 George C. Hickox; Superintendent, John Hooper;
 Secretary, Lytleton Price. Trustees—C.
 H. Stanyan, John A. Hooper, E. D. Sawyer,
 Annis Merrill, and one vacancy to fill. Martin
 White, the former President and chief manager,
 and L. G. Clement, the Superintendent, are the
 principal retirements. It is stated that the
 new Board of Trustees have paid all the indebted-
 ness against the company, and work is to be
 immediately resumed at the mine. The 1,000
 shares of the stock sold Wednesday at auction
 brought from \$6 to \$9 per share.

Gold and Quicksilver.

We were shown this week, by Mr. Geo. S.
 Spratt, Secretary of the Manzanita gold mining
 company some very curious ore from the mine.
 One of the pieces was very rich in free gold
 which occurs in a narrow seam of quartz, run-
 ning through the piece of slate. It also con-
 tained some sulphurets. The other specimen is
 unique and is a mineral curiosity. It seems a
 mixture of quartz and slate with specks of free
 gold and quantities of sulphurets. Along one
 side is a streak of cinnabar, almost pure "ver-
 milion," which is probably 80 per cent. quick-
 silver. This combination is a most unusual one,
 but is convenient from a mining point of view.

Although very rich in gold, if the price of
 quicksilver was high the owners would work the
 vein as a quicksilver mine; but as it is, they
 work it for gold, and a quantity has turned out
 at the mill \$42 per ton, although single assays
 run into the thousands.

The ore which is richest in quicksilver is
 selected and retorted first to obtain the mer-
 cury and is then milled for gold. The com-
 pany buy no quicksilver as they obtain all they
 want for milling purposes from the rock itself.

The mine from which this curious ore comes
 is in Sulphur Creek district, Colusa county, 25
 miles from Williams station, the end of the
 railroad running from Davisville. The country
 rock is limestone and the ledge is composed of
 talco-slate formation, interspersed with fre-
 quent veins and feeders of quartz, charged with
 alternate seams of rich sulphurets. The mine
 has been known as a gold mine for nearly 15
 years, and at that time considerable quantities
 of gold were washed from the creek which passes
 the ledge at its base, but only small amounts
 of the rock were worked prior to the undertak-
 ing of the present company in October, 1876, at
 which time they commenced operations with a
 force of 20 men and have during the time ex-
 tracted a large amount of ore. The ledge mat-
 ter is 40 feet in width where cut by the tunnel
 at a depth of 140 feet.

There is on the property a new ten-stamp
 mill, supplied with Hendy's Challenge feeder,
 etc. A Stevenson pan and settler is now being
 shipped. They have crushed, so far, about
 2,000 tons of the rock, which have yielded well.
 The Board of Directors of this company are
 George Grant, Joshua Hendy, George Senn,
 John C. Sanderling, and George S. Spratt.

Early History of the Eastern Slope—No. 6.

Orion Clemens and "His Brother Sam."

As already stated, Orion Clemens had been
 appointed Secretary of the Territory of Nevada,
 having for assistant his brother Samuel, since
 better known as "Mark Twain." These broth-
 ers hailed from Missouri, and came out with
 Governor Nye, forming part of a numerous retin-
 e wherewith that gentleman arrived in Carson
 City, capital of the Territory, in the month of
 July, 1861. Entering the town in a body, costumed
 after the Eastern style, this party of officials,
 semi-officials and expectants attracted a good deal
 of notice; the article in their make-up that soonest
 arrested the attention of the older residents and
 most conclusively pointed to their recent arrival
 from a land more advanced in the properties, or
 at least in the matter of "loud" head-gear, was
 the stiff and towering plug hat, with which every
 single scone was ornamented. Such a spectacle
 having never before been seen over there, these
 outre hats soon became the common jeer of the
 town; which, the new comers perceiving, were
 not long in supplanting by a title more conform-
 able with the tastes and costumes of the "East-
 ern Slopers."

As there is nothing connected with the adorn-
 ment of his person in which the average Indian
 finds more delectation than in this style of hat,
 with its gloss and glue, it was the wont of the
 Piute braves, who made Carson City their cen-
 tral loafing point, to eagerly seize and appropri-
 ate these discarded "stove-pipes" the instant
 the Israelitish trader had cast them into the
 street, and then for a time thereafter these dig-
 nified fellows were to be seen wearing one, and,
 when successful at poker, perhaps two of these
 remarkable fabrics, from the top of which there
 invariably protruded a great shock of bristling
 black hair—it being the practice of these peo-
 ple, as soon as they get hold of one of these
 things, to remove the crown, to the end that
 those digital manipulations rendered necessary
 by the populous condition of the Piute head
 may be performed without a too frequent re-
 moval of his beaver.

Orion Clemens

Was a quiet, unambitious sort of man, content
 to discharge the duties of his place with indus-
 try and care, cherishing no political or literary
 aspirations; indeed, his tastes seemed to incline
 him to active work rather than books and study.
 Though a modest and retiring gentleman, he
 possessed a good share of administrative ability,
 as was evinced by his able conduct of the nego-
 tiations carried on between California and Ne-
 vada on the boundary question, of which he had
 charge during a temporary absence of Governor
 Nye from the Territory. After the close of his
 official life, which was ended by the substitu-
 tion of a State for a Territorial government, he
 returned East, leaving many friends and a good
 record behind him.

Samuel, His Brother,

Up to the time of his arrival in Nevada had not
 much distinguished himself in that department
 of literature in which he has since made himself
 so famous. Indeed, there is no evidence that
 he had before ever essayed that line of writing,
 nor is it at all probable that he would have en-
 tered upon it here had he not, having a good
 deal of leisure on his hands, been tempted to
 accept the situation of "local" on the *Territorial
 Enterprise*, the leading paper of the country.
 From the time of his advent into Carson City as
 a member of the "Plug Hat Brigade," this
 brother had been looked upon not only as a
 queer sort of fish but as a genius in his way; a
 careless independence and a habit he had of re-
 marking in his usual drawing manner upon per-
 sons and things with a refreshing looseness and
 in quaint and comical terms, having gained for
 him the reputation of an oddity and wit before
 he had left Carson to enter upon his journalistic
 labors in Virginia City. Here, in his new call-
 ing, with the columns of a paper already noted
 for the utterance of sharp and pithy sayings and
 that audacity of opinion that suits a border
 community, open to his use, Clemens found just
 the channel best suited for giving play to his
 peculiar talent; the *Enterprise* thereafter teem-
 ing with items, homical, sarcastic, or broadly
 humorous; no institution, person or subject
 being too high or too low to escape critical
 notice, though it is but just to say these attacks
 partook more of the burlesque than the censor-
 ous or the satirical.

Mark Twain.

Writing sometimes for the paper on which he
 was employed articles of greater length or on
 some more pretentious subject than usual,
 Clemens signed these with the *nom du plume*,
 then first assumed, of "Mark Twain," this
 style of signature having been adopted, as it is
 said, for the following reason: When acting as
 steamboat pilot on the Mississippi, it had been
 made part of his duty to take the soundings. In
 doing this it becomes necessary to sing out the
 depth of water as indicated by the lead, direct-
 ing the proper scoring to be made, thus: "mark
 one," "mark twain;" the latter, the ancient and
 now nearly obsolete form of the word two.
 From his peculiar manner of drawing this out,
 young Clemens had acquired among the steam-
 boat fraternity the sobriquet of "Mark
 Twain;" which droll phrase being familiar to his
 ear, and pleasing him, perhaps by its originality
 and fitness, was retained for the above purpose.
 This may be a fanciful explanation of the or-

igin of the term in question but we do not recollect of having heard any other suggested.

The First Article from the Pen of the Great Humorist that Attracted Much Attention

Was an account of an inquest purporting to have been held in Humboldt county by a man named Sewell, a protégé of Governor Nye's, and who had by him been appointed Justice of the Peace and ex-officio Coroner for that remote and isolated region. Sewell, though by no means deficient in business tact, was one of those persons who attach undue importance to official position; wherefore he considered his appointment to this empty place as investing him with a degree of dignity and imposing upon him a weight of responsibility the sense of which he could not altogether conceal. He was, moreover, a man of inflexible integrity, prompt and particular, and fond of discharging all of his duties with a punctilious and conscientious exactness that sometimes savored of ostentation.

The Governor had received from this appointee of his several papers, all prolix, and some of them rather extra-judicial, giving an account of his stewardship in this distant and unimportant satrapy; the which had disappointed His Excellency of the good results that he had hoped would come from placing 200 miles of desert between himself and the pertinacious Sewell. In the over-meddlesome disposition and untimely zeal of this Humboldt Justice, Clemens found what seemed a proper subject for one of his characteristic lampoons; in which, after referring to the commendable watchfulness manifested by one so charged with the conservation of the public welfare and peace, the narrator goes on to relate how a party of miners, while out prospecting in the mountains a long way east of Humboldt came upon the well preserved and perfectly petrified body of a man; which circumstance, on their arrival at the county seat, was duly reported to the Coroner. This official impressed with the importance of the fact and the solemnity of the occasion, proceeded at once to impanel a jury and with them repairs to the spot. Upon this body, though evidently a fossil of a very early age, an inquest is held and a proper finding had, after which, according to the account, the remains are, with all becoming formality, granted Christian sepulture. This story is told with a minuteness of detail and a gravity that, despite its evident absurdity, gave it much the semblance of an actual occurrence.

The next characteristic story from the pen of this jocular writer was that recounting the fearful atrocities connected with

The Butchery of the Curry Family;
A tale so inconsistent in its statement of facts that it obtained at home only a partial and momentary credence—the entire narrative being so outrageously improbable that none but the most credulous stranger could be expected to believe it. Abram Curry, better known as Col. Curry, was an old resident of Carson, and a man much given to practical joking; not many of his more familiar acquaintances having escaped being made, one time or another, the subject of some clever trick of his—it being even probable that "Mark Twain" himself might on some occasion have been a sufferer in this way. However that might be, Curry was justly considered a legitimate mark for a shaft from the humorist's quiver. In this blood-curdling narrative Curry is represented as having become suddenly insane, and, while in that condition, to have taken his children, consisting of a large number, and butchered each one of them, also the mother, in a manner simply fiendish. This grimly facetious story was, in fact, so stuffed with horrors that, if the scene had been laid in almost any other country, it would have been regarded as nothing but a canard. Being represented as having transpired in Nevada, however, it met with ready credence in the East and in Europe, where it was gravely commented upon as one of the most atrocious acts recorded in the annals of crime, and as furnishing a fearful example of the general savagism of the community where it occurred.

Among the Earlier Productions of Clemens
Was an article, that at the time created a good deal of amusement and added not a little to his local fame, descriptive of the festivities that attended the marriage of Thomas Hannah, a member of the Territorial Legislature, and in which the peculiarities of several well-known characters about Carson City were happily depicted; a variety of incidents connected with the wedding, itself an event of some note, having also been alluded to in a slightly satirical but altogether laughable manner. His reports to the "Third House" of the Legislature that appeared soon after, though witty and facetious and read with much gusto by those sufficiently well acquainted with home affairs to appreciate the many apt hits and local allusions contained therein, did not wholly gain the popular sympathy, the subject being scarcely a legitimate one for burlesque and some of his remarks being too pointed and personal to be generally well-relished.

He Goes Illy Provisioned on a Prospecting Tour—And Meets With Adventures.

Sam, for it was by this name that he was at first best known among his acquaintances, really did have to wrestle with some pretty tough experiences during the first year of his residence in the Territory; what he relates in this connection in his book entitled "Roughing It," though tinted of course with his habitual exaggeration, being not wholly the fiction of his fertile brain nor yet perhaps very much overcolored. It was, indeed, a short-lived habit he had of making prospecting trips into the mines, a business that necessarily exposed him to some pretty

severe knocks, and in the diligent prosecution of which more bona-fide hard work was called for than this queer genius would be at all likely to perform.

As evidence that he did make such excursions, and sometimes get into a pretty tight place, the following, related by James Stark, the actor, is pertinent. While on a visit to the Esmeralda district, in the fall of 1861, Stark, accompanied by Thomas Hannah, the gentleman above alluded to, fell in with Clemens, then out on one of his so-called prospecting tours. At the time these parties encountered him a little way out of the town, he was sitting upon his hat in a sunny spot smoking a merchaum pipe, which, with a jack knife and a tobacco pouch constituted his entire mining outfit. He was without pick, shovel or culinary utensils, which latter, indeed, would have been a superfluity, seeing he had nothing with him to cook.

His Wardrobe and Toilet.

According to Stark's account, "Twain" must, at the moment the actor and his companion fell in with him, have presented an appearance outlandish and *outré* to the last degree. His feet were encased in a pair of cowhide boots reaching to the knees, and which, being many sizes too big for him, had so turned over as to bring the soles into a nearly vertical position. Into the tops of these stogies were tucked the legs of his blue overalls, which rent and sacky about the seat, were supported above by a single greasy suspender. A gray shirt, stiff with dirt and well ventilated at the elbows, did duty for both coat and vest. His hat, a tall and conical felt, turned down behind and up before, stood on his head like the section of a huge bologna sausage, pointing toward heaven, as if it would thitherward lead the way, had the owner shown any

An Important Improvement in Telegraphy.

The district telegraph system is one of the outgrowths of the advance of science and civilization, and fast becoming as much of a necessity in large cities as the fire alarm or anything else for the convenience and protection of citizens and their property. When the system was first started the mechanical means of carrying out the idea, on which everything of course depended, were very crude; and although considered sufficient at the time, the needs of the district telegraph gradually increased, and new and more improved mechanism became necessary. When people found they could summon a messenger, the policeman, or the fire department at will, they soon became desirous of having other "calls," and naturally thought these could be added to the machine without the necessity of summoning a messenger to convey their idea. It needed, however, a skilled and ingenious electrician to take hold of the district telegraph box and so improve it that it would answer the demands. This electrician had also to be an inventor, and one of no mean capacity, moreover, in order to properly improve the crude signal box first used.

It remained for California to find the man to invent and carry out the improvements required, in the person of Stephen D. Field, an accomplished electrician and inventor residing in this city. Mr. Field is a nephew of Cyrus W. Field, the projector and constructor of the original Atlantic cable. For a number of years Stephen D. Field was electrician of the Western Union Telegraph Co., and now holds the posi-

very important one and is operated as follows:

It consists in the combination with each signal box of an alarm, or sounding apparatus, consisting of a series of tripping levers, a trigger and an alarm device, which are so arranged that the alarm can either be set by the act of transmitting a signal, or by an independent action, and afterwards be released by the operator at the central station by shunting a portion of the resistance in the line circuits, increasing the battery power, or reversing the line battery, so as to sound an alarm or signal at the particular box from which a signal has been received. The alarm is connected with the same wire over which is transmitted the signal from the signal box to the central station, but the inventor interposes in the same circuit an electro-magnet of low resistance that will not be affected by the electric current in ordinary use upon the line, so that signals can be transmitted over the line after the alarm is set without affecting the electro-magnet or alarm mechanism. After the signal has been received at the central station the operator or receiver can, by simply increasing the battery power, or by shunting a portion of the resistance in the line circuits, or by reversing the line battery, sound the bell at the box from which the signal was sent so as to notify the sender that his signal was received and understood.

In this "electro-mechanical" apparatus the inventor prefers to use the "heel and toe" system of levers on the tripping device because this allows a greater throw of trips with a smaller magnetic force. The theory being that as magnetism diminishes in proportion to the square of distance from armature the shifting of the leverage allows a very feeble attraction to start the action. Electro-magnets have heretofore been used in signal boxes in the following manner: First, by cut-off opened when the box is started and cut out by the train when the signal is complete. This gives a rattling sound, by the vibration of the magnet armature while the signal is being sent, but as the box gearing accomplishes the cutting out it is impossible for the operator at the central station to respond that he understands. Second, a magnet, with its armature or other sounding devices permanently in circuit and responding to all breaks and closes on said circuit. This device is objectionable because the great number of magnet coils, one in each box, requires an immense battery power, and also because of the annoyance caused box-holders by the tapping of signals other than their own. In Mr. Field's device the cut-off is removed by the action of starting the box and replaced by the action of the operator at the central station in responding his understanding of the call. The improvement, therefore, embodies a cut-off opened by the subscribers, either unconsciously, while setting the box, or at pleasure by moving a special lever (which may be an extension through the side of the box of the arm) and closed by an increase of the battery power however obtained; the end to be obtained being to return a responsive signal from the central station to the person sending in a signal, that the signal has been received and understood. This arrangement of signals and response can also be used in hotels and similar places instead of the annunciators ordinarily used.

Another improvement devised by Mr. Field is a means of correcting any mistake of the sender of the message, in case the pointer is turned to the wrong "call." Even with the improved box, before the latest additions were made, in case the sender of the message turned the pointer past the call he intended to make—something which frequently happened—he had no alternative but to send the wrong message or none at all; and this because there was no means provided for moving the pointer back without pulling down the lever and sending the message. By a simple contrivance operated by a button, *C*, over the box, it is now so arranged that in case the pointer is set at the wrong call, the sender, before sending the message, can press on the button and bring the pointer back to the place and then re-set it properly before pulling down the lever which sends the message.

These boxes are now made in this city in the style shown on this page, by the Electrical Construction and Maintenance Company. Large numbers are now being made for shipment to New York, where they are replacing the old-fashioned signal boxes, and it will not be long before they are introduced into every large city where they have a district telegraph system. They are now in use in this city and Oakland, and also in San Jose.

TELEPHONES IN MINES.—The *Mining Journal* calls the attention of mine owners to this wonderful instrument, which was lately described in this paper. A telegraph wire can be laid through the mine, and with telephones at a few important stations, conversations can be carried on between those in different parts of the mine and those on the surface. Should an accident occur, the prompt notification of it and its nature might save many lives and much property; and the possibility of conversing freely between distant points without the necessity of skilled operators will unquestionably prove an incalculable advantage in mining, as it will be in other departments of industry.

On the first inst., the timbers in the Oak Grove gravel mine, on McAdams creek, near Yreka, gave way, letting down about half an acre of the mine. Luckily the workmen had just come out of the mine for dinner. Otherwise all would have been caught beyond any possibility of being saved.



IMPROVED DISTRICT TELEGRAPH SIGNAL BOX.

disposition to follow. This hat, when the miners first beheld it they marveled greatly thereat; saying the one to the other, of a truth, this is the plicene fossil of which we have heard others speak. In short, if the story of the great actor may be credited, "Twain" was just then a spectacle pitiful to contemplate and ludicrous to behold.

He Introduces Himself.

Neither of these gentlemen had any acquaintance with "Mark," but he, recollecting to have seen Hannah before, came up and introduced himself in his usual slothful style of speech, somewhat as follows: "M' name's Clem-ens. Reckon y' know me brother Orion. Dam'n, sent me out 'n sage-brush here 'thout a red. Grub's gone—m' nearly starved. Call it tight pa-pers—dam'd 'f don't. Cabaged couple cans oys-ters las' night. Eat'm all t' one meal. Cook'd cans fr soup 'smornin'—s' nearly hell."

Seeing the fix he was in and that he was a comical genius within, Hannah invited him to go with them and get something to eat. This invitation having been accepted, the three made their way into the town, and repairing to a restaurant, the best dinner to be had was ordered. As the viands were served up, Clemens, who was at all times a good feeder, proceeded without ceremony to largely sample every dish as it came to the table. The others found time for social converse, but not so their guest, who, complimenting the *cuisine* of the establishment by hastily devouring one dish after another, looked his gratitude to his entertainers, time being too precious for speech. Seeing the strait he was in, Hannah gave "Mark" money enough to take him back to Carson, for which place he set out on foot the next morning.

Among other Esmeralda adventures that Clemens liked afterwards to talk about, was the manner in which he managed to elude an overhauling at the hands of a mining company, whose claims he had indiscreetly attempted to jump. In the adjustment of this matter, his droll manner and jocular talent seem to have served him an excellent purpose, the outraged miners amused with his ready wit and awed at his original modes of lying, having incontinently let up on him.

tion of electrical engineer to the Electrical Construction and Maintenance Co.

The old district telegraph box when first taken hold of by Mr. Field was a small one, very rough in appearance, and with a capacity of sending only three messages to the central office. Having an intimate knowledge of all telegraphic apparatus and a strong liking for his profession aside from pecuniary advantages, it was not long before a much more perfect apparatus was devised by the young inventor, and he has been continually improving it until the apparatus is now one of the most complete pieces of electrical mechanism known; and probably the most ingenious invention ever patented in California.

The apparatus consists of a dial with indicating pointer, *B*, the dial carrying on its face various names showing the various services rendered by the company. Inside of the box is a series of wheels and levers in immediate connection with the dial and also in electrical connection with the signal lever, *D*, the whole being enclosed in a neat cylindrical brass case, handsomely nickel plated. The knob, *A*, serves to turn the pointer, *B*, to the proper position.

The operation of the box is extremely simple, although the mechanism is ingeniously devised and apparently complex. By turning the indicating pointer to any desired "call" upon the dial, the apparatus within the box is put into position to send that particular call and none other—a proceeding analogous to setting type, only in this case the setting and distributing are both mechanically performed. When the pointer is found to be resting on the proper call, a depression of a lever on the back of the box starts the gearing in operation. This automatically transmits the signal to the central station and at the completion adjusts the pointer back to its initial point, or the "messenger" call. Mr. Field's most recent improvements, for which he obtained letters patent through the MINING AND SCIENTIFIC PRESS Patent Agency last week, consist in providing the apparatus with an answering back signal, for the purpose of returning a signal from the central office to the subscriber, indicating the receipt and understanding of the call. This improvement is a

The Summer Mine.

A correspondent of the *Courier-Californian* says: "As you requested sometime since, I write to let you know something of what is going on here, and of our business prospects. Our prosperity depends almost entirely upon the success of the Summer mine, and the development of the Summer mine has been dependent upon Senator Jones's capital; so you will readily see that we are dependent upon the faith which the Senator may have in the mine. The mine is a very large true fissure vein, of miles in length, carrying some gold the whole distance, and where the principal works are there have been several bonanzas of excellent ore near the surface, and over a million dollars have been extracted and added to our circulating medium, and the prospects were considered favorable enough to go down on the mine. In sinking, a much larger body of water was encountered than was anticipated, and works have been added from time to time, until there are now as complete and extensive works for sinking and hoisting on the mine as on this coast—sufficient to sink on the mine at least 1,500 feet—and involving an outlay on the Senator's part of \$800,000. He has responded nobly thus far, but any one might weary in 'putting up' after a while, and the largest purse run low, and we people who are dependent on the mine for bread and butter watch the developments, perhaps, with more anxiety than those who have expended so much on it; and it is with great pleasure that I can assume you that prospects in the mine look much better than at any time since sinking was commenced. I visited the mine on the 14th, and on the 300-foot level they have a breast of ore of over 20 feet in width, for over 80 feet in length, and are still running on it. The east wall has not been reached yet, but from indications the ore-shoot must be at least 25 feet in width. The 80-stamp mill has been running for the past week, but I understand that it will have to hang up again for a day or two, for a reason unheard of before in this locality, viz: for want of hands to extract the ore. Of course, after the stopes, etc., are ready, very few hands comparatively will be required, but it takes a large amount of ore to keep 80 stamps at work. "As it now looks, I think our bread and butter is assured, and that soon Senator Jones will be receiving from the Summer mine instead of disbursing, and I hope as liberally."

New Laws for Homestead Entries.

The following is a copy of a law passed at the last session of Congress. It relieves parties of the trouble and expense of visiting the land office in the district in which they may reside for the purpose of making proof of residence, etc.:

An Act to amend Section 2,291 of the Revised Statutes of the United States, in relation to proof required in Homestead Entries.

Be it enacted by the Senate and House of Representatives of United States of America in Congress assembled, That the proof of residence, occupation or cultivation, the affidavit of non-alienation, and the oath of allegiance required to be made by Section 2,291 of the Revised Statutes, may be made before the Judge, or in his absence, before the Clerk of any court of record of the county in said State or district and Territory, in which the lands are situated, and if said lands are situated in any unorganized county, such proof may be made in a similar manner in any adjacent county in said State and Territory; and the proof, affidavit and oath, when made and duly subscribed shall have the same force and effect as if made before the Register or Receiver of the proper land district; and the same shall be transmitted by such Judge, or the Clerk of his court, to the Register and Receiver with the fee and charges allowed by law to him; and the Register and Receiver shall be entitled to the same fees for examining and approving said testimony as are now allowed by law for taking the same.

Sec. 3. That if any witness making such proof, or the said applicant making such affidavit or oath, swears falsely as to any material matter contained in said proof or oaths, the said false swearing being willful and corrupt, he shall be deemed guilty of perjury, and shall be liable to the same pains and penalties as if he had sworn falsely before the Register.

Approved, March 3d, 1877.
An Act for the Relief of Settlers on the Public Lands under the Pre-emption Laws.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that when any person who has made a settlement on the public lands under the pre-emption laws shall change his filing to that for a homestead entry, the time required to perfect his title under the homestead laws shall be computed from the date of his original settlement made under the pre-emption laws.

Approved, March 3d, 1877.

Refrigerator Shipments.

There bids fair to be no lack of designs in car building to accomplish the prolonged carriage of meat and fruits. There promises to be as many of them as there are of fruit driers or spotted steers. We are not prone to have them less. We would give to each as warm a welcome as its cold nature will admit of. Competition will make them move like warmed molasses and if they get up a contest for the possession of our fruits, meats and vegetables,

which will increase the farmers' rewards for these lines of products, we bid them railroad speed. We have an item in another column of the organization of a new refrigerator car company in this city, and we now read in a Chicago paper of the successful movement of perishable produce from Colorado to Chicago in one of another design. We shall quote some statements of results with this car, because they contain experiments with moving fresh meat nearly as great distances as are now contemplated in the shipments from this State and Nevada. A Chicago journal, of a recent date, says: "A few days ago quite a sensation was created at the Chicago and Alton depot by the arrival of a Tiffany 'summer and winter' refrigerator car from Pueblo, Colorado, with beef consigned to Thomas Armour & Co., of Chicago. Though eight days on the road, with the thermometer through the week ranging at 90° in Kansas, and receiving no more attention than ordinary freight, the beef was found to be, on examination, in perfect condition, and fit for immediate use. Last January a car-load of dressed beef was shipped from West Las Animas, Colorado, consigned to A. F. Anderson & Co., of Chicago, and though it remained on the car 14 days, and was subjected to a fluctuation of temperature varying from nine to 30° below zero, when unloaded was found to be perfectly fresh and sweet, and was rapidly disposed of in advance, while beef shipped at the same point, in an ordinary car, and arriving at Chicago at the same time, was so frozen that a crowbar was necessary to separate the quarters, resulting in such damage as to render it unsalable. Fruit and vegetables have been transported with equal success, strawberries having been kept eight weeks on the same principle. In a few days a car will be sent to San Francisco, to bring back a car-load of fruit."

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PASO ROBLES, CAL., October 18th, 1875.
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JOHN H. MERTZ.

Business Directory.

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Corey & Kingery Mine for Sale or Lease. This mine is a gold bearing quartz lead, situated on French Creek, Siskiyou county, Cal., 7 miles south of Etna. Mine opened by tunnel and shaft 170 feet below surface; average width of lode, 18 inches. For further particulars call and examine our mine, or address us at Etna, Siskiyou county, California.
H. O. COREY,
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Our readers can see watches second to none of American make, by asking "the time o' day" when our agents call. They travel by the N. Y. watch, and are very proud of them.

We can recommend the New York watch, of Springfield, Mass., as A 1.

Continued from page 277.

Upon the Richmond and American mines, shafts are being sunk. At 12 feet, the Richmond shows a vein four and a half feet wide. The ore is antimonial sulphate, and the assays range all the way from \$200 to over \$300 to the ton. Mulvenon & Roach will start up their furnace in a few days, on ore from the United States mine, in Copper canyon.

In Bradshaw district the new Luke & Co. road is nearly completed. Eight teams are on the road, loaded with mill machinery. Work is being carried on upon the Gretna, and a good character of ore is being taken out.

In Peck district, the tunnel upon the Whipple mine is now in 20 feet. This ledge crops out boldly and carries a strong vein of silver-bearing ore. A shaft is being sunk upon the Mountain View, and shows a good ledge and an excellent prospect. Upon the Silver Prince, Messrs. Houghton & Curtin are running levels from the main shaft and are getting out some very high-grade ore. The work is still progressing on the north tunnel of the Peck. Messrs. Hague, Walsh & Fogus have been out examining the mine. They brought in some 20 different samples of ore, which they have had assayed by Messrs. Kelly & Drew, the assayers, with favorable results. The mine shows an immense value in all of its veins, some estimating it as high as \$1,000,000. It has been excellently worked and is in good condition, demonstrating the fact that it is a good thing to have good mining men to work upon any mine. Rich ore is being received in Prescott daily by all the assayers from prospectors, and prospecting is being more vigorously carried on in this country than ever before. The Agua Fria furnace is running on Black Warrior ore, and is working about three tons per day.

From Mohave county we learn that the Silver Glance mining company have just completed a 13 days run. They worked an average of 12 tons per day, and have as a result 104 tons of high grade bullion.

The McCrackin company's mill was closed down for a few days, waiting for chemicals, but the mill has started up again and is running excellently. The dumps on the mine are full to overflowing of ore, and an enormous quantity has been taken out in the past few months, yet there is an immense quantity in sight in the mine.

A good many men are at work in Cedar Valley district, and great many arastras will soon be running.

In our county the miners are not by any means idle. The Bradshaw mountains and the Sierra Prietas are full of prospectors, hunting for their share in the brilliant outcome which will soon be the legitimate result of the interest now being shown by prominent operators in our mines.

In the Bradshaw mountains, Riggs and Hammond, upon their claim on the Tiger, now have their tunnel in 150 feet. From the tunnel they are running a cross-cut to tap the upper vein, and have it now 60 feet into the mountain from the face of the tunnel.

Upon the original location of the Tiger a survey has recently been made for a tunnel. This tunnel is intended to drain the main shaft, in which water accumulates rapidly. This shaft is down 90 feet, and this tunnel, when run, will strike the ledge 44 feet below the tunnel.

A large number of men are at work in Bradshaw district, and the camp is resuming the activity of former days.

This Luke's mill machinery has arrived at Walnut Grove and is being carried by Palmer's ox-teams to the mill-site. The putting up of the mill has been put under the efficient supervision of Mr. Charles Pietz.

Several men have recently gone to Castle creek to mine in the gulches.

A rich lead has been struck on Wolf creek, in Turkey Creek district. The surface indications on this vein are said to be wonderful. The ledge is about two feet to 30 inches wide, and is very high grade chloride ore. One assay, from surface rock, from this new discovery, gave over \$6,000 in silver. It is called the Mexican.

Colorado.

TERRELL.—Colorado *Miner* April 21: The pump has now been at work about two weeks, and is getting the water out of the mine rapidly.

The Union tunnel is steadily progressing toward the Terrell, which lode it is intended to develop. The silver ore tunnel is being pushed on to the Brown. It is already about 300 to 350 feet beyond the Terrell.

SILVER PLUME.—We hear that another strike of rich ore has been made on this mine, but how large a pocket has been found is not yet known.

PAY ROCK.—Is working from 20 to 30 mon. The mine is now in about as good pay as at any time.

P. McCANN & Co. have started up the Cree mill and are now in the market for silver and lead ores.

ATLANTIC.—This lode is now being worked under lease. There are about 15 men employed upon it. The ore vein is from one and a half to two and a half inches of rich ore, the first-class yielding about 1,300 ounces per ton.

SNOWDRIFT.—We are glad to hear of a rich find in this mine, which has not been heard from so long. The last run gave between 600 and 700 ounces for the first-class ore.

SILVER GLANCE.—George Hammond & Co., lessees of this lode on Democrat have struck the second "pocket" with the "Glance tunnel" and have from one foot to 18 inches of mineral which mills from 200 to 600 ounces of silver per ton.

The Central S. M. Co. have been developing their property in Peru district, Summit county, during the past winter. A cross tunnel now 30 feet long—is being driven into Ruby mountain, which will cut a number of lodes owned by the company, at an acute angle, and as the veins cut the mountain quartering, the drifts on each will gain depth as they advance. One lode has already been crossed. Although little more than prospect holes have been sunk so far, some of the veins show good mineral, specimens of which tested here contained as high as 430 ounces.

Idaho.

NEW DISCOVERIES.—Idaho *Statesman*, April 24: Years ago rich specimens of float quartz were found on the head waters of Willow creek, some 20 miles northwest of here. This fact was best known on the Payette by parties who saw the specimens. The diggings on Willow creek have been worked out for several years, but not with much success. For several years prospectors have hunted over this range of hills to find this supposed lode. We learn by Mr. Hawley, of the Payette, that Mr. D. Passmore has struck and is now operating a rich lode of gold bearing rock on the head waters of Willow creek, believed to be the lode so much hunted for by prospectors. Mr. Henry Padon and his son-in-law have found and located places diggings just below Passmore's lode that will pay two cents to the pan and it is counted good hydraulic ground. Water is scarce for placer mining; nevertheless, they think they can corral the heads of several creeks and get water for two or three months in the year. Both parties are highly elated with their discoveries and others are visiting their camp and prospecting in that section for more gold. This discovery will no doubt lead to considerable mining on Willow creek.

GOLDEN CHARLOT.—Idaho *Avant*, April 23: The mine continues to look well and the work as it progresses in the different sections of the mine presents the most cheering developments. The 1300-ft level is now in nearly 300 feet, and the vein at this point, although not as large as usual, contains a heavier streak of mineral, the gold predominating. The operations in driving south from the cross-cut to the Crane and Briggs are being attended with the most favorable results. There is abundance of good ore in the face of the drift. The stopes south from the winze between the 6th and 7th levels are yielding large quantities of high grade ore, and everything in and about the mine presents a most promising complexion. The most satisfactory results are attending the economical and energetic management of Superintendent Baldwin. Private letters received here from Captain Bledsoe, at San Francisco, state that he has been successful in negotiating with some capitalists there who propose to commence operations without delay at Atlanta. That camp presents an inviting field for the investment of capital.

JOHN CATALDO, Esq., is expected here from below in a day or two. It is rumored that he has a "pocket full of rocks," and will probably make arrangements to start up the Oro Fino in a few weeks.

GREAT hopes are entertained in connection with the prospects of carrying forward operations in the Poorman on a large scale the coming summer.

This Belle Peck is looking well. Some inconvenience is still being experienced in battling with the water. There is no doubt of the existence of a promising ore body at the point of present operations.

The Potosi crushing of 112 tons yielded \$26 to the ton. There was quite a loss somewhere, as the tailings assayed over \$24.

Montana.

PLACERS.—Helena *Independent*, April 16: Hortop & Wright are running a hydraulic. Their ground pays well. There is considerable activity manifested just now by the miners on the foothills around Cave gulch. The water is abundant and all the claim owners have begun work. Several companies will work on Grewell's bar this season, and the prospects are very flattering that it will pay well. The gold obtained is of fine quality and the quantity is very satisfactory to those owning the mine. Magpie miners are washing out considerable money from the drift diggings, and Loomis, Harris & Co. are running a hydraulic—have been all winter—and are making good wages. Some of the small gulches adjacent to Magpie are being worked, and all pay fair wages, but none of them are remarkably extensive or rich. The miners in St. Louis gulch and its tributaries, and others adjoining, are now working with the greatest vigor. There is said to be an abundance of water, and the mines have always paid well heretofore. It is safe to predict that the mines in that section will yield much more gold this year than they did last, as the working season promises to be at least one month longer than usual.

SHUT DOWN.—The recent order from the President's office of the Hope mining company, in St. Louis, to "close down the mill, annul all contracts and close the mine," was received here on Saturday, and created much surprise. The apparent reason for this action, the Superintendent asserts, may be found in the present suit, instituted by the County Commissioners to collect taxes upon the entire products of the mill during the year 1876. During this time, we have reason to believe, 3,000 tons of ore was mined and milled, averaging about \$50 per ton in the mill, the tax upon which is an item of interest to the company, and a question of law involved, which the company propose to have settled before proceeding further so we are informed. The surprise arose from the fact that it was well understood the mill had plenty of pay ore in sight, the machinery in good running order and a full supply of chemicals on hand.

All is still silent upon the premises of the Northwest company. The machinery is rusting for want of use, and plenty of first-class ore waiting to be reduced.

When at Oli's concentrating works, last week, we found B. Parks employed in sacking and getting ready for shipment to Baltimore, a lot of about 38 or 40 tons of copper ore, which had just been finished up.

From parties just arrived from Salt Lake and Franklin, we learn that there are large numbers of men on the road making their way north, some on foot and others on horseback, seeking employment in the mines of the Territory. Some are heading for Pony, some for Pioneer and others for Butte and Phillipsburg.

From a party just returned from Pony, we learn that the camp is lively and full of people, but there is very little money circulating as yet. Indications are promising, however, for a speedy change in this respect.

Mr. Roast returned some days ago from Radersburg, where he had been to secure an engine and boiler to drive the machinery for the saw mill, now being erected by Roach & Co., on Dive creek.

Prof. Smith informs us he will hereafter run his works day and night, commencing to-day. The arastras have been idle for some days past, owing to having no ore on hand, the roads up till recently being in such condition as to make it almost impossible to haul any amount from the mine. A supply of ore has now been delivered, however, and the works will be kept steadily running.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco.

BRANZAN KING M. Co.—April 23th. Location: Arizona. Capital stock, \$10,000,000. Directors—C. L. Place, E. Johnson, T. C. Johns, S. S. Tilton and A. W. Scott.

CALIFORNIA DREDGING CO.—April 23th. Object: To manufacture and sell dredging machines. Capital stock, \$1,000,000. Directors—Charles H. Swain, B. Hedge, H. B. Butterfield, W. E. S. Whisman and C. E. Buckingham.

GOODYIN M. Co.—April 23th. Location: Arizona. Capital stock, \$10,000,000. Directors—Robert Sherwood, C. W. Fox, William M. Lent, Edmund G. Peck and M. Masterson.

MASSASOIT M. Co.—April 23th. Location: Arizona. Capital stock, \$5,000,000. Directors—F. C. Remington, J. W. Brown, C. F. Balcorn, J. A. Chandler and Joseph Baloun.

PROCESSE G. M. Co.—April 30th. Location: California. Capital stock, \$6,000,000. Directors—E. Brewster, Abraham Halsey, Edmund Green, G. Palache and J. E. Kelly.

ENDOWMENT M. Co.—May 1st. Location: Nevada. Capital stock, \$10,000,000. Directors—R. Webber, W. B. Crane, Thomas Cole, G. W. Grayson and C. W. Crane.

ALBION RIVER RAILROAD CO.—May 1st. Capital stock, \$40,000. Object: To operate a railroad commencing in the southeast quarter of section 23 and running into and through section 27 in northeastern direction, or as near thereto as the route shall be found most practicable, to connect with Albion river, in township 16 north, range 16 west, Mount Diablo meridian, in Mendocino county, State of California, under and pursuant to the laws of the State of California. Directors—Henry Wetherbee, Thomas Pollard, A. W. McPherson, Jr., George A. Gray and John Dolber.

SILVER KING M. Co.—May 3d. Location: Pioneer district, Arizona. Capital stock, \$10,000,000. Directors—Jas. M. Barney, Benjamin W. Regan, George L. Wood, Benjamin A. Barney and Wm. H. Booth.

Introduction of a New Blasting Powder.

The Judson powder manufactured by the Giant Powder Company in this city, is a new style of explosive intended as a substitute for black powder, to which it is superior. It is sold loose, or made into cartridges if desired. We have been shown several testimonials from large companies who are introducing this powder in gravel mining, of which the following is a sample:

OFFICE MILTON MINING AND WATER CO.,
San Francisco, May 2d, 1877.

Messrs. Bandmann, Nielson & Co.—DEAR SIRS: Mr. Y. G. Bell, Superintendent of the Milton mining and water company, writes me under date April 29th, 1877, that the two blasts fired in our claim with "Judson powder" were a complete success, as far as he can judge from appearances.

Speaking of one of the blasts where he used the equivalent of 70 kegs black powder, he writes "that it broke much more ground than we anticipated, and it looks as if the gravel was much better pulverized than black powder would do." From a very indication it broke up at least 50% more ground than the same amount of black powder would have done. The foreman thinks it did as much execution as 150 kegs of black powder."

Do not fail to ship us our 10,000 pounds Judson powder by next Friday's steamer, via Marysville.

Very truly,
H. PICKING, Sec'y.

Treating Base Metal Ores.

EDITORS PRESS:—The description of "Stewart's new process" in your last issue, seems to call for a few remarks as being open to criticism from several points of view.

Passing over the possibly questionable statement that metal sulphates are to be found in ore which has been subjected to a chloridizing roasting, we find in the next sentence the assertion that "oxides of iron, copper, zinc, etc., * * in presence of metallic iron and the undecomposed salt and sulphate of soda * * form soluble iron, copper, zinc, lead, etc., which, in presence of metallic iron, are precipitated." * *

Now, again passing over the obvious error of saying that iron is precipitated from such a solution under such conditions, I would observe that oxide of iron is not soluble under the given circumstances; oxide of zinc is doubtful, and an entirely erroneous view is taken and conveyed of the solubility of copper and lead oxides, which is due, not directly to the presence of metallic iron, salt and sulphate of soda, which alone would not produce any such result, but to the fact that metal chlorides are also present; which, if reducible by metallic iron, as chloride of silver, lead, copper or zinc, produce chloride of iron, which then acts on any oxides of copper or lead in the ore, dissolving them as chlorides, to be again decomposed by metallic iron, and reduced to metal which enters the amalgam.

The reason that a simple hot water leaching is not effectual in preventing the formation of base metal amalgam is two-fold. Firstly, hot water will fail to extract dichloride of copper and sulphate of lead, which are directly reducible by the iron pan, producing metallic copper and lead; and secondly, the oxides of copper and lead also remain, and are reduced indirectly through the solvent action of chloride of iron, produced in the first place by the reduction of above mentioned dichloride of copper and chloride of silver, also, in presence of salt, of sulphate of lead. Thus it is seen that protochloride of iron which, in the article referred to, is incorrectly credited with all the results of the Stewart process, always and necessarily exists in the pulp when roasted silver ore is worked in an iron pan, or a barrel containing scrap iron.

Why then does or should the Stewart process give a better result than the ordinary method, since protochloride of iron is present in both? Partly because the base metals contaminate the quicksilver in the latter, and partly because it is not chiefly nor directly the protochloride of iron which does the work in the former.

The action of the bath of protochloride of iron and common salt, the effects of which I described as to its action on oxide of copper in your columns in March, 1865, and as to other effects at various times, and for which, it having been once known as Hunt's, then as that of Hunt & Douglas, and in the article under discussion being designated by the somewhat comprehensive title of the Hunt, Douglas and Stewart, I beg to suggest, the (honorary but harmonious) prefix of my own patronymic, thus: the Aaron, Hunt, Douglas and Stewart bath; the action I say of this much-named bath is somewhat incorrectly stated in the article from the Colorado *Miner*.

Alone, the protochloride of iron and salt solution will dissolve oxide of copper, forming chloride and dichloride of that metal, and oxide of lead as chloride, which, however, in presence of sulphate of soda in roasted ore is converted into sulphate of lead. It cannot dissolve oxide of iron nor dichloride of copper. By the action of the air, however, on the bath a quantity of perchloride of iron is produced which dissolves dichloride of copper, etc., and acts on various sulphides, if present, producing very complex results, among which is free acid. (V. "Keris' Metallurgy.") It also attacks quicksilver, forming calomel, which must be guarded against.

The presence of sulphurous acid prevents the formation of perchloride of iron, and dissolves oxides of iron, copper and zinc, also zincblende and probably other sulphides. Dichloride of copper is not injurious to quicksilver, as incorrectly stated; but oxychloride (which is decomposed by sulphurous acid) converts it into an oxide, and is therefore injurious.

Protochloride of copper, which is formed by the action of protochloride of iron on oxide of copper, and by that of perchloride of iron on dichloride of copper, converts quicksilver into calomel.

Now, in an iron pan neither perchloride of iron, nor either of the chlorides of copper can exist for any length of time, owing to the reducing action of the metallic iron, which speedily converts them all into protochloride of iron, and as the former and not the latter are useful in acting on the unroasted portion of the ore, it is easy to see that pans are to this extent disadvantageous for roasted base ores, and still more so for unroasted ores when chemicals are required for its reduction.

The Stewart process as described, is a jumble of doubtful utility of several processes, among which are that described as "Aaron's process" in my little work on "Testing and Working Silver Ores," the Hunt & Douglas process, and

a process patented some years ago, in which the ore is treated with a bath of perchloride of iron and hydrochloric acid, with recovery of the bath.

I think the process of doubtful utility because of the great danger of injury to the quicksilver, and consequent great loss of that metal. The only apparent advantage it offers over Aaron's process, above mentioned, is in recovering the bath, which recovery being combined with amalgamation, seems also to be the only patentable novelty, but being patented, and involving a good deal of extra trouble, as well as additional outlay, is of questionable benefit.

Aaron's process is not patented, except that modification in which sulphurous acid is used as an aid in amalgamation, which is patented, to which I beg to call the attention of parties concerned.

Where it is desirable to save the copper contained in an ore, it would seem that the Hunt & Douglas process, pure and simple, fulfills all the requirements, for as shown by another recent paragraph from the Colorado *Miner*, Mr. Stewart has found that it can be so modified by means of perchloride of iron (not protochloride as stated) as to extract the gold as well as the silver perfectly.

C. H. AARON.
NOTE.—"Testing and Working Silver Ores" is published by Dewey & Co., price \$2.00.—Eds. PRESS.

[Copyrighted.]

Mechanical Ore Concentration and Separation—No 24.

[Written for the PRESS by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.]

What is on the Basis of all Practice in Mechanical, Mineral—Concentration and Separation.

When in the introductory remarks to this treatise, "specific gravity" was mentioned, it was done so for the practical purpose of showing the extent to which mineral dressing is applicable and where the natural limits of its application are. The relative density of materials constituting metallic ores or other useful minerals was then enumerated, and the way was indicated to ascertain the degree of such density. It now remains to explain why specific gravity (density) is the principal quality to be acted upon for the mechanical separation of minerals according to quality.

In examining the table of densities previously published, it will be observed that most valuable minerals being the ore of metals, exceed in density such of all rock accompanying them as matrix, whether in fissure veins or in stratified or in irregular deposits.

Experience now has shown that particles of equal size, but of unequal density, when allowed to drop from the surface of a liquid of still less density, will arrive, the one of higher density sooner at the bottom than the one of lower density. On this elementary experience all mechanical mineral dressing is based, and on some modifications of this experiment, which will be detailed hereafter.

'What is Equal Falling?'

As "equal falling" is designated solid particles, which, when simultaneously dropped from the surface of water of more or less density, will simultaneously reach the bottom.

It is evident and experiment proves it to be so, that

1st. Two particles of solids of equal size and shape and of equal specific gravity (density) will prove equal falling.

But experiment proves not only this; it proves also that

2d. Two particles of solids of equal size and shape, but of unequal density (specific gravity) are not equal falling; but the particle of higher density will reach the bottom before the same sized particle of less density will reach it.

3d. Two particles of solids of unequal size but of equal density (specific gravity) are not equal falling, but the larger particle will reach the bottom before the smaller particle of same density will reach it.

4th. Two particles of solids of unequal size and shape and of unequal density may become equal falling, and they will become so, if the size of the particle of less density be so much larger to make up in size, viz: in positive weight (medium to penetrate the water and to resist its adhesion or friction on the way down of the particle of solid) what it lacks in relative gravity (density); globules one-eighth inch in diameter of galena are equal falling with globules of one-half inch diameter of quartz.

The shape of particles influences these results for so limited an extent, and in practice it can be controlled so little, that for all practical purposes shape can and may be neglected if the size alone be regulated.

The effect of a column of water without motion, and the effect of a vertical upward stream of water do not differ so as to result in an alteration of the before-stated four principles (axioms.) But the upward motion has the effect only, which a greater density of the liquid would have to retard the motion of all solids in their downfall. In a lighter liquid or in air the motion of solid particles would be accelerated comparatively; therefore motion must be imparted to air in order to impart to it the same rate of resistance as water possesses without motion.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

General News Items.

THE Turks and Russians are rushing for good points for the coming struggle.

LARGE sales of horses for French light cavalry have been made in New York.

The river Duiper overflowed, and 20,000 people are homeless.

The German Parliament refuses to impose compulsory duties on iron and iron goods.

RATES of fourth-class freight between Chicago and New York have been advanced.

Tuz story that the Benders were killed by a party which pursued them from Kansas is revived.

An extensive conflagration occurred in Constantinople on Saturday. Six hundred houses were destroyed.

It is reported that England is negotiating with the Porte for the cession of the Suez canal.

EX-SENATOR WM. G. BROWNLOW, better known as "Parson" Brownlow, died on Monday at Knoxville, Tenn.

THE Internal Revenue receipts to the 30th of April show a gain of \$2,600,000 over the corresponding 10 months of last year.

THERE is not a single vessel at this port receiving wheat at present—a circumstance that has not happened before since 1875.

THE plasterers have at last accepted the terms of the Real Estate Associates, \$4 per day for 10 hours, and work is again going on at the company's new building on Montgomery street.

SAN FRANCISCO, with a larger paid-in banking capital than St. Louis, Cincinnati and Chicago combined, has only about a quarter as large a debt as the smallest sum of liabilities in the trio.

It is said that a bill will be introduced in the coming Congress reducing the army to 10,000. The Indian war is ended, and neither Sherman nor Sheridan believe it will be resumed.

HENRY WATTERSON has accepted an invitation to deliver the memorial address on Decoration Day over the graves of Union soldiers buried in the National cemetery at Nashville.

MORE Cheyenne warriors have surrendered at Red Cloud agency, and 40 other lodges are reported as at the mouth of Tongue river, coming in. Crazy Horse's band are on the way to the agency.

Luxury on the Rail.

The Difference.

We have been frequently asked: "What is the difference between a railroad dining car and a Pullman Hotel car?" That there is a vast difference is well known by those who have had occasion to use either; but the untraveled public are not fully advised as to the points of difference. The old-fashioned railroad eating-house, almost too well known; its peculiar, hastily-eaten meals have been partaken of by too many thousands to be forgotten. The dining car, then, is this well-known eating-house placed on wheels, attached to the train at the usual meal hours, and hauled along for 30, 40 or 60 miles, until the meal has been served, when it is set off on a side-track, and is by the next train hauled back to its starting point, and so it runs a few miles for each meal. To get meals in this or the passenger has to work his way through the train while it is under full motion—pass from car to car, running the risks of falling between the platforms, and finally finding the car at the rear of the train. Then comes the meal, which must be hurried through with to give chance for other hungry passengers to take your place, and you must force your way back to your seat, and again run the risks of your platform passage while the train is at full speed. In such cars you pay 75 cents for each meal, even if you take or need only a cup of coffee and a cracker. Bear in mind, in no case do these dining cars accompany the train from starting point to destination. They are always "cut off" and taken on as we have described. With the Pullman Hotel car the case is different in every respect. These cars are 60 to 66 feet long, have 16 wheels under each, are built strong, so as to insure steady, quiet running, without the usual unpleasant side motion. Each Hotel car contains, in the order named, the following compartments:

1st. A cosy, neat and clean little kitchen, fitted up with a range, an ice and meat box, rows of shelves covered with bright silver and glass ware, and all the appliances needed for preparing a sumptuous meal.

2d. A compact china and glass closet, in which is kept the table ware and table linen, cutlery, etc.

3d. A passage way, cutting off the kitchen and china closet from the rest of the car, and forming an air chamber to prevent the smell of the cooking victuals from reaching the saloon portion of the car.

4th. The grand saloon. This is fitted up with 12, 14 or 16 sections, with space for tables between each, and in these the meals are served. You, while on the car, own the space you occupy as much as your room at home, and no one can hurry you while at meals, nor are you forced to give it up to allow any other person to occupy it. At night, as if by magic, this saloon is changed into a boudoir, and here your couch is prepared, and here you rest yourself isolated, and as separated from your fellow travelers as you would be in your own bed-chamber.

5th. An elegant drawing-room, with room for six or eight persons to occupy as much as your room at home. In it you and your family or party of friends may be as secluded as you please, or you can slide open the end and have the company of those in the grand saloon.

6th. Charming arranged lavatories are partitioned off, and arranged in two distinct compartments for the separate use of ladies and gentlemen. These lavatories are supplied with pure water, clean towels, combs, brushes, and all the things one most desirably may desire for the perfect performance of an elaborate toilet.

7th. Then follow conductor's and porters' rooms, linen closets, etc.

It will thus be seen that this car is, as its name implies, a perfect modern hotel, with all of its appliances and comforts complete. This car is taken on at the commencement of the journey, and is part of the train to its destination. In it you get your sleeping compartments and your meal accommodations, while neither encroach upon the other. Envious dining-car employees, who are paid to decry this form of hotel car, cannot, with anything like truth on their side, give any valid or conclusive reasons for preferring the dining to the hotel car, and they only chatter in favor of their dining car because they are paid to do so. These hotel cars have been run from New York to San Francisco and back with the Emperor Don Pedro to San Jarrett & Palmer's party, that traveled at almost lightning speed—with many a party of California bonanza kings; and all join in pledging their honor that the cars are incomparable.

Two lines of these celebrated cars run between New

York and Chicago, and one line only between Chicago and Omaha. It may be needless to say that this last-named line runs over the steel track of the Chicago and North-western Railway. That these cars are attracting a large share of the California travel, both ways, might easily be conjectured. Any road deserves to be patronized that is enterprising enough to give the traveling public such facilities as are freely tendered by the Chicago and North-western Railway on its California line.

We have neglected to say that, in these hotel cars, the meals are a *la carte*—you pay for what you get, and nothing more; and that at very reasonable rates—*The Tribune*, April 7th, 77.

THE GRAND PACIFIC—This fine hotel, in the city of Chicago, cost \$1,300,000, and occupies an entire block. It is 130 feet high and has 500 rooms. It is a very elegant structure, and is a favorite resort for people from the Pacific coast, as everything is in the best style and all the arrangements are as complete as an efficient management and great experience can suggest. The building is specially secure against fire, as it was constructed with this object prominently in view, and every appliance known for the prevention of fire is at hand. In all its features the Grand Pacific has been guarded against the chief enemy of all large structures.

METALS.

[WHOLESALE.]

THURSDAY, M., May 3, 1877.

Am. Pig. ton.	29 00	63 00
Scotch Pig. ton.	31 00	62 50
White Pig. ton.	30 00	62 00
Oregon Pig. ton.	—	—
Boiler, 1.	4 00	4 1/2
Plate, 13 to 20.	7 1/2	8 1/2
Sheet, 10 to 14.	—	—
Sheet, 16 to 20.	5 1/2	—
Sheet, 22 to 24.	4 1/2	—
Sheet, 26 to 28.	6 1/2	—
Horse Shoes, keg.	6 00	—
Nail Rod.	8 1/2	9 1/2
Nail, Oval.	8 1/2	8 1/2
Roller.	7 1/2	9 1/2
Copper—		
Copper Tinned.	37 1/2	40
Sheathing, lb.	37 1/2	40
Sheathing, Yellow.	21 1/2	22 1/2
Sheathing, Old Yellow.	10 1/2	11
Composition Nails.	21 1/2	—
Composition Bolts.	24 1/2	—
STEEL—		
English Cast, lb.	14 1/2	25
Anderson & Woods, ordinary sizes.	16 1/2	—
Drill.	16 1/2	—
Flat Bar.	15 1/2	20
Play Steel.	8 1/2	12 1/2
TIN PLATE—		
10x14 C Charcoal.	9 00	9 50
Banca Tin.	24 1/2	—
Australian.	18 1/2	18 1/2
ZINC—		
By the Cast.	11 1/2	—
Zinc Sheet 7x3 ft, 7 to 10, lb.	11 1/2	—
7x3 ft, 11 to 14.	11 1/2	—
8x4 ft, 9 to 10.	12 1/2	—
8x4 ft, 11 to 12.	12 1/2	—
NAILS—		
Assorted sizes.	3 3/4	—
QUICKSILVER—		
By the lb.	42 1/2	45

LEATHER.

[WHOLESALE.]

WEDNESDAY M., May 2, 1877.

Sole Leather, heavy, lb.	26 1/2	29
Light.	22 1/2	24
Jodot, 8 Kil. doz.	48 1/2	—
11 to 13 Kil.	68 00	67 00
14 to 19 Kil.	82 00	64 00
Second Choice, 11 to 16 Kil.	57 00	67 00
Cornellian, 12 to 16 Kil.	57 00	67 00
Females, 12 to 13 Kil.	63 00	67 00
14 to 16 Kil.	71 00	67 50
Simon Ulmo, Females, 12 to 13 Kil.	58 00	66 00
14 to 15 Kil.	66 00	67 00
16 to 17 Kil.	72 00	67 00
Simon, 18 Kil.	72 00	67 00
20 Kil.	65 00	67 00
24 Kil.	72 00	67 00
Robert, 7 and 9 Kil.	35 00	64 00
Kys, French, lb.	1 00	1 35
Cal. doz.	40 00	66 00
French Sheep, all colors.	8 00	65 00
Eastern Cal. for Backs, lb.	1 00	1 1/2
Sheep Roans for Topping, all colors, doz.	9 00	63 00
R. Linings.	5 00	61 00
Cal. Russet Sheep Linings.	1 75	4 50
Boot Lega, French Cal, pair.	4 00	—
Good French Cal.	4 00	4 75
Best French Cal.	5 00	—
Leather, Harness, lb.	3 00	38
Fair Bridle, doz.	48 00	67 00
Skiing, lb.	33 1/2	37
Bit, doz.	30 00	65 00
Buff, ft.	15 00	20
Wax Side.	17 1/2	18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, May 2, 3 P. M.

LEGAL TENDERS IN S. F., 11 A. M., 94 1/2 SILVER, 5 1/2 CENTS.

GOLD IN NEW YORK 107.

GOLD BARS, 880 @ 930. SILVER BARS, 10 @ 15 1/2 cent. discount.

EXCHANGE ON NEW YORK, 50 @ 55-100 cent. premium for gold on London banks, 43; Commercial, 44; Paris, five francs @ dollar; Mexican dollars, 94 @ 95.

LONDON Consols, 9 1/4; Bonds, 102.

QUICKSILVER IN S. F., by the flask, 1 lb. 41 @ 42c.

DEWEY & CO. PATENT AGENTS.

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PATENTS obtained promptly. Caveats filed expeditiously; Patent re-issues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting Business promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons, and our success and business are constantly increasing.

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IMPROVED VERTICAL ENGINE.

Any parties needing STEAM ENGINES, from Four to Ten Horse-Power, will do well to call on me before purchasing elsewhere. Particular attention is called to my improved Feed Pump.

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Practical Engineer and Machinist.

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BRASS and BELL FOUNDRY

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BRASS CASTINGS of all kinds,

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A General Assortment of Engineers' Findings.

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STEAM PUMP

The Best and Most Durable in use. Also, a variety of other

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For Mining and Farming Purposes.

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For Ventilating Mines and for Smelting Works.

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AT LOWEST RATES.

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Instructions on Analysis and Assaying.

By Fire, Blow-Pipe and Chemicals.

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The Testing Machine for Gold, Silver, Lead, &c.

Price of "Wee Pet," \$100. The Tester, \$40.

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Assay for Gold and Silver, Copper, Iron, Lead,

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Minerals tested at \$2 per Metal.

Qualitative or Quantitative Analysis of Ores,

\$10 or \$25; Coals, \$10 or \$50; Water, \$25 or \$75;

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Baths cleanse the system from Lead, Arsenical, Mercurial

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Mining and Other Companies.

Booth Gold Mining Company—Location

of works, Auburn, Placer county, California.

Notice is hereby given that a meeting of the Board of Directors, held on the thirtieth day of April, 1877, an assessment of five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, No. 320 California Street, Room No. 5, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the fourth day of June, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on the twenty-fifth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors, GEO. R. SPINNEY, Secy.

Office, No. 320 California Street, Room No. 5, San Francisco, Cal.

California and Arizona Mining Company—

Location of principal place of business, 501 Montgomery

Street, San Francisco, California. Location of works,

Mohave County, Territory of Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of April, 1877, an assessment of two cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, 567 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid, on the thirteenth day of May, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fourth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, A. E. JEWELL, Secretary.

Office, 507 Montgomery Street, San Francisco, California.

California Fruit Growing Association—

Location of principal place of business, San Francisco, Cal.

Location of property, El Dorado county, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 14th day of April, 1877, an assessment, No. 4, of \$2.00 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, 331 Sansome Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 21st day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday the 3rd day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, HORACE JONES, Secretary.

Office, 331 Sansome Street, San Francisco, Cal.

Consolidated Bonanza Silver Mining Co.—

Principal place of business San Francisco, California. Location

of works in Eagle and Washoe Valley Mining Dis-

trict, Ormsby county, State of Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 19th day of April, A. D., 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Tuesday the 29th day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday the 19th day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, WM. MARTIN, Secretary.

Office No. 19 First Street, San Francisco, Cal.

Dolores Consolidated Mining Company.

Location of principal place of business, San Francisco, California.

Location of works, Dolores Mining District,

Esmeralda County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Blasdel, H. G., Trustee.	16	10,000	\$1,000 00
Blasdel, H. G., Trustee.	17	5,000	500 00
Blasdel, H. G., Trustee.	18	5,000	500 00
Blasdel, H. G., Trustee.	19	5,000	500 00
Drexler, L. P. & Co., Trustee.	8	25,000	2,500 00
Fry, J. D., Trustee.	10,000	1,000	100 00
Keene, J. R., Trustee.	9	10,000	1,000 00
Talbot, W. C., Trustee.	3	100	10 00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock P. M. of said

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,

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Established for the Manufacture of
RAILROAD AND OTHER IRON
—AND—
Every Variety of Shafting,
Embracing ALL SIZES of
Steamboat Shafts, Cranks, Piston and Con-
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JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

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Marine, Stationary and Portable Boilers, Smoke Stacks,
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For Steam Boilers, Pipes, etc. Best non-conductor of heat
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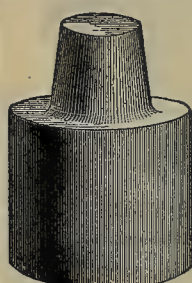
REFERENCES: United States Government Buildings and
the principal manufacturing establishments in the East and
on the Pacific Coast; the principal mines and mills in Nevada,
etc., etc.

United States and Foreign
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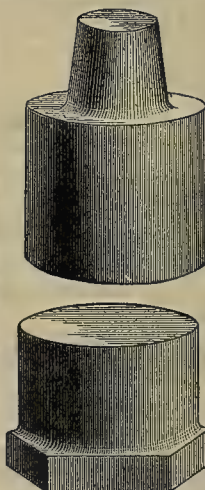
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Guaranteed Cheaper than the Best Iron.
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Owing to our largely increased business, the present
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we take great pleasure in announcing that from and
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QUARTZ MILLS at twelve cents per pound, delivered
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We also furnish Steel Plates for Blake and other Ore
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ALL STYLES OF FANCY HEAD BOLTS.
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Experimental and fine Special Machinery, Dies, Taps,
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The Only Illuminating Tile Manufactured for Light-
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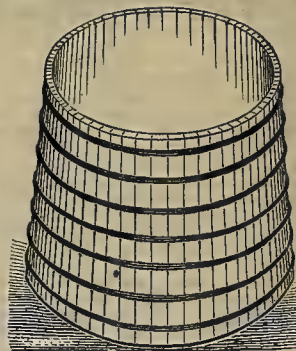
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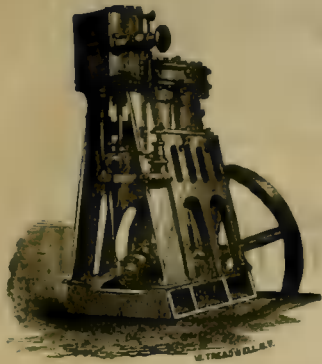
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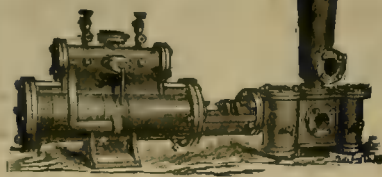
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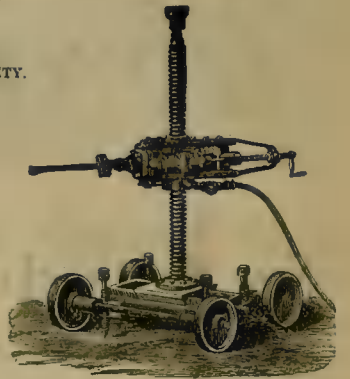
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Gents:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this year for my patent Straw Burning Threshing Engines give splendid satisfaction. They far surpass for regularity of speed any Governor that I have ever seen, and I have seen all the best kinds; I have seen the main belt fly off the pulley several times this season while threshing, and the engineer did not discover it, so perfectly was the speed maintained, until he was told of it; this I consider something wonderful; I consider the Governor absolutely perfect, so far as speed is concerned. I bought and put on to one of my engines a Shive Governor, to see which was the best, and after one season's trial I have no hesitation in saying they are far superior to any other Governor that I have seen or used. I wish you would send me the lowest price that you can furnish 25 Governors for next season's engines.
Yours respectfully,
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The only Governor that has received awards at each of the International Exhibitions. American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Baltimore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals; International Exposition, Paris, 1867, One Bronze and Two Special Medals; International Exposition, Vienna, 1873, Medal of Progress and Decoration; International Exhibition, Philadelphia, 1876, Medal and Diploma.

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Which will hereafter be our second grade. It is of immense strength,

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It is a Strong, Reliable and sure Powder, and will do excellent work.

SPECIAL ATTENTION IS CALLED TO THE REDUCED PRICE OF 35 CENTS,

At which we will hereafter sell this grade.

JUDSON POWDER. This New and Valuable Powder is Rapidly Coming into General Use as a Substitute for

Common Black Powder, to which it is in all respects far superior.

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Caps, single, double and tripple force, also, fuse of all brands always on hand.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, MAY 12, 1877.

VOLUME XXXIV.
Number 19.

An Improved Axle Set and Gauge.

On this page is shown an engraving of an axle set and gauge, which will enable any practical smith to get the height and dish of wheel, the taper of spindle, setting spindle for the dish, and adjusting spindle to any desired gather of wheels, without making a figure or diagram, or doing any guesswork, as rapidly as the gauge can be applied to the work in hand, securing perfect accuracy in the running of the vehicle.

Comparatively few vehicles on our public highways are free from the defects of imperfectly set spindles—putting the wheels out of line, changing the bearing of spokes and tenons, straining the whole running gear and producing hot boxes. The wagon is sent to a repair shop and here the painstaking smith, for want of a reliable axle set and gauge, is perplexed in giving the spindle the set required. True, if he has a draft board, rule and calliper, he can calculate what deviation the spindle requires; or if he has any of the old devices on hand for setting an axle, he can by aid of tables get at the needed change; or if he has forgotten the rule, he can set by guess, and by repeated heating, setting, measuring and hammering, get the spindles about right.

The test of a set of wheels is had by placing them (when fitted on axle), on a straight edge, then placing a square on the straight edge with the tongue against the face of the spoke, which must stand parallel with tongue of square if properly set on a plumb spoke. A second test of the wagon when turned out at the shop, is: The space between parallel spokes on opposite wheels, when measured at the fellow near the ground and on same spokes near the hub, must be exactly alike.

The apparatus under consideration consists of a one-inch by one-quarter steel bar, *A*, six feet three inches long, and an inch by three-sixteenths steel bar, *B*, three feet nine inches long, attached to the main bar, 13 inches from the right end by a straight standard, *K*, projecting four inches from one edge and three inches from the other. A screw passes through the center of this standard, serving as a pivot for the index and gauge bar, *B*, which at the left end is attached to the bar, *A*, by a slotted yoke and thumb screw. A scale is cut on the bar, *B*, to adapt it for any sized wheel, from two to five feet high. A vertical sliding rule, *J*, on the index bar, *B*, is designed to show the dish, while the graduated scale on the gauge bar shows height of wheel.

A movable arm-rest, *L*, with curved ends, projecting four inches from one edge and three inches from the other, fitted with socket and set screw, is attached to the bar, *A*, near the left end. It is designed to support the gauge on a true horizontal, over the center of the axle, the curved arm-rest, *L*, and straight standard, *K*, resting on the opposite shoulders of the spindles, while the index pointer of the taper-taker is placed over the end of the spindle to be set. The taper-taker, or graduated double calliper, is fitted with a movable arm, scale and graduated sliding gauge. It is moved on the index-bar, *B*, through a socket and held in place by a set screw. The short calliper and short ends of standards, three inches long each, are placed on the opposite edge of the bar, *A*. This is designated the "gather" side. Now for the application:

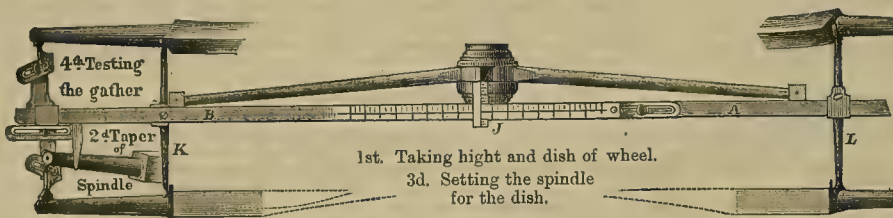
First. To get the height and dish of wheel: Apply the edge of the bar, *A*, fitted with the long standards, across the center of the wheel, below the hub shown, the straight standard, *K*, pressing against the tire, and the gauge-bar, *B*, against the spoke, over center of hub. Then slide the index-rule, *J*, to this point, which gives the dish, less half the diameter of the hub. To get this precisely, slide the index-rule, *J*, back to the right edge of the hub, and give the gauge-bar, *B*, the same dish at the edge as found at the center. This gives the exact dish of spoke from edge of the tire to center of hub.

Second. To get the taper of spindle: For convenience the taper-taker, or graduated double calliper, is removed from the gauge bar, *B*, and

applied to the shoulder of the spindle. It is then slipped down to the point thereof, as shown, when the true taper is shown on a scale graduated in sixteenths. The thumb screw secures the taper thus formed, and the taper-taker is thus replaced on the bar, *B*, ready for the third operation.

Third. Operation of setting the axle spindle for the dish: For convenience the bottom of the axle is turned up, and the gauge placed on it. The curved arm rest, *L*, and straight standard, *K*, rest on the shoulders of opposite spindles, while the graduated point of the calliper is fixed over the end, the gauge occupying a true horizontal line over the center of the axle, with the dish marked on the index rule, *J*, the taper of spindle shown on the calliper, the index point thereof indicates what set the spindle requires to insure a plumb spoke.

Fourth. To adjust the spindle to the gather: Move the gauge bar, *B*, until the scale on the sliding rule, *J*, indicates one-quarter of the gather desired. Apply the instrument horizontally to the front of the spindle, and bring the end of the spindle on a line therewith. For convenience and to facilitate a double test of the spindle, as to test and gather at the same time, transfer the gather adjusted as above to the short calliper on the gather side, secured in place by set screw. Then replace the set of the spindle for the dish on the taper-taker side, and the apparatus is gauged to test the spindle for



APPLICATIONS OF CARLTON'S AXLE-SET AND GAUGE.

set and gather, in two motions, insuring absolute accuracy of set and gather.

If it is desired to gather by the axle spindle instead of the wheel, set the short calliper, on the gather side, as much less than the taper of the spindle as the gather required. For instance, for a one-eighth gather, set the slide on the calliper one-eighth less than taper of spindle, (one-eighth), and set from front of spindle. Here is an example for working the gauge: Given, a four-foot eight-inch wheel, one inch dish, spindle 10 inches long, and one-quarter taper; the end of the spindle must be depressed one-quarter of an inch, as indicated in the gauge in four motions. First, place the apparatus on the axle; second, set slide-rule, *J*, on the index bar, *B*, at four feet eight inches; third, move the bar, *B*, at this point down one inch; fourth, set the index pointer on the graduated calliper down one-quarter, and the point thereof indicates a needed change of one-quarter of an inch.

The engraving shows all four applications in one view. The dotted lines on the lower axle indicate the curved shape of the same. The necessity for and convenience of this apparatus will be appreciated by every carriage-maker and blacksmith. It has been tested by some of the most competent smiths in the East. The instrument in the hands of an intelligent workman is a practical calculator of angles. Every result of the gauge has been mathematically verified. So practical is the machine that if the work is properly done, as indicated by the pointers, daylight cannot be seen through the measurements when the tests are applied, with the added advantage that with this axle-set any smith can turn out as many accurately-set axle-spindles in a day as he can heat and handle at the forge. The weight of the gauge is eight pounds, and it is substantially made for daily service. The gauge originated, and has been thoroughly tested in the shops of the Northwestern stage company, Wm. B. Morris, General Superintendent, Boise City Idaho, where economic original work and thoroughly accurate repairs on vehicles exposed to rough usage are of first importance. I. S. Van Winkle, 413 and 415 Market street, is the agent in this city.

A Fruit Pitting Machine.

There is now on exhibition in this city a machine for pitting fruit which is being examined with considerable interest because of the rapid work which its inventor claims it capable of accomplishing. We have not seen the machine in operation, but we are shown very emphatic testimonials of its efficiency in the hands of fruit manipulators who have used it in Oregon, where the inventor, Mr. Lillie, resides. The apparatus promises so much and there is such great need in our fruit drying and canning establishments for some mechanical contrivance which will reduce the great expense demanded by hand pitting, that we have made a little engraving of the machine so that we may give all interested some idea of the arrangement.

As the fruit drops from the trough, where it is shown in the engraving, it falls between springs or guides which are so adjusted that each fruit, large or small, shall be held centrally over two circular saws which revolve towards each other. When the fruit is in this position, the hammer, which is operated by an adjustable lever, (as seen in the engraving at the back of the machine,) falls and pushes the fruit down until it is caught by the saws. As the saws revolve toward each other they cut into the

working capacity is said to be 3,000 pounds of fruit per day. For this information concerning the machine we are indebted to Mr. H. Jones, who is the sole agent for this State. The apparatus is on exhibition at Mr. Trumbull's store, 419 Sansome street. Mr. Trumbull says he proposes to have the machine fully tested in public sight as soon as fruit becomes more plenty. Meantime he will be pleased to show it to all who may be interested.

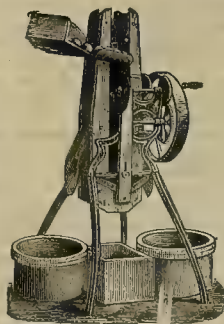
Milling.

The working of ores with the varied and excellent foundry improvements and attachments, is usually comprehended under the misused word "milling," which is properly to be regarded as the popular coinage responding to a demand for some handier word than "beneficiating." The word milling would be an excellent one if beneficiating or amalgamating were purely mechanical, as is the case with free gold; but where chemicals come into play to suit varied characters of ores, milling should not be a mere working by recipe, just as a cook makes pies or cakes; yet such is too frequently the signification of the practice. In every mining locality it is a recognized fact that this subject is of an importance above all others, for upon it

depends even the existence of whole settlements; and invariably it is the cost and percentage to be obtained that presents itself to science and the practical metallurgist. Good results, where the results are in the shape of bullion, call for the keenest practical intelligence and enlightenment with all the aid of the books and of new experiments that are to be had. Really our greatest need is that kind of knowledge that will enable us to work our mines with the largest profit; and, for the want of this, many of our mines are idle, which in Europe would be worked with success and profit.

In many places on this coast where mines are worked, when the expenses of milling are paid after those of mining, and 25% or 30% deducted from the pulp assay, an embargo is placed on all ores that do not run above \$50 or \$60 per ton. In more remote localities where expenses are greater, ore is of no use unless it will work over \$100 a ton. Cost of working and percentage of gain vary greatly in different localities and on different ores; but it frequently happens that there is a great difference in this respect in the same camp, which is, of course, in a great measure due to the methods of manipulation. Many ores have been pronounced smelting ores on this coast, which could, with skill, be better treated by other methods. Because ores are refractory with quicksilver under unskillful hands, it is not necessary to conclude therefore that smelting or some complicated process is required. This is, however, too often the case. The remedy is in the hands of the owners, and consists simply in refusing to have anybody about the works who does not understand his business thoroughly. One half of the failures which have occurred have been due to the incompetency of employees; people who have been put in because of relationship to prominent owners or some similar cause. If stockholders took more interest in the affairs of the companies, and when they saw anything of this kind going on would enter a vigorous protest, there would be fewer failures and better work done. There are plenty of perfectly competent men who may be procured to take charge of works, without giving the position to some one who wants to learn the business at the expense of stockholders. There are plenty of good, experienced miners who unfortunately consider themselves also good metallurgists, and these men are more apt to mislead others because they mislead themselves. It by no means follows that because a man is a good miner he is also a good millman. Although the professions are closely connected, there is a great difference in the requirements. It is important to have a good miner but it is equally important to have a good metallurgist, who thoroughly understands his business in all its branches, and who, if anything goes wrong will know how to remedy it.

The war in Colombia is virtually ended.



Lillie's Fruit Pitter.

each side is kept up to the saw by means of the tail screw with its coil spring, but in pitting freestones these knives are let down so far as not to touch the pit as it passes down. The upper, or long knives, are sufficient for free stone fruits. The machine is operated by a crank which the operator turns with his right hand, and with the left hand he regulates the rolling of the fruit into the opening.

This interesting apparatus is put forth as a pitter of all stone fruits, and claims the sole ability to pit cherries successfully. Its average

"Comstock Papers."

The following from a recent number of the *Virginia Enterprise* will serve as an addition to the "Comstock Papers" published in this journal:

Yesterday morning the reporter was awakened from his matutinal repose by the sound of picks and shovels near, and within a few feet of where picks and shovels first sounded on the Comstock. A moment later he found himself at the old original Ophir dump, near the intersection of Carson and Howard streets, the wind flapping his shirt sleeves fitfully and musing his unkempt hair as he stood watching some Mexicans undermining the dump. It may be said, by way of explanation, that nearly the whole of the old dump was removed to macadamize C street last fall. To reach the bottom, therefore, only requires now the sinking of a few feet, where previously it would have been necessary to have sunk from 12 to 20. The Mexicans, to the interrogations of the reporter as to their actions, gave the following explanation:

During the season of 1861, when the great freshet visited Sacramento, the Ophir was being worked for the rich ore of the croppings. This was not to be reduced by the rude appliances of the day, but was to be sacked and shipped on the hurricane decks of mules to California. Each mule load was worth from \$1,000 to 1,200, so rich was the rock. At the time of that freshet, from 20 to 30 sacks of this ore had been taken out and was ready to ship. The flood came down through Ophir ravine like the waves of the sea, taking everything before it. Cabins and all sorts of mining works were swept away by its fury. It even took a brick building down on D street. The sacks of ore were never found afterwards. The leader of the gang, with hair and beard like the almond's snowy bloom, and who mined on the Comstock before it was ever seen by the original prospectors, said he was satisfied that the sacks were covered by dirt and debris near where they were digging, and where dumps had subsequently covered them still deeper. Now that the dumps had been so nearly removed, he expected to be able to find them readily.

The conversation having thus drifted into olden channels, and the company having been increased by the presence of John L. Moore, one of the veteran prospectors of the Comstock, the reporter drew his note-book and listened.

Mr. Moore (to the gray-haired Mexican)—Did you know Savariano?

Mexican—Yes. He mined up here (pointing toward the old Mexican works) 20 years ago.

Moore—He was a great prospector.

Mexican—Yes. He found this (meaning the Comstock); he and Moldonado. Then he found Cerro Gordo. He discovered ore out there at Austin, too.

Moore—Did you ever go with him on his prospecting trips?

Mexican—Yes. I was with him when he found Cerro Gordo.

Moore—Oh, ho! then you know something about the 40 loads of ore stolen from Moldonado?

The Mexican looked alarmed; glanced at the reporter, shook his hands, shook his head, and refused to talk any more. At a nod from Mr. Moore the reporter took the hint without waiting for a boot as a starting point, and left.

An hour later he made it very convenient to meet Mr. Moore and from him he got the balance of the story.

When the pioneers first came to this section they found Mexicans working the claim named after them, but which is now part of the Ophir mine. The ledge from which this ore was taken has never yet been found by the Americans. In those days one-half of the claim was owned by Moldonado, and was worked by Savariano. The ore was very rich, a single mule load being worth from \$1,000 to \$1,200. This was taken by pack mules to California by the way of Placerville. Some 40 mule loads had been taken out and prepared for packing.

Next morning it was found that the pack train under Savariano had departed in the night. The lead had been covered up and has never been found since. The only thing ever seen or heard of the train was by an early teamster as it was filing towards the mountain by Woodford's, and beyond Genoa. Savariano had played Moldonado false, had stolen the mules and from \$40,000 to \$50,000 in ore, and left the country. Instead of going through by Placerville, he kept along the eastern slope of the mountains, struck down by Aurora, thence through Mono into Inyo county, California. It was during this flight that the gold mines of Cerro Gordo, in Inyo county, were discovered, and the white-haired Mexican said yesterday that Savariano was in that section now.

A year ago last summer, Mr. Moore saw a Mexican walking over the section where the old original Mexican claim lay. He watched the man for an hour, as he appeared to be searching for something, but seemed unable to find the bearings. At last Mr. Moore interviewed and found him to be Savariano. He was then searching for the lead from which this rich ore had been taken, and which, on the night of the flight, had been covered up. Savariano at that time asserted, as does the old white-haired Mexican who was with him while here and who went away with him, that the rich lode from which that ore was taken has never been discovered, but remains to-day on the Ophir ground as it was left at that time. Savariano, when here, tried to get a lease of the ground of

the Ophir company, but did not succeed. The old Mexican says things have changed so that he cannot tell for sure where the lode lay, but that Savariano knows where it is, and can uncover it in a day or two.

There are several things which go to corroborate this wonderful story. The sudden disappearance of the Mexicans and their pack mules is well-known to all early Comstockers. This was followed by a cessation of work on the claim and desertion of the premises.

Concentration in Montana.

The Butte (Montana) *Miner* gives the following description of Olin's concentrating works which are in successful operation:

Brief mention has been made of the condition and progress of these works from time to time in these columns, but no attempt to give anything like a detailed description of the process now in successful operation. A visit by our reporter last week found the works running, and appearances in and about the concentrator indicating a degree of activity and bustle rather surprising. The numerous "dumps" of ore waiting to be treated and the piles of concentrated ore lying outside, being sacked up and prepared for shipment, showed that something was being accomplished inside the building. But before entering upon any description, it may be well to state briefly how, and under what conditions, the proprietor has brought these works to their present state of perfection. Mr. Olin commenced operations last summer, with very limited means of his own and at a time when the financial condition of the camp and its business was not as good as now by a long way. The first idea of starting up with hand jigs was carried out, and after a thorough trial had to be thrown aside for various reasons, the principal one being that the process was too tedious and necessitated too much labor. Then plans were drawn by Prof. Knabe for an automatic jig, which is the one now in operation, made on the ground and substituted for those discarded. During this time the weather was cold and stormy and the ore on hand and at the mines was covered with ice and had to be dried before it could be worked. A furnace or kiln was then erected, which occupied more valuable time and cost something besides. Before going further it should be stated that this furnace is not used only in case the ore has become wet from exposure to storms, or when taken directly from the mine without having lain in the sun any length of time. In the latter case exposure to the sun and wind will dry the ore sufficiently in a few hours and the furnace is not needed. The statement published some time since that the operation of heating the ore injured its quality is incorrect, the action of the heat not being strong enough to affect the value of the ore a particle. We understand the statement operated quite seriously at the time against Mr. Olin, and there being no foundation for the opinion it should be corrected.

In connection with putting in the automatic jig several other additions had to be made to the works and when these were completed it was well on to spring. And thus the owner has been put back in one way and another in getting under way till within the last few weeks.

The works are on a small scale but will prove of great advantage to owners of copper mines this season. Our description of the process will be brief, it not being necessary to enter into minute details. A visit to the works will satisfy any person that they are doing good work and be more satisfactory than any statement we might write.

In the first place, after the ore is pretty thoroughly dried in the sun or otherwise, it is put through a Dodge crusher, a spout from which carries it to a pair of Cornish rollers, (patterns for which were made by Mr. Olin and the rollers cast at the Butte foundry,) the ore dropping from the rollers into an elevator box and carried up and deposited into a revolving screen. This screen is very fine (No. 40), and takes out what is called the slimes, which are run off by themselves and treated by hand, mention of which will be made further on. The balance of the ore passes through this revolving screen (it being on the same principle as those used in grist mills in cleaning wheat), and from here is conveyed to another screen or bolt (on the same principle again as those in grist mills), having three grades of mesh. In passing through this screen everything but sticks and what may not have been crushed to the size of a duck shot in going through the crusher and rollers, drops into a bin and is again taken up by elevators and deposited into a hopper over the jig, where it goes through the process of condensation and separation, the concentrated ore being deposited on the floor and the gangue passing off and out of the house through a spout with the water that has done its duty in the operation of dressing. We are not well enough posted to give an intelligent description of the *modus operandi* of this jig. The principle of the process is something similar to that of a grizzly in saving gold. As stated previously, the pattern for the jig was furnished by Prof. Knabe, he having seen some like the one in use here in Germany. It does its work well and is considered as good as any pattern which is manufactured in the country.

The slimes, which were spoken of above, contain about one-fourth of the whole value of the ore as originally introduced into the dressing process, and the treatment of them by hand through tailing sluices is the only serious draw-

back in the whole operation. The works are now dressing about seven tons of crude ore every 10 hours, and the labor required to dress the slimes amounts to as much as all the other force employed, three men being kept steadily engaged, and then not being able to keep the bin clear. It is the intention of the owner to make this part of the business also automatic, doing away with the labor and expense of three hands, and also doing more rapid work. He has a plan already perfected by which he thinks he can accomplish this, and his perseverance and energy will doubtless carry the point.

The works are only run during the daytime at present, but in the course of a week another set of hands will be put on and steam not be allowed to be turned off day or night except for cause. To give an idea of the successful treatment of the ores and the advantages secured to miners in the operation of this concentrator, it may be said that after sorting out what will bear shipment at the mines—35% to 40% ore—the remainder is called second-class and would be utterly worthless and unmarketable unless concentrated. This second-class ore is concentrated to about one-half its original weight and bulk, the product carrying from 36% to 40% in value—about the same as the first-class ore after being carefully sorted. Perhaps two-thirds of all the ore taken out is second-class, or under 30%. There are hundreds of tons of this ore on the dump at the different lodes now working. The concentrator is now running on a lot of 37 tons from Discovery claim on the Parrott. This lot assayed 28%, which would not do to ship and therefore had to be dressed. Another lot of 600 tons from the Poznainsky claim, Mountain lode, is being delivered, which will be put through next. Mr. Olin informed us that 400 or 500 tons more from the Parks claim will be forthcoming when needed.

Now, that the works are proving a success and giving satisfaction in every particular, we hope that the owner's efforts will be duly appreciated and given a fair and liberal support, which we have no doubt he will receive.

As before stated, the enterprise is of great advantage to copper miners, securing to them fully one-third more receipts for their labors, and, in benefiting the miners, must necessarily contribute something to the general welfare and progress of the camp.

The Idaho Mine.

The Grass Valley *Union* gives the following description of this famous California mine:

The Idaho quartz mine was located May 8th, 1863, by Thos. J. Pegg and others, numbering 31 persons, mostly residents of Grass Valley and vicinity, and recorded upon the county records of Nevada county, comprising 31 claims of 100 feet each, and upon the easterly extension of the Eureka quartz lode. By proper transfers, the mine became vested in the following persons, to wit: Thos. J. Pegg, Wm. Young, Dibble & Byrne, J. Fricot, H. D. Cady, T. Findley, M. P. O'Connor and E. W. Maslin, who proceeded to levy assessments for the purpose of prospecting the mine. Previous to this time, however, there were other parties, one Edwards and others, who laid claim to the ground, but failed to establish that claim in court, and consequently the title became vested in the above named parties. The first work was done by sinking a shaft nearly in the center of Wolf creek, and now about opposite the present company's office. Work was prosecuted with vigor during the seasons of 1863-4, but finding the rock very hard, it was finally concluded to stop the work there and sink upon the side of the hill, where the present heavy pumping machinery was erected two years since. During all this time, about two years, assessments were being levied, and, as is often the case in mining operations, things looked pretty dark for the company. As a consequence, the property changed hands more or less; but to the honor as well as the profit of some of those plucky men, they struggled manfully through with the burden of assessments. But as results have proved, they showed their wisdom in holding on, and to-day are quietly reaping upon their hard won, but well won laurels. Such is pluck, especially in mining enterprises.

The shaft spoken of above was commenced July 5th, 1865, and work prosecuted upon it until February, 1866, when the work was stopped for about 18 months, on account of the difficulty of collecting assessments from some of the owners in the mine, the shaft having been sunk 120 feet, and a cross-cut driven into the foot-wall 70 feet. It was not then an incorporated company. Up to this time, there were paid in and expended upon the work over \$21,000. About September 1st, 1867, articles of incorporation were entered into, and a code of by-laws framed for the government of the company. The first regular meeting of the Board of Trustees was held September 6th, 1867, at the office of the company, Findley's banking house, Grass Valley, and the following Trustees elected as the first officers: John C. Coleman, President; Wm. Young, Vice-President; Thomas Findley, Treasurer; and M. P. O'Connor, Secretary; to serve for the first three months; and Edward Coleman, Esq., was appointed Superintendent, and at the first annual meeting was elected President, and has continuously served in those positions in a most efficient manner until the present time, except for a short interim, in which he was absent from the State. An assessment of \$1 per share

was levied upon the capital stock of the company, at the time of the first election, aggregating \$3,100, and work resumed upon the shaft spoken of above, and continued until a depth of 300 feet had been attained, when the drift was run toward the Eureka mine and pay ore found.

During the progress of this work the shaft was continued to the depth of 500 feet, when the pay shute was struck in the shaft. From September, 1867 up to September, 1868, the sum of \$18,600 was levied and collected in assessments. A 15-stamp mill was commenced in July and completed in the fall of '68, and upon July 4th, 1869, the first dividend of 2½% upon the capital stock was declared. During the year 11 dividends were paid to the stockholders, amounting to the sum of \$170,500, and aggregating 55% upon the capital stock of the company. During the last eight years, and including the first four months of the fiscal year, the mine has paid a net profit to the stockholders of \$2,123,570, the ninety-second dividend having been declared on the 2d of April of the present year. In 1872 the 15-stamp mill of the company was remodeled, and its capacity increased to 35 stamps, with all the latest improvements in gold saving, at a cost of \$38,000. In 1872 a new hoisting shaft was commenced, six by 20 feet within timbers in size, and having three compartments. This shaft is now down 1,116 feet on the incline, at a cost of \$104,000, as we find by reference to the annual report of the Superintendent. The hoisting works connected with this shaft cost \$30,000.

The original shaft sunk upon the mine is now used as a pump shaft, with the machinery and pumps of sufficient capacity to successfully contend with any amount of water that may be encountered. The repairing of this shaft and the erection of the pumping machinery and the fire-proof brick building within which it is contained, cost \$36,000. Everything about mill and mine is in fine condition, and under the able management the future looks bright for a long time to come. A peculiarity noticeable in the Idaho mine is that there is no surface croppings of the vein except about 60 feet at the west end of the location, but the croppings or rather the top of the ledge sinks into the earth at the same angle as the pay shute. For example, the vein pitches southward at an angle varying from 73° to 51°, while the pay shute which came into the ground from the west and was struck on the 300-foot level, pitches eastward on the vein at an angle of 33° and still continues at that angle at the depth of the mine. This shows the importance of not always depending for a ledge on merely surface croppings; but that where well defined croppings are found, that it is fair to assume the ledge may hold its course underground, and that it may be struck at varying depths—those depths to be judged by the angle of the pay shute, if such be found at the surface croppings of the vein. On next Monday the Idaho will pay its regular monthly or ninety-third dividend. It will be \$7.50 per share, aggregating \$23,250.

San Diego Mines.

The San Diego *World* has these notes from Julian and Banner districts in that county:

The Helvetia mill has been running steadily on San Diego ore for the last week, and will clean up about \$1,500. The ledge is about two feet wide, and continues down to the bottom of the shaft, one hundred feet from the surface.

The Ready Relief mine is being worked by Messrs. Ring & Cundy, and is turning out rich ore, and looks better than ever before.

The Tom Scott mine, purchased by John P. Sanborn, has commenced operation under the supervision of J. M. Beach, J. W. Munday acting as foreman. As to what their intentions are in regard to sinking, or stopping, we are not informed.

The Centennial mine, under the supervision of Morgan, Vale & Co., is moving slowly. Prospects not very flattering.

It is understood that the Golden Chariot will commence operations as soon as the assessment, levied lately, is paid.

It is stated that the Stonewall will soon commence operations.

It stormed very hard in Julian last Sunday and Monday, with good rain and a light fall of snow.

GRAVEL MINES.—The burgs of Liberty, Lowell, and Remington Hills are beginning to show marked signs of prosperity. The mines already opened at these places are all paying dividends, and with the numerous miles of large deposits of gravel, which are known to exist in that vicinity, all of which it is thought will pay well to either drift or hydraulic, and from the large increase of prospecting which has been put in progress since the reduction of miner's wages, we have good reasons to predict that in all probability in less than two years from now there will be a large number of men employed in that locality, in working some of the richest and most extensive gravel mines that now exist in either Placer or Nevada counties. Several of the tunnels which are now under headway are being run by contract, the parties constructing them receiving for their labor a deed to one-half the ground, when the gravel in the bottom is tapped. There are two more companies talking of letting their ground on the same lay-out, and as each claim embraces considerable ground, there is still a chance for several more enterprising miners to get in possession of what the present prospects indicate to be a rich mine, at a very light expense.—*Dutch Flat Forum*.

MECHANICAL PROGRESS.

Balancing Buhrs.

John W. Hopkins, a millwright of Wilmington, Delaware, gives the *Mill Stone* a straightforward and practical method of performing this much discussed operation. He says: As "centrifugal force is always as the specific gravity, and the square of the velocity," therefore, every heavy block in the buhr below the horizontal plane of the cock head, throws up while running and down while standing, and every heavy block above the cock head throws down, both when standing and running, if not balanced by blocks of the same size and weight on the opposite side. This can be demonstrated to the eye as follows: Undo the connection between the throttle-valve and governor of a steam engine; substitute a wooden ball for one of the iron ones, and start the engine; the iron ball will reach the horizontal plane with a less velocity than the wooden one. But when we come to apply these principles to practice in the balancing of buhrs in the usual way, we find that they don't always work, and we wonder where is the mysterious influence which sets at naught the laws of gravitation and centrifugal force. The influence is in the irons. The cock head may be off the truth. Chalk will show that. It may be in the drivers; but far oftener it is where least expected—in the pivot bearing which rests on the cock head. Now, to get at the root of the evil, we must begin at the beginning, by asserting that not one in a hundred of these are right when they leave the machine shop. The usual way to find the center is by squaring, plumbing, measuring, etc. They are then taken to the drill-press, blocked up and bored with a flexible revolving drill, and not one in a thousand of borings are concentric with the circular part of the balance rynd. The right way is to make two cast-iron brackets for the purpose, bolt them on the face plate of lathe, turn off true, clamp on your balan rynd to these so as the inside circle and lower edge of rynd is true to the chalk; bore or turn out with a rigid fixed tool your circular and bearing, turn off the edge of rynd and turn inside of rim, true down to about three-quarters of an inch from edge. Now all this may be done and the rynd put in true by the millwright; but if the miller or dresser takes more off one side than another in dressing his buhrs, the mill in time becomes unbalanced. The true plan is to bore and turn a light cast-iron wheel or plate with an oblong hole, with set screw to receive an arm with marking point; fit this into the turned mouth of the balance rynd; to be used only to try if the millwright puts the rynd true, and if the miller dresses equally all around, this can be done cheaply and simply; and until this is done, none but the most expert and persevering of men will be able to keep buhrs in good order, the average miller will be humbugged, and poor flour and dyspepsied stomachs will be the result.

AUTOMATIC FURNACE DAMPERS.—Iron describes Mr. J. Watton's invention for regulating dampers of boiler furnaces. It consists of a self-acting apparatus constructed as follows for opening and closing the dampers of steam boiler furnaces. Over the furnace flue in which the damper works, is a hollow cylinder containing a long piston or ram, to the bottom of which the damper is connected. The damper and ram are kept in their raised position by counterbalance weights. A pipe from the steam boiler opens into the hollow cylinder, and in the course of the said pipe is a spring safety valve. When the steam boiler is working at its normal pressure, or at a pressure less than that which the safety valve is regulated to bear, the damper is kept in its raised position by the counterbalance weights, and the furnace flue is open. When, however, the steam in the boiler attains a pressure greater than that which the safety valve is regulated to bear, the safety valve is lifted, steam enters the hollow cylinder and depresses the piston or ram, and the damper and the flue is closed or partially closed. On the pressure of the steam in the boiler being reduced to its normal working pressure, the safety valve closes and cuts off the steam from the hollow cylinder, and the counterbalance weights raise the damper and ram, and the flue is again opened.

RAPID STEEL RAIL ROLLING.—The Scranton, Pa., *Republican* gives an account of rolling-mill work which the world is challenged to beat: "Last week the steel rail mill of the Lackawanna iron and coal company, in the usual 11 turns on a 50-pound rail 30 feet long, did the following work, which is considered one of the most extraordinary on record: 'Total number of rails rolled, 6,173; average per turn, 561; total tonnage during the week, 1,377.18; average time rolling each bar during entire week, including all stops during and between turns, 77 seconds; best single-turn rails, 740; best double-turn rails, 1,414; actual rolling time of above, consecutive, 1,414 bars, 23 hours, 43 seconds—average 60½ seconds per bar; 1,414 bars equal four miles and 90 feet of track. Greatest speed accomplished, 109 bars in 97 minutes, a little less than 53½ seconds per bar; 6,173 rails will lay 17 miles 2,835 feet of track.' On the above figures the officers and men of the mill make the following claims and challenge comparison: 1. To have rolled the largest number of rails yet rolled in the world on one rail train in one

week. 2. To have made the largest tonnage ever made on equally light rail in one week. 3. To have rolled the largest number of rails yet rolled in 12 hours. 4. The same claim as to 24 hours. Taking the above as an average the company, using both its mills, could roll rails for a double track to Pittsburg, a distance of 480 miles, in 27 weeks. This enormous amount of work turned out at No. 2 mill seems all the more when we compare it with that done at No. 1 mill on iron, now having the same capacity as No. 2, when the first Delaware, Lackawanna & Western track was being laid. The distance from Scranton to Great Bend is 52 miles, and it took the mill already mentioned nearly six months to roll the rails necessary, which could now be supplied in three weeks."

PETROLEUM FOR PRIMING OF BOILERS.—A paper "On the Priming of Steam Boilers" has been written by Mr. W. Major. The author draws attention to the great uncertainty which prevailed as to the cause of priming. The case of the *Serapis* was mentioned, the speed of which ship, through priming, was reduced from 13 to nine knots. The author then stated what he thought was the cause—friction of steam globes against impurities floating in the water. To overcome that, lubrication was needed. Tallow and oils had been beneficial for that purpose, but unfortunately had produced graver evils. Having tried many lubricants, the author found the purest rectified petroleum a perfect remedy, and he enumerated the advantages gained. He then explained his mode of application by reference to drawings, and stated the satisfactory results. He then mentioned two cases of collapsing of flues, in consequence of thick coatings caused by fatty and other particles carried over from the surface condenser, and preventing the access of the water to the internal parts of the boiler. He considered that this collapsing of flues caused the disappearance of many steamers which were never heard of again. He pointed out, in conclusion, that the use of rectified petroleum would not give rise to such accidents.

CASTING A BRONZE.—A short time ago, after the Italian residents of New York city had raised a nucleus of \$2,800, almost a penny at a time, the Italian sculptor, Turini, turned over to George Fisher, the founder, a colossal plaster bust of Joseph Mazzini, which was successfully recast in bronze. The *Iron Age* says it took two months to prepare for the casting. Into one of the halves of a great iron mold, filled with plaster and molding sand, the plaster cast was lowered, face down, and an impression of half the bust was taken. Exactly the same process was gone through with for the impression of the back of the bust. Both sides of the mold were then locked together, with the cavity left by the plaster cast filled in with a core of sand. The whole great mold was then baked until the back and front impressions of the cast were hard and clear, and the cast itself was reduced in the sand core, also baked hard and dry. Then came the delicate operation of shaving the impression in the mold and the core also, so as to leave a space between the core and the mold in which the molten bronze was to be run. After this had been accurately and perfectly accomplished—and it requires no little care thus to shave down the delicate features of a likeness—the core was hung in its place by bars and wires of iron, and the great mold was lifted to the side of the furnace.

MACHINE DRILLING IN MINES.—Sir G. W. Denys writes as follows: "Does boring by machinery pay? I answer decidedly, yes, wherever you have plenty of water-power and a long distance to go. I do not hesitate to affirm that I have driven 550 fms. with the borer, in one-third of the time, and for half the money, it would have cost to drive the same distance by ordinary hand labor. I am, indeed, afraid to hazard an opinion as to what it would have cost to drive by hand labor, for at the bottom I do not believe it could or would have been driven at all. Further, wherever extensive mining operations are intended, whether machine drills are to be used or not, an air compressor put up at the commencement, will pay for itself five or six times over."

USING SUPER-HEATED STEAM.—Mr. A. M. Clark, of England, has an invention for generating and utilizing highly super-heated steam. In a circular furnace is suspended one or more series of hollow spheres connected to one pipe, from which the generated gas escapes to an engine, and down which passes an internal pipe conveying water to be "decomposed." The spheres are made very strong, and the inventor claims that the "electric" gas produced from evaporated water possesses unlimited expansive force, which has not hitherto been made subservient to the will of man. The quantity of fuel needed is, he says, "out of all proportion" less than that needed to generate steam for the same amount of power. The specification describes an engine for using the "gas."

COMPRESSING STEEL.—M. Considere read a paper on the 30th of March before the French Saint-Etienne Association of Mining Engineers on the subject of "Compressing Melted Steel," which has been experimented on at Chaleassiere for the past twelvemonth. The results of experiments conducted on more than 100 tons of ingots enabled the author to affirm that steel castings never exhibit blow-holes when solidified under sufficient gaseous pressure, acting freely on the inner mass of the steel.

SCIENTIFIC PROGRESS.

Chinese Buying Science.

We read in English papers that the Chinese have bought out an English scientific establishment, and propose to export it to China. The account is as follows: "The gentlemen in this country identified with the promotion of Western knowledge in China, having been much impressed with the popular science lectures, which have been for some years past delivered at the Royal Polytechnic, in London, by Mr. J. L. King, F.G.S., determined a short time since to purchase the whole of the costly apparatus necessary for inaugurating similar lectures at Shanghai, and on Wednesday the Chinese Ministers and suite visited the institution in Regent street, to witness some of the most interesting phenomena connected with the polarization of light and other branches of optics, as shown by a new apparatus intended for an institution at Shanghai. The demonstrations were conducted by Mr. King, who delivered a brief lecture explanatory of the scientific principles which determine the phenomena, and who stated that the occasion derived its chief interest from the fact that it marked an awakening in the Chinese mind to the importance of scientific institution. The Chinese institution owed its origin mainly to the influence and exertions of Sir Walter Medhurst, lately our consul in Shanghai, who was Chairman of the Shanghai Committee, and Mr. Fryer, who acts as honorary Secretary. Their views have been energetically supported by our ambassador, Sir Thomas Wade, and by many of the leading mandarins, among whom may be mentioned Li-Hung-Chang, whose name has a European celebrity, Feng-Chu-ju-Taotai, of Shanghai; Hsu-Tschu-Tsun and his sons, who are well known throughout their own country for their technical skill and scientific enlightenment, and by many others who favor the importation of Western knowledge of every kind as calculated to render the most important service to their country. The design of the new institution is to make a first step towards satisfying this patriotic aspiration. A building has recently been erected at the city of Shanghai, within which lectures are to be given and interesting apparatus and processes shown; and likewise a reading room, provided with suitable works, is already in active operation."

THE DEPTHS OF THE SEA.—According to the late explorations of the English, German, and United States governments, it has been proved that the average ocean depths in the southern hemisphere are less than those of the northern hemisphere. The greater range of water surface in the southern hemisphere is, therefore, in a measure, compensated for by its shallowness. It has been a question how, considering the great apparent preponderance of land in the northern hemisphere, the center of gravity of the earth could coincide with its actual center, if such be the fact. These contours of the ocean-bed point to a possible solution. The greatest recorded depth in the southern ocean is 17,000 feet, while in the northern oceans 27,000 and 23,500 were found respectively in the Pacific and Atlantic. A published report of Captain Evans' remarks before the British Association, says: "The general surface of the sea-bed presents in general to the eye, when graphically rendered on charts by contour lines of equal soundings, extensive plateaux varied with the gentlest of undulations. There is one great feature common to all oceans, and which may have some significance in the consideration of ocean circulation, and as affecting the genesis and translation of the great tidal wave and other tidal phenomena, of which we know so little—namely, that the fringe of the sea-board of the great continents and islands, from the depth of a few hundred feet below the sea-level, is, as a rule, abruptly precipitous to the depths of 10,000 and 12,000 feet. This grand escarpment is typically illustrated at the entrance of the British channel, where the distance between a depth of 600 feet and 12,000 feet is in places only 10 miles."

FORMATION OF MINERALS.—Hartley has made further examinations of the liquids contained in mineral cavities. He finds, says *Harper's Magazine*, that the liquid carbon dioxide present varies considerably—from 27.27° to 33.7° C.—in its critical point in different mineral specimens, often varying in different cavities in the same mineral specimen. The presence of this substance in sapphire and topaz leads him to the supposition that these minerals may have been formed by the action of aluminum fluoride or chloride upon calcium carbonate at high pressures, producing alumina and carbon dioxide. Where water is also present in the cavity it would seem that the reaction had taken place in presence of moisture. As to the diamond, the author thinks that this mineral is the result of the action of reducing agents upon very highly compressed carbon dioxide at temperatures above its critical point—a condition of things which suggests a new direction for speculation and experiment.

It is said the fuchsia in its native country, Chile, runs into varieties as freely as blackberries do here—so much so that it is extremely difficult to decide what is a species and what a variety.

DARWIN'S CONCLUSIONS ON PLANT FERTILIZATION.—In Mr. Darwin's latest work of the conclusions reached, the first and most important is, that cross-fertilization is generally beneficial, and self-fertilization injurious. This is shown by the difference in height, weight, constitutional vigor and fertility of the offspring from crossed and self-fertilized flowers, and in the number of seeds produced by the parent plants. The advantages of cross-fertilization do not follow from some mysterious virtue in the mere union of two distinct individuals, but from such individuals having been subjected during previous generations to different conditions, or to their having varied in a manner commonly called spontaneous; so that in either case their sexual elements have in some degree differentiated. Again, the injury from self-fertilization follows from the want of such differentiation in the sexual elements. Thus, when plants of the *ipomoea* and of the *mirabilis*, which had been self-fertilized for the seven previous generations, and had been kept all the time under the same conditions, were intercrossed one with another, the offspring did not profit in the least by the cross. On the other hand, as showing that the benefit of a cross depends on the previous treatment of the progenitors, plants which had been self-fertilized for the eight previous generations were crossed with plants which had been intercrossed for the same number of generations, all having been kept under the same conditions as far as possible. Seedlings from this cross were grown in competition with others derived from the self-fertilized mother-plant crossed by a fresh stock; and the latter seedlings were to the former in height as 100 to 52, and in fertility as 100 to 4.

A NEW ERA IN TELEGRAPHY.—Prof. Loomis, of Washington, who has given to electricity and its uses much study and thought, says the time is not far distant when telegraphing will be carried out by means of aerial currents without the aid of wires or poles. He has already, he says, communicated with his assistant, who was 12 miles away, by means of an aerial current. The current was reached by flying kites a certain height at each point, the string used being a copper wire. When both of the kites would be at the same altitude and in the same current, he has, by means of an instrument attached to the ground end of the wire, sent to and received messages from his assistant, 12 miles away, there being nothing but an aerial connection between them. Prof. Peters, in an article on the telephone, written after he had witnessed its first performance, says: "The telephone of today probably bears to the telephone of the future about the same relation that Fulton's little steamboat bore to the magnificent floating palaces that now ply on our lakes and rivers, or to those nobler embodiments of human skill, which have reduced the formidable Atlantic voyage of our grandparents to an average ten days' trip."

A TESTIMONIAL TO DARWIN.—On his sixtieth birthday, Darwin was presented with an album, a magnificent folio, bound in velvet and silver, containing the photographs of one hundred and fifty-four men of science in Germany. The list includes some of the best-known and most highly honored names in Europe. He likewise received on the same occasion from Holland an album with the photographs of two hundred and seventeen distinguished professors and lovers of science in that country. The German album bears on the handsome title-page the inscription: "Dem Reformator der Naturgeschichte (To the Reformer of Natural History), Charles Darwin."

EVAPORATION OF NITRO-GLYCERINE IN DYNAMITE.—According to recent investigations of Captain Hero, of Vienna, it appears that a specimen of dynamite made in 1871 lost in five years 2.2 per cent. of its nitro-glycerine, and another sample manufactured in 1872 lost in four years 1.52 per cent., through evaporation. The conclusions are that regular times should be fixed as limits for the employment of dynamite supplies, and that, when the material is kept beyond these periods, it should be replaced by fresh. It is also suggested that, to allow for this loss, a larger proportion of nitro-glycerine than the percentage now employed (ranging from 71 to 73) should be introduced in dynamite.

TRANSIT OF VENUS.—Progress is reported at the Greenwich observatory in reducing the observations made on the last transit of Venus. Two of the most recent calculations required the use of 3,000,000 figures. The French attempts at obtaining new figures for the sun's distance by the study of the photographs taken during the transit, have been reported as turning out badly; it is even doubtful whether the photographs can be used at all for this calculation. Better results are hoped for at Washington from the photographs taken by the American expeditions, but the work proceeds very slowly because the appropriations by Congress were much smaller than had been expected.

DISTRIBUTION OF PLANTS.—From a sketch of the tropical forest of Hampshire, England, by J. Starkie Gardner, we learn that tropical plants, like the palm, cactus, and aroids, grew in company with the beech, oak, elm, maple, and laurel in the eocene period. Heretofore the accepted theory has been that the temperate plants did not make their appearance before the miocene, having migrated from America by way of Siberia. These discoveries will weaken the credit of this theory of migration.

TRANSVAAL has been annexed to the British empire.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

THIS ADVANCE.—Alpine Chronicle, May 5: We have nothing new in regard to this mine. It continues to prospect well. Although in over 100 feet of good ore the foot wall has not yet been reached. We can assure our readers that there has been no over-coloring in regard to this mine. It will soon be a great wealth.

PROF. THOMAS PRICE, of San Francisco, and Mr. Hughes, Superintendent of the Blue Tent gravel mine, in Nevada county, arrived yesterday at the Exchange mill, where they are the guests of Manager Chalmers. To-day they have been inspecting the mines in Scandinavian canyon in the interest of English companies.

AMADOR.

MECHANICS.—Amador Ledger, May 5: Work is temporarily suspended. The result of the last crushing did not come up to expectations. It is the general impression, however, that when the affairs of the company are straightened out, mining will be resumed. There is any quantity of rock in sight, and the drilling depth to which the mine has been prospected—between 100 and 200 feet, we believe—is hardly a sufficient test to justify the abandonment of the claim.

OLIVE.—Favorable reports continue to reach us from this mine. The ledge is now from 6 to 7 feet wide. This, it is thought, is not the full width of the ore body, as indications favor the opinion that quartz exists in the hanging wall. The rock presents a very uniform appearance. So far the yield of gold has paid for the sinking and putting up the works, which is a rare occurrence even with mines which have turned out enormously rich. A run of \$10 per ton will pay expenses in the present sinking. The Isonanza mill will be kept running for the next three months on Olive rock.

KENNEDY.—The Kennedy will be started up on Monday. Mr. Fleming, who is placed in charge of the works is already here making his plans for the future. Work will be confined to prospecting by sinking the two new shafts commenced last summer.

THE MONTERICHARD.—Amador Dispatch, May 5: We understand the proprietors of the Monterichard mine have commenced hauling rock from their mine to the Onida mill for the purpose of having it thoroughly prospected and creating a mill of their own. They contemplate having several hundred tons crushed, and they are confident that it will pay handsomely.

BUTTE.

BIG BAR CLAIM.—Oroville Mercury, May 4: On Saturday last week, the Trustees of the Big Bar claim took a trip up the north fork to their claim. They paid \$10,000 for it the 1st of January, and have expended some \$3,500 in sinking it up. They now have two chiefs and 1,000 feet of good iron pipe, and 1,400 feet of flume. They have run but a short time. Some days ago they were offered \$30,000 for their claim by parties below, but as they have a good thing, they propose to hold on to it for the present at least. On the clean-up the other day, they were more than pleased, having got double the amount expected. They supposed if they got \$1,000 out of the small piece of ground washed, they would be doing extremely well; but to get double that sum was a long time that the intelligence of a big clean-up scarcely provokes comment, and people have come to regard enormous returns from that mine as a matter of course. The crushing of 85 tons of Champion ore, just completed, yielded in the neighborhood of \$9,000—an average of over \$100 per ton. And that is not in excess of former returns from the same quantity of rock, not to mention the fact that the mine has been making for years. We have frequently charged the State to "bait" our "Champion," but West Point still carries the lead for having the richest quartz ledge in the country.

CALAVERAS.

BIG CLEAN-UP AT THE CHAMPION.—Calaveras Chronicle, May 5: The extraordinary yield of the Champion mine at West Point, owned by Messrs. Haskin & Hadler, has been such a regular thing for so long a time that the intelligence of a big clean-up scarcely provokes comment, and people have come to regard enormous returns from that mine as a matter of course. The crushing of 85 tons of Champion ore, just completed, yielded in the neighborhood of \$9,000—an average of over \$100 per ton. And that is not in excess of former returns from the same quantity of rock, not to mention the fact that the mine has been making for years. We have frequently charged the State to "bait" our "Champion," but West Point still carries the lead for having the richest quartz ledge in the country.

GRAVEL MINING.—While a tour of the gravel mines in this vicinity does not develop much that is new, it is convincing of the fact that work is being energetically conducted, the miners making good use of the water at present running in the ditch in anticipation of an early failure of that supply.

At the Duryea the battery is kept in constant motion day and night. A large force of hands are now employed in running tunnels and "breasting out" gravel. The Duryea is remunerative to its owner.

BROWN & CO.'S NEW TUNNEL ON TUNNEL RIDGE is fast approaching the channel, only 75 feet more being necessary to complete the work. We have an idea that when the channel is reached Brown & Co.'s tunnel claim will prove to be one of the best paying ones in this section of the country.

VEITH, proprietor of the Excelsior hydraulic on Tunnel ridge, is just "scooping" out the gravel by his powder and water process, and he makes it pay. Mr. Veith employs 20 men in and about his claim.

MORSE'S hydraulic, on Tunnel ridge, is in full blast. His claim is now in excellent condition for working to advantage, and ranks among the best paying in this vicinity.

COOK & CO.'S mammoth hydraulic, near the French hospital is progressing favorably. He uses 300 inches of water, has a pressure of 200 feet and a flume over 100 boxes long. Cook expects to clean up shortly.

HARRISON, the well known Happy Valley "squirrel" is working away with his usual energy and vigor. His mine is in good working condition, and its proprietor is satisfied with the returns.

UPPER COUNTRY JORS.—A company from S. F. are now engaged in working the Tolland & Miller lead with good results. Needhardt & Johnson, owners of a very promising lead situated near the Lone Star mine, have out about 30 tons of rock. Good judges say that the rock will average \$80 per ton. Porteous & Co. have recently struck very rich rock in their mine at Bannerville. Williams & Co., owners of a promising lead a few miles from West Point, have lately struck good rock and plenty of it. The ledge is a wide one. Rock from the Granite lead is being hauled to the Josephine mill and crushed. Work on the Mina Rica is progressing favorably. Sundermyer & Co., at Independence, have out 200 tons of quartz on the Tunnel ridge. In their 100 feet from the main shaft, they have struck rock that will average over \$100 per ton. Sundermyer & Co. have one of the best mines in the upper country district. Clark and Harris's mills are running in full blast on custom rock. The mining interests generally in the upper country district are improving.

EL DORADO.

THE MINES.—El Dorado Republican, May 3: At Logtown, Mr. Harding is now running the mill on surface rock, which has paid an average of \$20 per ton, and many hundred tons in sight. The Condo company are quietly taking out splendid ore at their claim. Williams & Co. are mining out a fine lot of rich quartz from the old Wilder lead. Their size will pay about \$80 to the ton. Messrs. Galt & Lovless have good prospects at Honeycomb; indeed, the whole country is full of prospectors, and nearly all are satisfied with their mines. I yesterday visited a new shaft being sunk by Gray & Warf. They have discovered a fine body of porphyry, encased in slate, all of which contains gold. They have hopes of soon reaching a rich vein. They also find indications of this mine having been worked in ages gone by.

THE PACIFIC.—This formerly famous mine will soon be

in full blast again. We visited it on Tuesday, and found a force at work, under charge of Dan Wickham, putting the machinery in order, and by the last of the week the hoisting works will be ready to start. It is thought that two or three days will be sufficient to free the mine of water, and then sinking will be commenced, and at the same time a large body of low-grade ore to the south of the 300-ft level will be taken out. This is the lowest level yet reached. By sinking another 100 feet, it is believed that the same vein, which paid so well from the 300-ft level, will be developed.

THE WARREN BROS. of Oakland, who have the management of the Old Hickory and the river claim above the Bar bridge, have completed an easy wagon grade to the former mine from the old Chile Bar and Kelsey grade, and are now engaged in grading a road to the river claim. Work will soon be commenced and vigorously prosecuted upon the latter claim. Upon the former, it is not their intention to rush things before next fall.

INYO.

SANTA RITA.—Coso Mining News, May 5: The Santa Rita furnace, which was started on the morning of the 26th ult., has been running constantly every day since, with the exception of three or four hours, when it had to stop for some slight repairs. The number of bars of bullion turned out is very creditable indeed, and regular shipments are being made.

MOBAC.—We hear that the connection by shaft has been made between Confidence No. 3 and No. 4. It is said the mine looks better than ever, and the facilities for working will now enable the company to supply the furnaces at a greatly reduced cost.

NAPA.

SILVER.—Callista Cor. Lake County Bee, May 3: Our silver mines are being rapidly developed and promise rich results. I paid a visit to a few of the mines since the Palisade and others in the neighborhood, and found them looking well. The Palisade is about two and a half miles north of Callista. Upon my arrival there I found Mr. Bivins with a force of men (white) busy at work sinking a shaft, intending to tap the ledge at about 50 feet from the surface. I found the ledge well developed, being about 11 feet wide. The rock on the outcroppings along the ledge as well as the developments warrant it. Adjoining this is the Stillwagon claim. This company has a force of men employed. The Centennial is another well defined ledge. Men will be put on here next week. I understand that the Callista company will start up their mill and mine soon.

QUICKSILVER.—The quicksilver mines are doing well. The Great Western and Oak Hill are shipping their regular amount of quicksilver weekly. The Mason will soon have their new furnace ready, and will then start up; they have a large amount of high grade ore on their dumps. Capt. Wright, of the American, is not certain whether that mine will start up this season or not.

NEVADA.

REPUBLIC.—Nevada Transcript, May 2: This mine, located near Eureka, of this county, has recently been purchased by some early settlers and farmers of this State, and preparations are being made to erect a 20-stamp mill. The vein is very wide and is free milling ore, there being but little or no sulphurets in the quartz. The ore will mill from \$7 to \$10 per ton, and the conveniences for mining and milling could not be better improved. It is estimated that the cost will not be more than \$3.50 to mill and mine the ore. We look upon this as one of the most substantial and steady mines in the county, and believe the enterprise has a good future before it. The Republic is located in the great quartz belt which runs parallel to the Sierra Nevada mountains, and extends through Nevada, Sierra and Plumas counties. It is in this great belt that the Sierra Butte mine is located, which has been worked for the past 20 years, and has disbursed monthly dividends regularly for 18 consecutive years. The Sierra Butte has an 80-stamp mill run by water power, and is the largest and best equipped of the Republic.

THE WATT DRIFT M. Co., located on the blue gravel channel, near North Bloomfield and Moore's Flat, have recently purchased a 60-horse power engine for pumping and hoisting. This company has the heaviest machinery in use of this class of mining in the State. They are down with their main shaft some 60 feet.

JACOB & SARGENT are making preparations to sink a shaft into the great quartz belt which runs parallel to the Sierra Nevada mountains, and extends through Nevada, Sierra and Plumas counties. It is in this great belt that the Sierra Butte mine is located, which has been worked for the past 20 years, and has disbursed monthly dividends regularly for 18 consecutive years. The Sierra Butte has an 80-stamp mill run by water power, and is the largest and best equipped of the Republic.

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GOOD GRAVEL.—Foothill Tidings, May 5: In the Washington mine, which was located for a quartz ledge at first, a bed of gravel was struck some time since and recently a drift has been run off upon it which brings to light a lead of regular blue gravel, and the prospect is good for paying gravel mine as of a good quartz vein. Quite a quantity of this gravel was taken out this week and washed, and the clean-up gave a return in coarse gold of fully 50 cents to the wheelbarrow load. We understand that arrangements will soon be made for working this deposit, which has been located for the Washington company.

A GOOD MINE.—The Idaho mine of this place will pay its 33d dividend on Monday next, aggregating in the eight years it has been running the neat little sum of \$2,148,820 as clear profit to the stockholders. As much more has been paid out from the product of the mine to workmen, merchants, etc. The Idaho is one of the best mines in the State and bids fair to continue such for many years to come. The chances for opening up others as good are not yet taken. Keep prospecting!

GRAND MINES.—Nevada Transcript, May 5: John McAllis, Superintendent, and one of the owners of the old Camer and Goodspeed claims, in Little River township, was in town yesterday. Since they bought the property, they have built two reservoirs, and otherwise expended in all about \$10,000 in putting the claim in good shape. They will commence washing some time next week, and will use 1,200 inches of water.

GRAND MINES.—This mine is still doing well in the way of taking out good quartz. A crushing of 60 loads has just been cleaned up, and the yield was \$3,300 in free gold, not counting in the sulphurets saved.

COLD SPRING.—Nevada Weekly Gazette, May 5: The Cold Spring gravel mine is located on the south side of the Washington road, about three miles from town. They have run 3,600 feet of drifts and tunnels, mostly through regular blue gravel, and the prospect is good for paying gravel mine as of a good quartz vein. Quite a quantity of this gravel was taken out this week and washed, and the clean-up gave a return in coarse gold of fully 50 cents to the wheelbarrow load. We understand that arrangements will soon be made for working this deposit, which has been located for the Washington company.

PLACER.

WORKING.—Dutch Flat Forum, May 5: The warm weather of the past week has not been favorable for our water ditches, as the effect of such weather is to shorten the season. The various mines in this section are working vigorously, so as to reap all the benefit possible while the water lasts.

THE POLAR STAR and Southern Cross continue washing at intervals, with one head of water, alternating from one claim to the other, as circumstances require. The Elmore Hill and Franklin are washing as continuously as possible.

THE BAKER and Star & Union claims both made a partial clean-up on Monday, changing their blocks so as to have them in good order for a long and profitable run. Neither of these claims were unable to wash any bottom gravel, and the rich deposit in both claims still lies ready for the approaching run. The blast in the Baker looked up a large area of bottom gravel, but only a small portion even of the top was washed off. These claims are now in first-class trim, and it is believed the next clean-up will be big. It is to be lamented that these claims were not ready by the commencement of the season, as the amount of gold that has been taken out heretofore.

THE FRANKLIN is improving the time washing away the gravel loosened by the last blast, and are preparing for driving another powder derrick. The derrick works to a charm, and the large boulders are being disposed of advantageously. The Pacific is washing day and night and promises well.

HUGH TREASURE.—Placer Herald, May 5: The water supply this season being short, the extent of the gold yield this year must depend more than usual on the quartz and drift mines. While the yield of the former will reach at least a full average in Placer county, the latter promises to exceed the average sufficient to make up very largely for the deficit in the yield of hydraulic claims. Besides the more general attention that is being given to drift and cement claims, heretofore worked, some new ones of this character have within the last year been opened. Notably among them is the Hidden Treasure, located on the Damascus lead, about four and a half miles from Damascus, and about six miles from Michigan Bluff. This claim was discovered by some of the original owners of the Mountain Gate, a noted drift claim near Damascus, who, by taking careful observations of the course of the Mountain Gate lead, were able to come upon this treasure some four miles away, on the opposite side of a rugged divide, by running a tunnel about 600 feet. The gravel was soon found to be very rich, and a company was at once formed for working it. This mine has yielded steadily since its first discovery, though up to the present, much of its proceeds, we understand, have been expended in getting the mine in shape. The mine is divided into 36 shares, held at about \$7,000 each, and not particularly for sale at that. At present the company is able to work but 40 men, and the yield is about \$12 a day to the man. As the breast is widened, they expect to increase their force, and every indication points to an extensive yield this coming summer.

PLUMAS.

QUARTZ PROSPECTUS.—Plumas National, May 5: From several gentlemen who have been in the Greenview country during the past week, we learn that the quartz fever is still raging, and developments are being made almost daily, which show that the mountains in that section are full of valuable lodes. Plumas certainly promises to be the Banner mining county in the State ere many years.

SANTA CLARA.

QUICKSILVER.—San Jose Mercury, May 5: For some time past we have heard rumors that valuable and extensive developments of metal have been made on the lower levels of the Guadalupe mine. We do not usually give credence to reports of this character, but in this case, from careful inquiry, we understand them to be well founded, and they require some significance from the fact that three members of the great bonanza firm of San Francisco have recently made several visits to the Guadalupe, and since then the product of that mine has been regularly shipped from our depot, consigned to Colonel Fair, the bonanza mine Superintendent, at Virginia City. We have it from reliable authority that the product of the Guadalupe mine is increased to at least 2,000 flasks a month, or as much more as the market will take, all of which we heartily rejoice at for the sake of our laboring population, who, in consequence of the continued drought and failure of crops, will welcome the new field of labor that so unexpectedly opens for them.

TRINITY.

FINISHED.—Trinity Journal, May 5: Mr. G. W. Sleeper informs us that the mining season is at an end in Hay Fork, that himself and partner quit piling last week. This season has been a terrible short one everywhere.

QUARTZ FOUND.—We learn that a quartz ledge has been found back of Perkins' bar, above the Arkansas dam, and arrangements are being made to prospect it. We not advised as to the prospects obtained from the quartz. The ledge is found in the presence of free gold in considerable quantities.

TULARE.

PLACERS.—Visalia Delta, May 5: Several parties from the Mill creek placer mines were in town last week, and had in their possession some fine specimens of washed gold. One piece weighed \$14, another \$38, an others less. We have been informed that Mr. McLean has staked out a claim five miles from the original diggings, on a flat, from which he had taken out an average of \$40 per day for six days. Mr. Neil owns a claim just below the one of Mr. McLean, which prospects equally well. There is not a superabundance of water, but enough for quiet working purposes, with a prospect for more as the weather increases in warmth. The gold sells in Visalia at \$17.40 per ounce.

YOLO.

THE CAL. Q. M. Co.—Yolo Mail, May 3: The news from the California quicksilver mine is that a sudden change has taken place for the better. One year ago there was but little silver being produced, the mines were apparently giving out; rich ore was not in sight, and everything seemed to be discouraging. Now, however, the new management, the mines are being developed; rich ore is found in abundance; the furnaces are constantly reducing ore, and between 70 and 100 flasks of quicksilver per month are being produced. There are about 150 laborers at work, and everything is lively.

YREKA.

GRAVEL IN THE STREETS.—Yreka Union, May 5: Some of the gravel from the bottom of the excavation for the new cistern at the corner of Miner and Oregon streets, prospected several "colors" to the pan. All the gravel bed under our town would doubtless pay well if mined, still we would not advise our citizens to tear down their buildings for the purpose of mining gravel lots.

QUARTZ PROSPECTING.—Messrs. McConnell and McManus, R. O. Dewitt and others of the Norfolk quartz company are about to send East for a portable quartz mill, which it is claimed will do the work of the usual four stamp mill, but is a great deal cheaper. They will use it to thoroughly prospect the quartz they have taken from the Norfolk and Lodi claims, and also of other claims in which they are interested. We are informed that a subscription is being taken up at Cottonwood to purchase one also, to test the many ledges around there. If these mills can do what is claimed for them, their introduction here will be of incalculable benefit to this county.

Nevada.

WASHOE DISTRICT.

YELLOW JACKET.—Gold Hill News, May 9: The station at the bottom of the north winze below the 2040-ft level is opened, and the drift east started for the commencement of explorations at the 2200-ft level. As soon as the drift is well opened another will be started south from the same

station, thus exploring the ledge in both directions. The material is birds-eye porphyry, with small streaks of quartz, some of which carry a little ore. In fact the whole of the ledge matter at this point bears a lively, very encouraging character, justifying the opinion that a good ore body might be found in that vicinity, the more especially as very good ore streaks were found directly above in the 2040-ft level.

CON. VIRGINIA.—Daily yield, 400 tons of ore, keeping the mills all running at their full capacity. The ore stops on the 1050-ft level continue rich. The face of the south drift on the same level, advancing to connect with the deep winze, also continues in the finest character of ore. The upraise from the 1500-ft level has reached and connected with the openings of the 1400-ft level. This winze, in ascending, cut through a considerable vein of very rich ore lying west of and entirely separated from the main body by a division of barren ledge material. This ore has a curved course to the north and west, directly away from that of the main vein, which is to the north and east. In accordance with our former reports, the old dividend of \$2 per share, aggregating \$1,080,000, was declared on the 7th inst., payable on the 15th.

DAVENPORT.—Daily yield of 500 tons of ore. The ore stops are showing splendidly at every point, and continue their regular yield of rich ore. At the same time the mine put on a more favorable appearance than at this time. Day before yesterday the regular monthly dividend of \$2 per share, aggregating \$1,080,000, was declared. The mills are all kept running up to their full crushing capacities. The 1750-ft station in the C. & C. was commenced yesterday.

OVERMAN.—The east drift on the 1400-ft level on Monday last encountered a strongly increased flow of water, so strong, in fact, as to force a suspension of the work for 36 hours. Last evening, however, the flow was again greatly lessened and work was resumed in the face. The formation in the face of the drift denotes a near approach to the vein, quartz beginning to show quite freely.

OPPIN.—Sinking the main incline is making the best of progress. The road to the depth of 100 feet yesterday, and to-day preparations are being made to put in the station set, preparatory to starting a drift at that point to cut and prospect the ledge. It will be necessary, after completing the station, to continue the shaft to a sufficient depth to form a pump before it will be safe to cut the vein. The Winfield mill is kept steadily running on the reserve of ore accumulated in the dumps.

SILVER SPRING.—Sinking the shaft is being pushed steadily and vigorously forward, the bottom in favorable ground, carrying streaks and stringers of quartz of a very fine character. The shaft has three compartments. **CHOLLAR-PODSI.**—Daily yield, 100 tons of ore, taken from the old stops above the level of the old Podosi tunnel, and assays on an average about \$20 per ton.

SILVER HILL.—Sinking the main incline and operations at the shaft level have been temporarily suspended. The north drift on the 650-ft level is going steadily forward, the face still in quartz and ledge matter of the most favorable description.

SUTRO TUNNEL.—During the past week the material in the face of the header has been very hard, being composed of very close-grained species of porphyry, with streaks of quartz and clay, the whole working and blasting very disadvantageously. The rock is, however, becoming more even in character, as well as softer, working to much better advantage. Total length of tunnel last evening, 16,713 feet.

NORTH CON. VIRGINIA.—The new station at the 1300-ft level is completed, and a drift started to cut the ore vein at that point. Sinking the main shaft has been temporarily suspended, pending the opening of the station and starting the drift at the 1300-ft level.

PULLMAN.—The east drift on the 1600-ft level is steadily advancing, with favorable prospects of soon reaching the ore vein.

BELCHER.—Daily yield, 80 tons of ore. The prospecting drifts on the 1600-ft level to the southward show no new changes. The flow of water is still quite strong. Sinking the combination drain shaft is making the best of progress.

MEXICAN.—The quartz and ore in the upraise from the 1465-ft level continues of a very fine and encouraging description. Good headway is being made with the raise, the entire size of which is in quartz. The east cross-cut from the north drift on the 1700-ft level has penetrated some very fine quartz.

JUSTICE.—Daily yield, 400 tons of ore. The ore stops on the 600, 700 and 800-ft levels are all yielding finely and promise well for months to come. The winze below the 800-ft level is still in ore, and a good quartz vein. The south drift on the 1000-ft level continues in good ore. This level is opening up splendidly.

GOULD & CURRY.—The main south drift on the 1700-ft level, running to connect with the Savage deep winze, is being pressed ahead at the usual fair rate of speed, the face in soft, favorable ledge material.

CALDONIA.—Sinking the shaft is making excellent progress. Much of the quartz is of a very fine character, some of it being highly impregnated with sulphurets of iron, giving low assays of both silver and gold.

IMPERIAL CON.—Sinking the south winze near the Yellow Jacket line, below the 2135-foot level, has just been commenced.

SAVAGE.—The water is being gradually reduced and is now much more easily held in check than at any time since the mine was flooded. A steady run of one hour day before yesterday, in conjunction with the pumps of the Hale & Norcross, resulted in lowering the water nine feet.

HALE & NORCROSS.—The repairs to the cave in the main incline is making all the headway possible, considering the great heat and the fearful difficulties under which the work is prosecuted.

THE BRIDGE.—The three cross-cuts now being run on the 1700-ft level are each being steadily advanced at a favorable rate.

LADY WASHINGTON.—The face of the north drift on the 850-ft level is still in a fine character of quartz and ledge material.

PROSPECT.—Face of main west drift, at the 400-ft level, continues advancing in very hard working material.

NEVADA.—Prospecting the 1750-ft level, both north and south, from the main shaft is making the best of progress. The chances for yet developing some good ore on that level is first-class.

DAYTON.—Some excellent ore has been opened up in the east drift on the 220-ft level, ore that will, no doubt, assay a good milling profit.

ALTA.—Sinking the shaft has been resumed. The new pump is working splendidly, and will lift the water for a depth of 200 feet.

NEW YORK.—The operations on the pumping compartment are all that is being done in the mine at present. **LEVATHIAN.**—The faces of both drifts are in very encouraging vein matter, with an occasional streak of low-grade ore.

JULIA.—The face of the south drift on the 1800-ft level is showing fine quartz and ore, that assays from \$20 to \$25 per ton.

BALTIMORE CON.—The northeast drift on the 1400-ft level is being pushed vigorously forward, the face in a fine character of vein matter.

UNION CON.—The north drift on the 1300-ft level is showing more quartz in the face.

ATLANTIC CON.—The shipment of ore to the Boston mill has been commenced, and crushing will begin to-morrow morning.

EUREKA DISTRICT.

HAMBURG.—Eureka Sentinel, May 3: The Hamburg company is daily receiving large quantities of charcoal at their furnace. It is particularly lively up around the coal shed, above their works.

The Richmond company are running but one furnace at their works, they having shut one down last Saturday. They have about completed the repairs on some of them, but no time is set for starting them up.

Snow is rapidly disappearing from the mountain peaks that encircle Eureka.

THE ENGINEER.

Interesting Experiments with Hydraulic Cements.

In the course of a long essay on cements, a writer in the *Polytechnic Review* states that the most thorough and valuable contribution to our knowledge of the influence of foreign addition upon the properties of the hydraulic cements, the technologist owes to the industry of Mr. Frederick Schott, the results of whose experiments with Portland cement are so highly important and suggestive that they deserve the careful study of all who are interested in the subject.

Mr. Schott asserts that the hydraulic properties of the cements are by no means conditioned by the purity of their composition, but that, on the contrary, they may suffer very considerable modifications from this standard without destroying their hydraulicity; indeed, this property may even be decidedly exalted by such modifications. In substantiation of these statements the author details the following experiments: A sample of Portland cement, mixed with moderately diluted hydrochloric (muriatic) acid, solidified quite rapidly, and, after immersion in water for nine days, it had attained a stony hardness, and was externally quite smooth. If the muriatic acid used for the mixture is concentrated instead of diluted, the sample solidifies even while being stirred, and cannot be poured from the vessel. With tartaric acid the result is the same, solidification occurring instantly. This phenomenon may be best observed by first mixing the cement with water to a stiff paste, and thereupon moistening the mass with the acid solution, when it hardens at once to stony consistency. A sample treated in the manner here described could scarcely be scratched with a knife after having been immersed for six weeks in water. Still more remarkable, however, is the action of the carbonate of soda (the soda of commerce). Portland cement, mixed to a thin paste with a cold saturated solution of soda, solidifies so rapidly that it may, with difficulty, be poured from the vessel. Carbonate of potassa behaves in this respect precisely like soda. When the oily liquid which is formed by treating this salt with a small quantity of water, is mixed with cement so as to form a thick syrup, it rapidly solidifies, and, when immersed thereupon in water, it rapidly acquires a very considerable hardness, without exhibiting the slightest disposition either to disintegrate or to scale. A sample prepared as just described, after immersion for 14 days, was found, upon drying, to be so hard as almost to resist scratching with the knife; it gave back a clear ring when struck with the hammer, and when written upon with ink, gave back the characters plain and sharp, without the slightest spreading.

A solution of silicate of soda or potassa (water, or soluble glass) very materially adds to the hardness and density of the cements. A cement casting, if immersed, after having sufficiently hardened to be removed, in a very dilute solution of the silicate, solidifies thoroughly; it is necessary, however, to renew the solution from time to time, until, after long contact with the cement, it gives a constant precipitate with chloride of ammonium. Very hard blocks are likewise produced by mixing the cement directly with dilute silicate solution, the samples solidifying more rapidly. A syrup-thick silicate solution, thinned with an equal volume of water, and then mixed with double its weight of cement, gave excellent results. Portland cement, stirred into a syrupy solution of silicate, solidifies at once. Blocks of extreme hardness were obtained by taking samples of cement which had acquired some hardness in water, allowing them to dry somewhat, though not entirely, and dropping thick silicate upon their surfaces until no more was absorbed.

Portland cement, treated with a cold saturated solution of chloride of ammonium (sal ammoniac), cemented very well, and in a few days had acquired, in the air, a very considerable degree of hardness; after immersion for a week in water, the sample had become so indurate as to emit a sharp sound when scratched with the knife.

Carbonate of ammonia exercises a very favorable action upon the cements, hastening the hardening process and augmenting the density of the product. Samples laid in the solution of this salt acquire extreme hardness in a very short time.

USE OF STEEL IN RAILWAY STRUCTURES.—The committee, consisting of Sir John Hawkshaw, Colonel Yolland and Mr. Barlow, appointed by the Board of Trade to consider the practicability of assigning a safe coefficient for the use of steel in railway structures, and the correspondence connected therewith, have made their report. *Iron* says: They recommend that the employment of steel in engineering structures should be authorized by the Board of Trade under the following conditions, namely: 1. That the steel employed should be cast steel, or steel made by some process of fusion, subsequently rolled or hammered, and that it should be of a quality possessing of considerable toughness and ductility, and that a certificate to the effect that the steel is of this description and quality should be forwarded to

the Board of Trade by the engineer responsible for the structure. 2. That the greatest load which can be brought upon the bridge or structure, added to the weight of the superstructure, should not produce a greater strain in any part than six and a half tons per square inch. They remark that cases may arise when it will be proposed to use steel of special make and tenacity, and when a higher coefficient than the above might be permissible, but they think those cases should be left for consideration by the Board of Trade when they arise.

Utilizing Niagara.

Two weeks ago we printed a paragraph from an English engineer proposing to use our great cataract. It now appears that the Canadians have tackled the proposition at once. The *Ottawa (Canada) Press* says:

A letter has recently been addressed to His Excellency the Governor-General, by Horace H. Day, a gentleman who owns the American side of Niagara falls, on which side the water-power much exceeds that of the Canadian fall. Mr. Day recommends the utilization of this vast water-power by the establishment there of manufacturing for spinning and weaving cotton cloth. When our ship canals, and eventually the Pacific railway are completed, the subject of cheap production may have a measure of interest to our manufacturers now not even thought of. The chief points of Mr. Day's scheme are the following, and should his ideas as yet fail to be appreciated, we may recall to mind George Stephenson, fighting his railway enterprise through amid the ridicule of Parliament and people, and Mr. Muntz going humbly from one ship-owner of London to another vainly asking permission to apply, at his own expense, a coat of his metal to the bottoms of their ships:

1. The formation of compressed air, by means of the water-power, and its appliances to drive the machinery of cotton factories, placed where convenient, the air being conveyed in pipes and applied to the common steam engine.

2. The manufacture, by this means, of cotton cloth, so near to the producing points of the raw cotton and of the food staples, as materially to lessen the cost of production.

3. The loading and unloading of vessels by means of the same cheap hydraulic power, the only expense of which is, of course, the erection of the apparatus.

4. The gray cotton cloth being so manufactured, its transportation (when the canals are enlarged), in sea-going vessels, direct from the point of production to England, there to undergo the finishing processes of bleaching and printing, and to be thence distributed to the markets of the world.

We understand that His Excellency has promised Mr. Day to lay his communication before the Dominion government, and to forward a copy of it to the Secretary of State for the Colonies, for the consideration of her Majesty's government.

Official Report on the Eads Jetties.

The sixth report of General Comstock, the Government engineer charged with the inspection of the progress of the works for the improvement of the South pass of the Mississippi river under J. B. Eads, was received at the War Department April 9th. The report is quite long. It is accompanied by maps and diagrams fully illustrating the work. It will be sent to the public printer for publication at once. The following extracts are of interest:

"At the mouth of the South pass, between November 18th, 1876, and March 16th, 1877, a few new wing-dams have been built and some old ones repaired. About 16,000 cubic yards of material have been dredged out at points where the channel was worst. A storm of December 30th, 1876, damaged the ends of the jetties and the wing-dams near them quite severely; 26,000 feet of the west jetty has been raised by mattresses two or three feet thick built in place; a layer of stone eight-tenths of a foot thick on this portion gives it a height varying from five-tenths of a foot to two feet above average flood tide. The other end of this part is 700 feet from the sea end of the jetty; 167 new piles have been driven in the jetty. Little work has been done on the east jetty. The channel of 20 feet in depth at the mouth of the South pass which, on December 27th, 1876, had a width of 200 feet from the pass of the Gulf, has narrowed at a point near the sea end of the jetties so as to be but 70 feet in width, and at a point a little below the head of the west jetty so as to be 180 feet in width.

"A table accompanying the report shows that depth could be taken through between the jetties as follows:

"June, 1875, 9 2-10 feet; May, 1876, 15 feet; August, 1876, 19 8-10 feet; November, 1876, 20 3-10 feet; March, 1877, 20 5-10 feet. A comparison of the soundings off the ends of the jetties with those of June 21, 1876, shows that in that period the 50, 70 and 100 feet curves have on the whole remained in the same position. At the head of the passes the west T-head has been extended up-stream to meet the line of mattresses across the head of the Southwest pass, and its upper part has been made a solid dyke. A line of mattresses has been carried from the east T-head down to the head of Goat island. A solid mattress dam has been built across the old east entrance to South pass. About 50,000

cubic yards of dredging has been done, making the total amount of dredging here 40,000 or 50,000 cubic yards. The river began to rise on January 24th, and caused a sharp scour between the T-heads, so that 23 feet 9 inches could be taken from the Mississippi river into the South pass on March 7th, 1877."

THE SIMPLON TUNNEL.—The *English Mechanic* says that the preliminary studies for boring the great tunnel of the Simplon and making accessions lines are now in course of execution. The plans and measurements have been completed in the offices at Lausanne. The line commences at Brigue, which will thus become the international station, to enter the tunnel, which will have a length of 18,340 meters. The end of the tunnel will be near d'Isella, and the line proceeds from there to Bombo d'Assolla. The total length of the line will be 46,900 meters. Near Bombo it will rejoin the old works, the Italian continuing to the station of Arona. As far as the village of Crevola the line follows the left bank of the Boveria, but crosses it there on a large viaduct.

The Pelican Mill.

A long time ago, says the *Colorado Miner*, when Georgetown was a gold mining camp and before silver was discovered in the district, Providence, R. I., sent out a man with a pile of money to build a quartz mill here. A large sum of money was paid for a number of supposed gold lodes. A valuable mill site and water-power were secured and an expensive quartz mill erected. The mill site covered the ground upon which Georgetown is now built. The investment for years appeared to be a total loss, but the discovery of silver, and consequent influx of population, enabled the What Cheer company to dispose of their property advantageously.

The first silver brick made in Colorado came from this mill. Garrett, Martine & Co. put in the Bruckner cylinder, (an invention of Prof. Bruckner, and first practically tested here,) which, in spite of the bitterest opposition, has proved to be a good machine and is still regularly and successfully grinding away.

Garrett, Martine & Co. were succeeded by Hupedon & Walters, and the concern was popularly known as the "German Reduction Works," for some time. The firm of Palmer & Nichols followed, and finally the Pelican company purchased the property and, for a number of years, have run the mill on ore from their own mine. The mill was recently overhauled and enlarged, three new cylinders and more barrels for amalgamation were added, also a new 10-stamp mill, new dust-chamber built, two new boilers substituted for the old single one, and a new engine room built. It is now as complete a silver mill as there is in the State. The firm of Fraser, Chalmers & Co., Chicago, furnished a great portion of the new outfit.

To those not familiar with the process of silver production, it may be well enough to say briefly something about the *modus operandi*. The ore arrives from the mine in a common quartz wagon, and is first thoroughly dried, after which it is pulverized in the 10-stamp mill—a double-discharge California battery. The stamps weigh 650 pounds each, and drop 90 times per minute. The timber of which this quartz mill is constructed has a history of its own. It is of the best Wisconsin oak, was purchased by an Eastern company proposing to operate at Montezuma, Summit county, was transported to that inaccessible district at a heavy expense, and finally brought over the Snake river pass by the Pelican company, and placed in its present position. The money actually paid for these oak timbers would have been amply sufficient to pay for one of rosewood or mahogany. This by the way.

The ore, when pulverized, is carried to the top of the mill by means of an elevator, and deposited in a large hopper over each cylinder. This cylinder is made of boiler iron five feet in diameter and 12 feet long, and is lined with brick. Through the center there is a diaphragm so placed as to cause the charge of pulverized ore to be constantly moved from one end to the other. It is practically the same operation performed in the reverberatory furnace, but is done by machinery, and one man is able to roast and chloridize as much as 12 in the old way; besides this he has an easy position, the charging and discharging of the cylinders being the only real work there is about it. The cylinders are discharged into an iron car, and the ore is put on the cooling floor, after which it passes into the amalgamating barrels, from which the silver is obtained in the shape of amalgam, and the worthless ore is dumped into the creek. The time required for the operation depends on the character of the ore. Heavy zinc ore requires from 15 to 20 hours in the cylinder alone. The Pelican mill, with its five cylinders, has a capacity of 10 to 20 tons per day. The ore has been averaging about 100 ozs. per ton for some time past, just as it is broken and comes from the mine, without sorting. The silver produced is not as fine as it might be, ranging between 750 and 850, but this is a matter of economy. They are able to make it 999 fine, but the difference in price does not justify the extra trouble.

The Pelican mill is peculiarly interesting for several reasons. It produced the first silver brick from Colorado silver ore. It demonstrated the practicability of roasting ore by machinery and established all that the inventor ever claimed for the Bruckner cylinder. It is

the first mill in Colorado where dry crushing of ore was successfully tried.

The mill, under the prudent and economical management of Hon. B. F. Napheys, is producing a large amount of bullion annually, and is making a good profit on the labor performed. Mr. E. Y. Naylor, the Superintendent of the company, gracefully presides in the office, and Mr. Patrick is the assayer. This mill is one of the old landmarks, and has set good examples to other similar institutions now scattered all over the State.

Nevada County Mining.

We do not believe, says the *Nevada Transcript*, there is a better field for the energetic prospector than in this county, and time will prove that our mining ground up to this year has hardly been touched. In many localities there are claims upon which work was suspended when wages, water and other mining expenses were double what they are now, and which could be worked at a good profit. Many such claims could now be purchased at low rates, and could be fitted up at a small cost. There are also very large ranges along the gravel channels which are unprospected, and which have never been taken up, or even if taken up, they have been forfeited for not having complied with the requirements of the law. In these cases they are open for relocation, and in case of a contest, nine times out of ten, a suit would result in favor of the party who, in good faith, goes to work on the ground with the intention of uncovering the valuable deposits. The large number of locations made each month, as shown by the books at the County Recorder's office, proves that our mines are not being neglected by prospectors. There is one thing certain, and that is, it requires money to open these claims; but when the channel is reached by the prospector or locator, and the gravel is tested, if it pays, it is a very easy matter to obtain capital to carry on the development of the mine. In quartz, prospecting is being carried on quite lively, and scarcely a day passes by without a location is placed on record. During the past year many good claims have been opened, and though there have been a few failures, as there is in every business, the result has been most satisfactory. If a hundredth part of the money which has been lost by gambling in stocks on the Comstock had been invested in this county, we would to-day have more and better paying mines than there is in the State of Nevada. The great drawback to the development of our mines is, that capitalists have millions for speculation, but risk only a few hundred dollars for the actual development of mines. If these men can flood the market with certificates of mining shares without risking their own money to work the mines, they are ready to do so, and this practice has created the belief that mining is hazardous, whereas nearly all the losses are either from bad management, or because people have bought stocks which were never worth the paper they were printed on. But this latter kind of business has about petered, the people having got their eyes open to the fact that they have been continually robbed by stock manipulators, we already perceive the benefit that is accruing to this county. While we sympathize with the unfortunate victims who have lost heavily in stocks, yet their loss will be our gain, as it will redound to the prosperity of our own and other mining counties in this State, provided no more dupes can be found to invest their money in the Comstock manipulations. Stock gambling is carried on between brokers now, and when an outsider is silly enough to invest his money, there is a scramble for it, and his hard earnings are soon gone. The people now, more than ever before, seem to appreciate the situation. It is a sad lesson to some of them, but it may prove to be the best thing that ever happened, if not to them personally, to the community in which they live, and for the State. Something had to happen. A change was necessary to convince men that they were not all born to be rich, and that stock gambling was undermining the very foundation of the financial prosperity of the State. The last break in stocks did the business, and the mines of Nevada county will surely receive more attention than they have for many years past. We again reiterate, that as good a field for prospecting cannot be found on this coast, and Nevada county is the peer of the Pacific slope for profitable mining.

SALT WORKS.—A new enterprise has been started near the sink of the Humboldt, Nevada. The *Silver State* says that Walter Schmidt, the discoverer of the Rye Patch mine, has commenced the manufacture of salt near Brown's station on the railroad, and in a short time will be prepared to fill orders for the article in large or small quantities. The works are situated near the road, which enables the owners to defy competition. A sample of the salt was exhibited at the fair last fall, and was awarded a diploma by the committee. There is plenty of salt in Nevada, the Humboldt salt marsh being practically inexhaustible, but hauling it to the railroad is so expensive that its owners cannot compete with that from works situated near the road.

A SALE in this city of 33 tons of ore from the Silver King mine, A. T., aggregated \$39,510, the highest lot bringing \$4,650 per ton, and the lowest \$1,230. The ore came by the Southern Pacific.

Mining Affairs at Cerro Gordo.

A correspondent of the *Coso Mining News* says: In one of my former letters, I promised to give you a description of the Belmont silver mines, and here is the fulfillment of my promise.

In former years, when Cerro Gordo was in its bloom, and when two rival companies were eager to bring the ores at a living price, quite extensive operations were carried on there, as men could then afford to work their claims to advantage, and the camp gave employment to some 40 to 50 men. Now, when there is only one company at work, and that company buying the ores at their own price, the place is almost deserted. Ores, no matter how rich, are bought for 50 cents per ounce, silver, delivered at the furnace, and ore assaying below 40 ounces silver cannot be sold. And not alone this, but ores which formerly assayed hundreds of ounces now assay ridiculously low, so that miners are not at all satisfied or convinced of the honesty of the concern.

The mines are situated on the east of the Cerro Gordo mountain, about three miles from the town, and facing Lee district. The ore is mostly copper-silver ore, though carrying sometimes considerable lead, and all of it contains from \$20 to \$30 gold per ton. Indeed, with the exception of a small portion of it, it is mainly milling ore. The principal mines are the Belmont, owned by Mr. Wm. Hunter; the Witte-Kind, patented and owned by Mr. John R. Hughes; the Buena Suerta, owned by Dr. H. W. Gould; the McDonough mine and the Nettie, Barbarossa and Gracewood, owned by Dr. Hehner and K. C. Johnson.

Of these the Belmont is the most extensively worked. A large, well-defined ledge, of from two to three feet high, and carrying all free-milling ore. As high as 20 to 25 men have been employed here formerly. Hundreds of feet have been run in tunnels, drifts and shafts, and Mr. Hunter sold, four summers ago, ores to the amount of \$63,000 alone, keeping two pack trains constantly employed. From this an idea may be gained of the immense quantities of silver taken out of the camp. The Witte-Kind, adjoining the Belmont, has also been very largely worked. The ledge here is somewhat smaller, but the ore is of a very high grade, assaying as high as 400 to 500 ounces per ton. As, however, the mine is patented, its present owner prefers the ore to remain in the mine rather than selling it at such ruinous rates to the Union Consolidated company. The Buena Suerta is also a very valuable property, the richest ore in the district. Its owner, Dr. H. W. Gould, is residing at the mine, but refuses also to sell any more ore to our monopolists. The mines of Dr. Hehner and Kit Johnson are leased to some Mexicans, and in all of them considerable ore is in sight. In the Gracewood they are now sinking a shaft. The ledge is very regular, averaging some 18 inches in width.

It is a wonder, indeed, that mines as valuable as those at Belmont, should have gone begging so long for the want of proper means of reduction. It is true enough that there is no water, but a very good road can be made, with but very little expense, to the lake, and ores can be hauled down for about \$7.50 per ton. Ten stamps could be kept constantly running, and we do not know of any better investment in regard to mining enterprise in the county. A year ago, Mr. S. Linkton came over from Darwin, looked at the mines, and taking along some sacks of ore from the Belmont mines, had it milled. The result was 62 ounces silver per ton. This was as poor ore as was ever taken out. He then bonded the Belmont, Witte-Kind and McDonough for \$20,000, but for some reason forfeited his bond.

We have had a visit from Mr. Belshaw, and, as a consequence, a reduction of wages at the furnace as well as the mine, of 50 cents per day. The cause alleged is that the mine has not paid during the last year. Probably, however, the real cause may be found in the fact, that owing to the dull times and the general scarcity of money, such a reduction could now be safely made, and will be an established fact when ore will be struck in the new shaft. The latter is being steadily pushed ahead, and it is currently reported, and on good authority, that a large body of ore has been struck in the cross-drift, but that it is hushed up on account of their tax suit. Some very fine galena has certainly been taken out already.

That the Union Consolidated company should really have the assurance of going to law about their taxes, and how employees of that company could have gone before the Board of Equalization and made oath that the property was not worth \$8,000, and at a time when upwards of \$20,000 had been already expended alone for machinery and work on the shafts, is a cause of wonder to everybody at all acquainted with the prodigious resources of that mine.

MCGARRAHAN CLAIM AGAIN.—The application of the New Idria company for patents for quicksilver mines has been referred by Secretary Schurz to Assistant Attorney-General Marble, law officer of the Interior Department, and an animated argumentative contest is now in progress before him, between ex-Senator Stewart and William Neely Thompson in behalf of the company, and Montgomery Blair and others representing McGarrahan. Meanwhile the apparently everlasting controversy as to the history and merits of the case has been revived in the Washington newspapers.

USEFUL INFORMATION.

The Movement of Storms.

Prof. William Ferrel, of Washington, has gained and deserves high reputation at home and abroad as a student of meteorology. His constant endeavor is to bring it, as a science should be brought, to the tests of facts and mathematics. The essay which he has just delivered before the National Academy of Sciences will add to that reputation. This essay on the "Progressive Motions of Storms," is intended to show that the movement of great storms across our continent, for instance, is determined by the currents of our atmosphere—its upper currents especially. He presented in tabular form the results of his theoretical determinations as to the speed of atmospheric currents for different heights. By these currents neither the ordinary surface winds nor the winds which form part of great storms or cyclones are referred to, but the great easterly current which is mainly above the surface and extends far above the clouds. This current is chiefly due to the difference of heat between the equatorial regions, and consequently is greater in winter when that difference is greatest, as compared with summer, when it is least. The theory assumes that this current is swifter with increased heights from the earth, but varies with different latitudes. The figures of the increment are:

Latitude.	Per Mile of Height from Surface.	
	Winter.	Summer.
70	7.5	5.8
60	10.1	5.6
50	10.9	5.1
40	12.1	4.9
30	14.7	4.3
20	15.0	2.4

The increment is to be added to easterly surface wind; but where, as in low latitudes, the surface wind (trade wind) is westerly, it should be subtracted. Thus for latitude 40 degrees the amount to be added to the prevailing easterly wind at the surface would be, for a height of five miles, in winter, 60 1/2 miles per hour. In this great easterly current it is conceived that storms, cyclones, and the like are carried along though their specific winds may be blowing on the surface in an apparently contrary direction. The theory is partly corroborated by the calculation of the Rev. Clement Ley, of England, that the maximum speed of cirrus clouds having an altitude of four miles, is 120 miles per hour.

A theoretical explanation was also given for the observed circumstances that while the storms north of 40 degrees latitude go easterly, those south of that line go 30 degrees north of east. But Prof. Ferrel's chief object was to show that the progress of a storm most largely depends upon the general movement of the atmosphere; a movement increasing with altitude, and greater in summer than in winter.

PURIFYING PARAFFINE.—We read in the London *Mining Journal* that with a view to realize in an expeditious and economical manner the separation of the oil and coloring matter from paraffine, and the separation from each other of the constituents of other fats or fatty matters, whose constituents have different melting points, Mr. F. G. Morton, of Deptford, proposes to place the cakes or pieces of paraffine or other fats or fatty compounds in shallow boxes or cases constructed with perforated sides, interposing a quantity of common soda or other alkali between the cakes or pieces of paraffine or fat or fatty compound. The boxes or cases may each be composed of a frame of wood forming four lateral parts or sides, say about one inch wide, and of two perforated sheets of zinc forming the two other and larger lateral parts or sides; one at least of the perforated sides must be made removable for the introduction of the material to be treated. The perforated boxes or cases are placed about two inches apart in a tank of water heated by steam or otherwise (but preferably by steam) to a temperature slightly below that which will melt the constituent having the higher melting point, and the temperature is then regulated to allow the heat to gradually extract the constituent or constituents which melt at lower temperatures, as for example in the case of paraffine, to gradually extract the oil and coloring matter. As this operation is repeated the paraffine is finished and filtered in the ordinary way. For some operations, perforated boxes or cases as herein described may be employed without the use of alkali. The perforated boxes or cases may be arranged horizontally or vertically, and may be fixed, or may have an oscillatory or rotatory motion, according to requirement.

UNIVERSAL HYDRAULIC MOTOR.—According to a Turin fortnightly, *Il Progresso*, a certain Gerolamo Cavanaugh, of Genoa, has been in Rome demonstrating to the Minister of Marine the reality of an important discovery which he claims to have made. Cavanaugh substitutes water-power for steam in all application, even for locomotives and marine engines. He asserts that he is able to use liquids for the production of powerful mechanical effects, his invention resting (1) upon the utilization of the pressure from the bottom to the surface of any liquid mass, enabling him, with the outlay of but a small additional force, to elevate that mass; and (2) upon his utilizing this mass as a heavy weight, the pressure of which is converted into a driving or other power. We confess that the statement has a vicious circle look with it, which we do not find reassuring.

Peculiar Colliery Explosion.

The Manchester *Guardian* has the following: On Wednesday, when the workmen were leaving their work at Troedyrhiw colliery, situated in the greater Rhondda valley, and at the entrance into the Ferndale valley, the scene of a terrible explosion some years ago, a roar of rushing water was heard. Many men succeeded in making their escape to the surface, but it was soon discovered that 14 men and boys were missing. There were plenty of brave volunteers forthcoming, and many descended the shaft, which is 92 yards deep, and entered the workings. They quickly discovered that all the workings within a few hundred yards of the bottom of the shaft were filled with water to the roof, and no hope was entertained that anyone would be discovered alive. While the explorers were consulting what should be done, faint knockings were heard on the other side of the coal, at a distance, it was conjectured, of a dozen yards. No sooner was this heard than a score of men threw off their jackets, and, with mandrills, commenced cutting through the solid mass. The imprisoned did likewise. Relays of men worked with great energy throughout the night, and about four o'clock yesterday morning they reached within speaking distance of each other. The imprisoned men were greatly excited, saying that the rising water was gradually approaching them. It came out that there were five firemen and a boy. About six o'clock in the morning a mandril struck through. The next moment a terrible explosion, as that of a cannon, occurred, but not of gas, and one man was terribly cut about the face. A few minutes later, on approaching the hole made, it was discovered that a man named Morgan had been jammed in the hole, and that he was dead. The inundation had been so sudden as to imprison the air in the inner workings, and the force of this had kept back the water from the five men. The moment a small hole was made by Morgan's mandril this volume of imprisoned air escaped. Between eight and nine o'clock Morgan's dead body was brought to the surface. Yesterday afternoon Mr. Galloway and the officers of the Troedyrhiw and other collieries, after penetrating as far as possible into the colliery, heard knockings ahead of them. Some of the men left in the colliery, therefore, were still alive at the hour, but there is half a mile of water from the nearest point reached and where they are imprisoned, and, owing to a deep basin intervening, filled with water to the roof, it is feared that they cannot be reached for some days.

CONSOLIDATED TEA.—The operation of compressing or consolidating tea, as carried on by Messrs. Goundry, of London, is very simple. The tea is weighed out by girls—who almost exclusively carry out the process from beginning to end—into quarter pounds, which, one after another, are passed into molds on a revolving iron table, a piece of metal exactly fitting the mold being placed on the top. As the table revolves, each mold comes under the stroke of a hydraulic ram, which exercises a pressure of about 80 tons on each quarter of a pound of tea, reducing it to one-third of its bulk, and consolidating it into a mass, marked out by depressions into divisions of exactly half an ounce each in weight. As the table revolves, each cake is ejected from its mold, and the process, in which, by the way, not a particle of moisture is used, is completed. The effect of this enormous pressure is stated to be so thoroughly break the cells and smaller vesicles of the tea leaves that the theine and aromatic oil are set perfectly free, and the mass of tea is more easily affected by boiling water, in which it at once falls to pieces. The practical result is that the liquor produced from consolidated tea after ordinary infusion is considerably stronger than that produced from loose tea, varying according to the quality of the tea subjected to the process. It is found that a half ounce of consolidated tea gives in five minutes the same strength of liquor as the same weight of ordinary tea in four or five hours.

CALIFORNIA CONTRACT GOING TO ENGLAND.—The New York *Iron Age* says: If all the rumors we hear are true, the hoop iron contract is not the only large one that has been lost to us to give employment to English mills. We hear, from a reliable source, that a large order for plates for California, amounting to some 2,000 tons, has been or will be given to English bidders. The pig iron, bar and railroad iron trade of this country may be lost to England; but, as we have several times suggested, in the higher grades of iron the closing battle has not been fought yet. The "mother country" is getting down to "hard pan" as well as we, and when she gets there, and there is any improvement on this side of the water, there will be "blood upon the face of the moon."

DURABILITY OF PORTLAND CEMENT.—During the course of some recent experiments in Paris, it was found that a brick of pure Portland cement, which had been kept in water six weeks, broke under a tensile strain of 170 pounds to the square inch; but a brick, six months old, which had also been kept under the water, broke under a strain of 441 pounds per square inch. The experiments proved that cement hardens more rapidly when exposed to sunlight and fresh air than when affected by humidity, but that this is at the expense of the tenacity and impermeability of the product.

GOOD HEALTH.

The Doctor's Story.

Deacon Rogers, he came to me:
"Wife is agoin' to die," said he.
"Doctors great an' doctors small,
Haven't improved her any at all.
"Physic and blister, powders and pills,
And nothing sur: but the doctors' bills!
"Twenty women, with remedies now,
Bother my wife the whole day through.
"Sweet as honey, or bitter as gall—
Poor old woman, she takes 'em all.
"Sour or sweet, whatever they choose;
Poor old woman, she daren't refuse.
"So she pleases who'er may call,
An' death is suited the best of all.
"Physic and blister, powder an' pill—
Bound to conquer, and sure to kill!"

Mrs. Rogers lay in her bed,
Bandaged and blistered from foot to head.
Blistered and bandaged from head to toe,
Mrs. Rogers was very low.

Bottle and saucer, spoon and cup,
On the table stood bravely up,
Physic of high and low degree:
Calomel, catnip, boneset tea;
Everything a body could bear,
Excepting light and water and air.

I opened the blinds; the day was bright,
And God gave Mrs. Rogers some light.

I opened the window; the day was fair,
And God gave Mrs. Rogers some air.

Bottle and blisters, powders and pills,
Catnip, boneset, syrups and squills;

Drugs and medicines, high and low,
I threw them as far as I could throw.

"What are you doing?" my patient cried;
"Frightening death," I coolly replied.

"You are crazy!" a visitor said;
I flung a bottle at his head.

Deacon Rogers, he came to me;
"Wife is a-gettin' her health," said he.

"I really think she will worry through;
She scolds me just as she used to do.

"All the people have poohed an' slurred—
All the neighbors have had their word;

"'Twere better to perish, some of 'em say,
Than to be cured in such an irregular way."

"Your wife," said I, "had God's good care,
And His remedies, light and water and air.

"All of the doctors, beyond a doubt,
Couldn't have cured Mrs. Rogers without."

The deacon smiled and bowed his head;
"Then your bill is nothing," he said.

"God's be the glory, as you say!
God bless you, doctor! good-day! good-day!"

If ever I doctor that woman again,
I'll give her medicine made by men.
—Will M. Carleton.

Wearing Spectacles.

A writer in *Scribner's Monthly* for April gives an article on this subject, from which we condense the following. His views correspond with the generally received opinions of medical men with regard to this matter: It is currently believed that the use of glasses should be put off as long as possible; that a too early use of them is injurious, and that when once begun it becomes, earlier than it should be, a necessity. As the office of the glass is to supply the refracting power which the eye, through age, can no longer furnish, it is evident that so soon as a need of this artificial power is felt we should resort to it. By failing to do so, we deprive ourselves of much useful work of the organ, while the work it does is done under a disadvantage, and with greater or less risk. Far-sighted persons feel the need of assistance very early—often as early as the 25th or 30th year. When one can no longer read with ease the finest print of a newspaper at a distance of 12 inches, glasses are needed. Inconvenience will first be felt in the use of the eyes in the evening, and for a year or more their use may be confined to work at that time. Under ordinary circumstances the first glasses should be weak—say about No. 60, according to the numbering in this country. Such a number, however, should be selected as will enable one to read the finest print at a distance of 12 inches. A pair of spectacles of clear glass, free from defects, and accurately ground, which in a neat steel frame cost about \$3 or less, will do as much as pebbles, for which \$25 and even more is asked. For cleansing the lenses, use a piece of old, soft cotton cloth. The case in which glasses are kept should open at the side and not at the end. The rubbing of the lenses against the sides of the case soon mars their transparency.

BARE NECK AND ARMS.—An eminent physician declared: "I believe that during the twenty-six years I have followed my profession in this city, twenty thousand children have been carried to the cemeteries a sacrifice to the absurd custom of exposing their arms naked." And yet it is said the low-necked fashion is coming again. Do not follow it.

TURNIP SEED FOR INDIGESTION.—A reader of the *Press* writes as follows: I use turnip seed for medicine in case of dyspepsia or indigestion, and find them much better than the mustard seed, commonly used, besides they are much more palatable. They taste something like a nut kernel.



W. B. EWER..... SENIOR EDITOR.

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SAN FRANCISCO:
Saturday Morning, May 12, 1877.

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The Crown Point.

A meeting of the dissatisfied stockholders of
the Crown Point mine has been held to take ac-
tion with regard to the present management.
Mr. O. H. McKee read an elaborate report of
his investigation into the affairs of the company,
in which he made the following statements:

Since January 12th, 1875, eight assessments
have been levied, aggregating \$750,000. Dur-
ing 1876, 66,941 tons of ore were reduced, the
product being \$1,078,718. The total paid for
milling was \$667,199, leaving a balance to the
company of \$411,519. To this add \$500,000
drawn during that year in assessments, and the
total working expenses of the mine amounts to
\$911,519; and in addition to this the manage-
ment contracted an indebtedness of \$135,000,
making the total expenditure during 1876 of at
least \$1,046,519. In 1876 Yellow Jacket levied
assessments amounting to \$360,000; Bullion
(first since 1872), \$250,000; Overman, \$346,000;
Caledonia, \$260,000, and Imperial, \$350,000.
These companies did not mill any ore in 1876.
He thought the stock would become valueless if
the extravagant outlay was not checked.

After considerable discussion a committee of
three was appointed, composed of Messrs. Mc-
Kee, A. P. Wheeler and Kronberg, to investi-
gate the subject and report at a meeting to be
held shortly in a public hall. Among other
grievances, it was asserted that the present
Board of Trustees hold among the five only 175
shares of stock. All stockholders were urgently
requested to have their stock transferred to their
own names at least 10 days before June 4th,
as on that day there will be an election of new
officers.

Science and Practice.

The science of mining and metallurgy con-
sists simply in a knowledge of the results of
practice and experience; although many per-
sons seem to think that it is the other way, and
that practice is the result of the researches of
science. There is no reason at all why the sci-
entific man may not be practical as well, and
vice versa. The two go hand in hand. The
practical man may establish a fact and science
will preserve it for the use of others. The sci-
entific man may suggest an idea, but unless
proved correct by practice it is valueless and is
abandoned.

Most men seem to think that science means
Germany and books; that is to say, they think
it consists of knowledge gained in German
universities. What is taught there is simply
what has been learned by practice and expe-
rience, the scientific men having preserved the
facts and compiled them in a shape in which
they are accessible to all.

Now we are making science of this kind on
this coast every day, and the best kind of sci-
ence too. All we want is to collect and save it.
What is sometimes called "practice" is expe-
rience wasted or selfishly kept secret. A prac-
tical man can easily become a scientific one by
simply recording the results of his experience,
taking an interest in the application of the
knowledge acquired, and giving others some
benefit from what he has learned. The real sci-
entific man is at the same time practical, else he
is a mere theorist and his ideas worthy of little
consideration.

The every-day work in our mines and mills,
when recorded, described and applied else-
where, is as much science as any of that which
we get from the German books or universities.
The advantage they have over us is, that
they have, or take, the time to make a matter
of record of all that happens in their daily
business, so that others may benefit by their ex-
perience; while people in this country are either
too busy or, too careless to do any such thing.
It is unfortunate that this is so, but it is the
fault of the people themselves. In a measure
the numerous newspapers in the country remedy
the evil and help to make science out of prac-
tice, by recording such things as come under
their observation. The PRESS has always done
what it could in this direction, and only needs
the assistance of the practical men of the
country to do a great deal of good. If our
millmen would only take the trouble to let oth-
ers know what they find out, and not make a
secret of it, they would benefit others and not
detract anything from their own knowledge.
The experience which has been gained in the
practice of California and Nevada has been ex-
ceedingly valuable, although it is not as satisfac-
torily a matter of record as it might be. We
have had so many classes of ore to deal with,
and so many varying conditions that we have
had to try all kinds of experiments, some of
these have been failures and others have proved
successful. We have branched out from the old
systems of mining in many particulars, and
made many new departures in metallurgical
practice. All this is of great interest abroad,
but others depend for their knowledge of
these things almost entirely on the newspapers.
Still we, having the practice, have the basis of
the science, and it is our own fault if we allow
others to claim the latter as their own.

Salting the Bullion.

A week or so ago there was a wholesale dis-
charge of miners from the Bullion mine for an
alleged "salting" of rock by which the insiders
lost some money. It seems that on the 2000-
foot level and in the north drift, some excellent
indications were found, and to hurry up matters
it was determined to take long hand-drills and
send them on ahead and assay the pulp as it was
drawn out. This worked well, but some one
"played" the managers. He took some rich
ore and powdered it, and mixed it with the pulp
formed by the drill. The assays ran into the
hundreds, and the "inside" loaded up with
stock for a rise. When the drift got to where
the rock was supposed to come from the trick
was exposed. As it was impossible to find the
guilty man, the whole force on that level was
discharged. The worst of it was that the drop
in the market came just after the load-up above
mentioned, and consequently the loaders are
caught.

Since then all the men have appeared before
a Justice of the Peace and made oath that they
did not, at any time, tamper with the rock
they were working, or salt it in any manner,
and that they had no knowledge who had done
so. After this it was no more than fair that the
men should be reinstated, especially as employ-
ment is scarce just now in that part of the
country. It seems, however, a good judgment
on the insiders, who were laying to catch some
one else, and got caught themselves. A few
lessons of this kind would be wholesome, and
probably the man who did the "salting" had
that in view, and did it to catch the very per-
sons he did. At all events nobody has much
sympathy with people who keep ahead of a drift
with a drill to take advantage of other stock-
holders who do not happen to be in the manage-
ment. All sympathy is with the poor fellows
who lost their places on account of the affair.

Foundry Notes.

Although business at the foundries is by no
means as lively as it might be, all of them have
some work on hand, of course. Work has been
taken this year at less prices than heretofore,
so that profits have been lighter as well as
work scarcer.

At the Etna Iron Works

They are keeping a full force of hands all the
time, and their trade has been pretty good of
late; in fact, for two months as good as cor-
responding months last year. They are building
at present one of Wilson's two-stamp steam-
stamp mills, on an improved plan. This is to
be taken to Globe district, Arizona, and a
White rotary furnace will accompany it. A
company are taking it down there who are to
work it as a custom mill as well as for their
own mines. In this mill the valve motion is
changed from those previously made and bal-
ance valves put in. With the old style it took
about half of the power to move the valves, so
that the new mill will work much better. It
will have a four-sided discharge, and be set on
four iron columns, having no wood about it.

At these works they are also building a new
rotary pulverizer, which will be completed in a
few days. As soon as it is finished and tried
we shall describe it in detail. They have cast
a large five-ton propeller for the steamer *Ajaja*.
This is a fifth one cast from this pattern, the
largest ever cast in the State. It is four-bladed
and 14 feet in diameter. They are also doing
some work for the steamer *Neuborn*. They are
re-boring a cylinder and putting in Dunbar pack-
ing at the Alviso flour mill. They are doing
the usual jobbing and small work.

The Golden State Iron Works

Have considerable small work on hand. They
are making a lot of Frue concentrators to be
worked on the gold beach sands, where they
have proven successful. They are doing con-
siderable work for the Napa Consolidated quick-
silver company and also for the Cloverdale and
Sulphur Banks' companies; also doing the iron
work for the new railroad bridge over the Rus-
sian river, being built by the Pacific bridge com-
pany. They are making some amalgamating
machinery for the Manzanita mine in Colusa
county, of which we spoke of last week. A
considerable amount of castings is being made
to go to Virginia and Gold Hill.

They are making quite a number of the
Golden State pressure and suction blowers
principally for quicksilver mines. One is being
made for use in ventilating a dairy and keeping
the temperature even. A small stream of
water is conducted to the pipe connecting with
the blower, and the blower throws it in a fine
spray into the milk-room. We understand
that this principle has been applied with suc-
cess at the dairy of Hon. C. S. Abbott, Salinas.

At these works they are also making some of
Thomas Guerin's patent main sewer traps,
an invention particularly useful in a climate
like this where we have such long dry seasons.
It is intended for use at the corners of streets
where the water from the streets flows into the
sewer. It consists of a vertical pipe in which
is placed a wooden valve, so as to shut the cess-
pool off from the main sewer when there is no
water running. When there is water to run,
the wooden valve or float, rises and allows the
water to run off, closing automatically after the
cesspool is drained so as to keep the sewer gas
from escaping into the street, as it does by the
present system. To use these traps, there is no
change necessary in the present cesspools, ex-
cept to remove the present iron arch and insert
the pipe and trap. By the use of this appara-
tus no sewer gas is allowed to escape into the
streets, to the detriment of the health of the
city. The trap has been examined by the
health officer and pronounced good.

BULLION SHIPMENTS.—Since our last issue
shipments of bullion from prominent mines have
been as follows: Grand Prize, April 30th, \$6,596;
Modoc, May 1st, \$5,633.70; Northern Belle, 1st,
\$7,900; Comanche, 1st, \$8,770; Northern Belle,
3d, \$8,286.12; Con. Virginia, 5th, \$244,326.83
—total to date, \$845,657.37; Modoc, 3d, \$6,
717.90—total to date, \$12,351.60; Grand Prize,
5th, \$6,800; Northern Belle, 6th, \$11,794.21;
California, 8th, \$230,165.70—first shipment for
May account; Con. Virginia, 8th, \$106,157.24
—April account to date, \$951,814.61; Modoc,
7th, \$6,658.42—total to date, \$19,044.60.

THE Mechanics' Institute held a meeting this
week, when S. H. Wheeler, Joseph Britton,
James Patterson, A. S. Iredale and I. M. Scott
were appointed to nominate seven Directors to
serve for the ensuing two years. At this meet-
ing a resolution was adopted, suggesting the
appointment of Prof. Geo. Davidson, President
of the California Academy of Sciences, as a
member of the Board of Regents of the State
University, to fill the place of the late John B.
Felton.

A boy found 400 pounds of amalgam in an
old tunnel near the Kelsey mill, near Silver
City, Nev., last week. The amalgam had been
placed there recently, and was in all probability
stolen from one of the mills near by.

It is said that the Nevada bank helped the
Martin White company, of Ward district, out
of its financial difficulties.

Hard Times on the Comstock.

The phrase of "hard times on the Comstock"
would have sounded queerly a year ago, but
there is more truth than poetry in it now. The
depression in the stock market and lack of faith
in mining securities, has naturally operated to
the injury of the mines. All of the large mines
on the Comstock have reduced the working
force, and many of the "outside" ones have shut
down altogether. When such mines as the
Yellow Jacket only keep a dozen or so men at
work, the chances for miners to find employ-
ment are slim. The discharge of workmen con-
tinues daily, and with many it is no longer a
question of making a fortune, but one of ob-
taining the common necessities of life. Only
this week we read in the local papers of the
case of a mother and three fatherless children
being found starving to death. The people
there are just awakening to the misery and des-
titution which exist in their midst, and it has
been suggested that a relief committee be ap-
pointed.

This state of affairs, in what has been consid-
ered the most prosperous mining town on the
Pacific coast, is truly deplorable. Miners who
find no employment there have no where else to
go to get it, as all the camps have the same
trouble. Business is dull at all of them and
times hard. Some are thinking of going to the
Black hills and others to Arizona, but both are
bad places for a man "without a stake." It
seems strange to an old resident to hear of such
rough times on the Comstock, as it has always
been the miners' Mecca, where work could be
found when other places were dull. Now,
however, it is as bad as, if not worse than, other
localities, and many there have not means to
leave if they knew where to go. In speaking
of the prevalent distress, the *Enterprise* says:

It looks now as though in a few days more it
will be a question for landlords to decide
whether to accept less rents or to have tenant-
less houses; a question for railroad corporations
whether to charge less freights or to cease run-
ning trains; a question for laborers, whether to
take less wages or cease laboring at all; a ques-
tion for everybody, whether a half-dollar can
be made to go as far as a dollar did a year ago,
or whether to go without the half. The mines
are daily discharging workmen. The number
of destitute and desperate men and families are
increasing daily. The situation is very serious.
What the cause is or who is to blame is a second-
ary matter; the question now is, what is it
best to do? We think there should be a relief
committee organized at once. Of our own
knowledge we know that there are delicate
women and little children here who have not
any sufficient food or clothing. The safety of
the property-holders demands that these people
shall be looked after and provided with what
they absolutely need at once. There are dozens
if not hundreds, of strong men walking our
streets half crazed for want of work and bread,
and wild with anxiety for their little ones.
There is a limit beyond which these men will
not go, and the time comes to a man at last
when he says "I don't care." A great calamity
fell upon Virginia a year ago last October. In
five hours the main portion of the city was
lifted up in a whirlwind of fire and carried
away. Every heart was open then and every
exertion was made to rescue and relieve suffer-
ers. Our people should remember that a calam-
ity, four-fold greater in its immensity, has
fallen now upon our city. The only difference
is that it has been coming for five months in-
stead of having been precipitated in five hours.
Men before had no houses, but they had work
and could buy food. Now they have shelters,
but no work and no money. We do not wish
to be thought an alarmist, but, in all truth and
seriousness, we say that there is such terrible
suffering here now as puts the city itself in
danger. We invoke our rich men to meet and
consult and see if some work cannot be found
for our most needy laborers; we commend to
citizens generally the need of organizing to try,
with a concerted movement, to inaugurate a
system of charities which shall feed and send
away our most deserving poor; and to all we
commend the utmost charity and forbearance.

MECHANICAL ORE CONCENTRATION.—The se-
ries of articles on mechanical ore concentration
and separation, by Mr. F. M. F. Cazin, M. E.,
of Santa Fe, New Mexico, is concluded in this
issue. The article, as a whole, is very valuable,
and stamps Mr. Cazin as a practical and well
posted man in his specialty. He informs us
that he has elaborated the articles published in
the PRESS and will probably present the whole
in book form before long. The treatise is the
most complete on the subject which has been
given in this country, and is rendered more
valuable to us from having been written by one
who has had so much practical experience in
American mines. The subject is one of great
importance on this coast, where it has been too
long neglected. Mr. Cazin deserves great credit
for his valuable compilation of facts concerning
concentration, and as much of what he has
written is the result of his own experience, an
elaboration of the treatise will be valuable to
the mining community.

Mechanical Ore Concentration and Separation—No 25.

(Written for the PRESS by FRANCIS M. F. CAZIN, M. E., Santa Fe, New Mexico.)

Equal Falling.

In a vertical upward stream of water, the streaming action supplements within a limited vertical space (column), what this space (column) may lack in height for permitting two particles of solids of equal size, but unequal density, to separate locally, in a degree sufficient for practical application. If, therefore, motion is required in order to utilize the difference in density in practice within water for separation, according to quality, such motion (power, fuel) is required in a higher degree in using a liquid of less density than water or air. This involves a greater amount of expense in using air than in using water for motive power for gaining the same effect.

The same tendency shown by unequal falling particles to differ in their rate of motion in a column of water without motion, and in an upward vertical stream, is shown also in a horizontal stream, as well when the particles of solids are suspended free in such horizontal stream, as when these particles of solids are in contact with the floor on which the horizontal or inclined stream is in motion.

In practice all four modifications are utilized, either singly or in combination, and the following supplementary axioms govern the action:

First. Of two particles of solids being either free in suspension in a horizontal or inclined stream of water, or in contact with an even floor it runs on, being of equal size but of unequal density, the particle of less density will be carried to the greater distance.

Second. Of two particles of solids in a horizontal or inclined stream of water being in contact with an even floor on which the stream runs, being of equal falling but of unequal size and density, the one of larger size but less density will be carried to the greatest distance.

But in pursuing the course of experiment further with regard to the even floor (horizontal or inclined plane) on which the particles of solids are to move by a stream of water, we find that a separating motion may be imparted to the particles by and in their contact with the solid plane (floor) they run on, and then find the further axiom.

Third. Of two particles exposed to a horizontal or inclined stream of water when in contact with an even floor (plane), such particles being either of equal size or equal falling but differing in size, the particle of greater density will, when the solid floor receives a percussion, either contrary to direction of stream or in a right angle, it will either be arrested or be made to recede to a greater extent than that of less density; and the difference will be the larger, the more equal in size the particles differing in density.

By these axioms one conclusion must by necessity be arrived at—the necessity of assorting according to size before entering into any action for separating according to quality. There is only one case where equal falling will act for equal size. This is where the particles are in contact with an even floor.

This quality of equal falling is therefore utilized where the minuteness of sizes does not longer permit mechanical assorting for preparing material (slimes) for the separating action as shown in the proper place.

Conclusive Remarks.

The preceding treatise has been begun when the author was temporarily free from practical work in his special line of action, and has been completed when again under the pressure of daily duties. This, and the great distance between San Francisco and Santa Fe, preventing him from reading proof-sheets, have not only permitted many imperfections and even errors to escape, but even occasioned the misplacement and falling out of chapters; but nevertheless what has been said will prove of real practical benefit wherever needed and heeded. It is the author's intention, when spare time arrives therefore, to make this treatise the skeleton of a complete one in book shape; but he is in hope that the present one will be useful in drawing closer attention to the great importance of mineral dressing in our mining industry, and would be well pleased to thus have been useful to the development of the immense resources of this country.

PICNIC OF SANTA CLARA COUNTY PIONEERS.—We acknowledge the receipt of a card of invitation to attend the above named festivity which will occur at O'Donnell's gardens, San Jose, Friday, June 22d. The occasion will doubtless be one of much enjoyment to the pioneers and their guests. The picnic is under the auspices of the Pioneers' Association, of which Coleman Younger is President and A. P. Murgotten is Secretary.

The Crown Point mining company having found it necessary to increase their pumping facilities in order to handle the water on the 2000-foot level. The Dayton mining company are going to let them have their big No. 7 air-compressor for use until such time as new pumping machinery can be obtained from the East.

The O'Harra Champion Furnace.

The O'Harra Champion furnace at the Exchequer mill, Alpine county, has been accepted by Manager Chalmers for his company, and he is so well satisfied with its work that he has ordered one of the same capacity for the I X L mill. We gave some time since a description of this furnace, but it has been so successful in Alpine county, and so much interest is manifested just now in furnace work that we give herewith illustrations showing the construction, and take the following description from the *Alpine Chronicle*:

The furnace is perfect in its mechanical arrangements and runs like clock work. It has not been stopped a moment on its own account since starting. Before seeing the furnace at work we had some doubts as to the iron work standing the heat, but after seeing the plows and chains moving through the flames and red

the lower hearth it gives up a portion of its sulphur, and changes to a sulphate. After passing the first fires it receives oxygen from openings on each side of the furnace, and from that on the chlorination progresses. As it is moved toward the second or last fires, the draft is so arranged that it is equally divided and looks as though it hardly knew which way to go—in fact the chlorine gases arising from the bed of ore stop there, hovering over the ore as the plows expose a new surface every minute, thereby causing the ore to chloridize to very near 100 per cent. of the fire assay. For instance, on an average sample of a forty-eight hours' run on low grade ore (that was run through to get it out of the way) the chlorination was found to be 94 per cent.—within six per cent. of the fire assay. The furnace was built for a thirty-ton furnace, but it is found that it will easily work forty tons in twenty-four hours. With this furnace a number of steam pipes, with superheaters, are connected and so arranged as to throw jets of steam, and cause a rush of oxygen to mix with the flames, but it is found to be unnecessary to use them on the Exchequer ore, as the bullion is 960 fine.

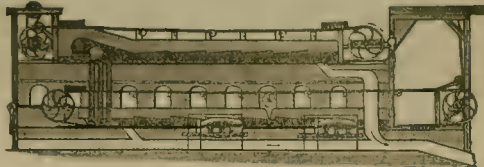


FIG. 1. SECTIONAL SIDE ELEVATION OF FURNACE.

hot ore, and coming out of the furnace almost cold, we are satisfied that they are little, if any affected by the heat and gases, and the secret of this is, they are in the heat only half a minute and out in the cool air one minute and a half, consequently they have no chance to become over-heated while the furnace is running, and when it is stopped the chain is lowered in a groove or opening in the hearth out of the heat by slackening the chain at one end where the shaft is on a carriage, and so arranged as to be tightened or slackened by a ratchet. For the

The cost of roasting 20 tons of ore in 24 hours is as follows:

One man.....	\$ 4 00
One man.....	3 00
Wood—13 cords, at \$3 per cord.....	5 25
Salt—1,000 pounds, at 2½ cents.....	40 00

Cost of 20 tons.....	\$52 25
Cost of one ton.....	2 61½

Mr. O'Harra says he can build a 100-ton furnace that would make the cost of roasting much cheaper. We learn that the Advance company, at Monitor, are negotiating with Mr. O'Harra

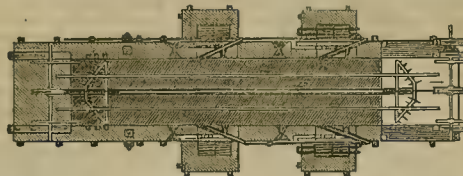


FIG. 2. BOTTOM HEARTH OF FIFTY TON FURNACE.

benefit of those that have not seen the furnace we will try to give a description of it. It is 85 feet in length, with two hearths, one above the other, as two furnaces, each seven feet wide. There are five fire chambers, one on the upper hearth which is used only for heating the furnace, after which the fire is allowed to go out, as the heat and gases arising from the lower hearth is sufficient to heat the ore and prepare it for chloridizing on the lower hearth, on the sides of which there are four fires, two on each side.

for the erection of two 30-ton furnaces this spring. The people of this county may rejoice that our rebellious ores have at last been subdued. Alpine is wealthy in her mountains, and capital, to be well directed by energetic men, would soon place her in the front rank with the best mining districts in the world.

Since the above was put in type Manager Chalmers informs us that since the furnace was accepted by him it has done its work still better—working up to 100%—up to the full assay

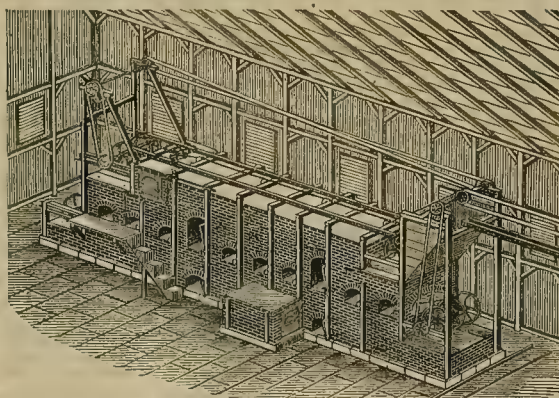


FIG. 3. THE O'HARRA CHLORIDIZING FURNACE.

There is an endless chain that moves through a groove in the furnace and around large sheaves at each end and over the top outside. To this chain is attached two triangular frames, and to these frames are fastened a number of plows, so arranged at a certain angle as to turn the red-hot ore to the right and then to the left, and at the same time move it forward a little every time they plow through it. The heat arising from the lower furnace ascends to the upper hearth through the flues and ore shutters, and is brought to bear on the ore as it is discharged from the battery and fed to the furnace and moved forward by degrees by the plows, prepares it, or heats it up, evenly and gradually, ready for the chloridizing heat of the lower hearth. When it reaches the opposite end from where it is fed it drops through an opening or shutter to the lower hearth or lower furnace; from thence it moves in contact toward the discharge end and through the flames, a space of about seventy-five feet. As the ore is moved forward in contact with the first fires of

value—stamping it as the best reduction furnace in existence.

MINING SUIT.—H. S. Moore has filed a suit in the Twelfth District Court, against Isaac Yoakum et al., to recover possession of the Long Tom, Ophir, Gould & Curry No. 2, Cornelia McDonald, Josephine, Sam Patch, Mammoth, Ingomar and Isabel mines, known as the Long Tom mining property, quartz mills and other property, and \$75,000 for the withholding and use of the same. The plaintiff also prays for an injunction restraining defendants from working the mines during the pending of the action.

Owing to the stringency of the times and the heavy expense in conducting mining and prospecting operations, the Yellow Jacket mining company find it necessary to discharge the greater portion of the men in their employ at the present time and to reduce expenses in every way possible. Only enough men will be retained to keep the old works running and sink the new shaft.

Amador Mines.

We had the pleasure of a call this week from Capt. Beck, of Jackson, Amador county, and Mr. John Clements. These gentlemen have been in the city about 10 days in order to place some gold mines of Amador county. They have sold the Good Hope and Pioneer mines, near Jackson; both to Eastern capitalists. The mines have been bought and the money paid. Capt. Beck is now getting drills, pumps and other machinery, to go immediately at work to develop the properties for the parties to whom he has sold. Both gentlemen say they found no trouble in selling the mines, everything having been accomplished within the few days of their stay. The mines are rich and there is no doubt the investors will get a good return for their money.

Mr. Beck has also purchased one of W. C. Wilcox & Co.'s new pattern pumps for his own mine, the Bismarck, and will take it back with him. He is very much pleased with the appearance of the pump, and is sure it will do first-class work. At the Beck mine they have 46 feet of ore. This and the other mines were first worked by Mexicans, who, when they came to work in their shafts—four of them—gave up work. Mr. Beck is an old Lake Superior miner, and has been in Colorado, Utah, Arizona, etc., but thinks Amador county, in this State, has the best and richest mines he has met with. The prospects are better there, he thinks, for honest, legitimate mining, than any place he has seen. The gold mines are rich and only need intelligent development to make them very profitable.

The dry weather of the past winter has been favorable for quartz mining as they have been able to prepare everything for work, and have been less troubled with water than usual. Capt. Beck thinks the mines right at our own door would be more profitable investments than if our capitalists went further off. To get to Jackson you leave here on the C. P. R. R., at 8 A. M., and go to Galt station; from there to Ione, on the Ione railroad, and thence to Jackson by stage, arriving at 5 P. M. Any one owning mines in that vicinity, can run up at any time and see how they are getting on, and as communication is speedy, there need be no delays about work.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

They will commence opening a station at the 1900-foot level of the Ophir next week.

In the Justice, owing to the great size of the ore chamber, above the 400-foot level, the same being a perpendicular height of 125 feet, by 136 feet in length, the overhanging wall presses with such force against the timbers that the expense is very great; 600, 700 and 750-foot levels, north lateral drifts are still in a very promising condition.

They are using the Ingersoll drill in the Utah mine.

During the month of April the Manhattan mill reduced 573 tons of ore; assay value \$90,866.

They struck a new body of ore in the Ready Cash of the Steptoe Con. Co., which is somewhat different and better than any heretofore found in the mine.

All the various ore stopes in the California mine are looking well. They are producing some 515 tons daily.

The south drift on the 1650-foot level of the Con. Virginia is being advanced as fast as possible, but will require some days yet to reach the deep winze. The rock is hard and heat intense.

The face of the north drift of the Advance is said to be in pay ore.

They think they have good prospects for a large body of ore in the DeFrees mine.

In the Yellow Jacket mine what little water is found in the bottom of the winze below the 2040-foot level is sent up to the 1740-foot level by a pump worked by compressed air, from which point it is sent to the surface by the main pump. A syphon is now being put in to run the water from this point across through a drift to the 1850-foot level of the Crown Point and Belcher pump shaft. If this should be successful it will do away with the necessity of running the heavy main pump of the Yellow Jacket. The idea is to run the old works as cheaply as possible, and yet keep the prospecting of the mine going forward, while the new shaft is being sunk.

The yield of the California mine in April was \$1,558,722.44, of which \$817,046.56 was gold and \$741,674.88 silver.

The flow of water in the Crown Point has been so great in the face of the drift, on the 2000-foot level, that it has not been safe to attempt its advancement during the past week. In the meantime, however, the northeast drift on the same level, which will cut the ledge diagonally with its main course, has been advancing through a stratification of quartz and porphyry identical with that developed in the east drift. This drift will also soon have to stop as it will not do to tap the water at two different points at the same time. The quartz found in the face of the northeast drift assays from \$5 to \$7 per ton, being identical with that first struck on that level.

The Great Suspension Bridge between New York and Brooklyn.

The work of arranging, testing and preparing for the laying of the wires of the main cables is steadily progressing, and is watched with much attention by engineers and others interested in this remarkable work. As a matter for convenient reference, we subjoin the following epitome of principal facts and dimensions:

Construction commenced, January 2d, 1870.
Length of river span, 1,595 feet, six inches.
Length of each land span, 930 feet (1,860 feet.)

Length of Brooklyn approach, 971 feet.
Length of New York approach, 1,562 feet, six inches.

Total length of bridge, 5,989 feet.
Width of bridge, 85 feet.
Number of cables, four.
Diameter of each cable, 15½ inches.
Each cable consists of 6,300 parallel (not twisted), steel wires, No. seven gauge, closely wrapped to a solid cylinder.

Ultimate strength of each cable, 11,200 tons.
Depth of tower foundation below high water, Brooklyn, 45 feet.

Depth of tower foundation below high water, New York, 78 feet.

Size of towers at high water line, 140x59 feet.

Size of towers at roof course, 136x53 feet.
Total height of towers above high water, 277 feet.

Clear height of bridge in center of river span above high water, at 50° Fah., 135 feet.

Height of floor at towers above high water, 119 feet three inches.

Grade of roadway, three and one-fourth feet in 100 feet.

Size of anchorages at base, 129x119 feet.
Size of anchorages at top, 117x104 feet.

Weight of each anchor-plate, 23 tons.
Estimated total cost of bridge, exclusive of land acquisition, \$9,000,000.

Estimated cost of land, say, \$3,500,000.
Total estimated cost, \$12,500,000.

Experiments Made by the Eastern Railroad Association.

The Springfield, Mass., *Republican* of recent date says: A very interesting series of experiments have been in progress on the Boston and Albany road the past few days by means of the dynamograph car of the Eastern Railway Association, in charge of P. H. Dudley, which has been run between Springfield and Worcester on both freight and passenger trains to test the relative amount of power required at different points along the road, especial reference being had to the Springfield and Charlton grades. The experiment on the Modoc train east, leaving Springfield at 6:30 A. M., which, on the day in question, consisted of two sleepers, four passenger and baggage cars and the dynamograph car, showed power required as follows: For the first 2,920 feet out of the depot the tension on the draw-bar was 6,526 pounds; for the next mile 6,460 pounds, the rate of speed being 32 miles per hour; for the next, 6,200 pounds, the speed being 36 miles; and for the last 1,100 feet to the top of the grade, 6,250 pounds. The last mile required the engine to produce 19,625,800-foot pounds of power per minute, the term foot-pound indicating the power required to lift one pound one foot. In going up the grade from East Brookfield to Charlton, beginning at the station the tension on the draw-bar for the first 3,880 yards was 5,722 pounds; for the first full mile, the velocity being 37.5 miles, 4,250 pounds; for the second mile, with 37 miles velocity, 5,232 pounds; third, with 36 miles velocity, 5,450 pounds; fourth, which contains a sharp curve, with 37 miles velocity 5,612 pounds; fifth, with 41 miles velocity, 5,230 pounds; and sixth, which ran a little past the summit at Charlton, 4,356 pounds. The engine had an 18 by 24 cylinder, and the track was in excellent condition. The maximum of the Springfield grade is 60 feet to the mile and the Charlton grade 51.47. At the sharpest curve the grade is about 49 feet. Similar experiments were made on a freight train of 27 cars drawn by the Adirondack, famous for her trials with the Mogul engine last summer, and showed that the tension on the draw-bar going up Springfield grade at a speed of 5.9 miles per hour was about 16,000 pounds, and the average strain going up Charlton grade at an average speed of about nine miles per hour was 14,500 pounds, the power required in the first instance being 84,840,000 foot-pounds. Near the top of the grade the power of the engine was tested by applying the brakes and it was found that, running at four miles per hour, the engine could exert a tension of 17,000 pounds. Beyond this point the drivers would slip and little progress was made.

Really, the most important experiments in which the Association is just now engaged are in testing the quality of iron and steel used for bridges, rails, axles and car wheels. Recent trials of the tenacity of iron used for various bridges and car axles indicate that much of the iron in use will only stand about two-thirds the strain which it is guaranteed to resist. For instance, some iron now being put into a new bridge at the East, which is supposed to stand a pressure of 60,000 pounds to the square inch, breaks readily at 40,000 pounds, and a car axle supposed to be equal to 110,000 pounds snapped at 70,000. When it is borne in mind that the calculations of bridge-building engineers are based on the guaranteed strength of the irons

the reason for the fall of iron bridges become, apparent at once, and, instead of wondering at an Ashtabula horror, the wonder rather is that it is not repeated.

The Eastern Railroad Association, which is making these experiments, is composed of all the railroads on the Atlantic coast north of Richmond, Va., and east of Pittsburgh and the Alleghenies, and was organized about 10 years ago, having for its object the investigation of the validity of patents and claims to royalties for the use of the same. S. M. Whipple, of South Adams, is the General Agent. The scope of the Association has naturally broadened, and it has been for the past few years largely engaged in testing the merits of various railway equipments with the idea of getting the best in every department. The dynamograph car is a curiosity in itself, containing, besides the dynamograph, which is a wonderful instrument, registering exactly the amount of power to pull a train, a chronograph which records the speed of the train every seven and a half seconds, an anemometer which registers the velocity of the wind, whether natural or caused by the motion of the cars, and a complete set of instruments for testing the hardness, tenacity, ductility, density and amount of carbon in rails, axles and the like.

The Dives Mine.

The Colorado *Miner* says: We have been down in the Dives—down and through and out by way of the Diamond tunnel, 650 feet below the surface at the discovery. A trip through this celebrated mine suggests enough to more than make a book; stories connected with the men and stirring times in the history of the Colorado silver mines occur to the mind, and one feels like he was walking over an old battle field. At present, however, we must be confined to the simple story of what you see in going through the mine.

Passing through a tunnel 730 feet long, you arrive at the engine chamber, which is scooped out of the rock, 24x30 feet, and timbered like an Episcopalian church, only the rafters are big pine trees. The engine and boiler are delightfully clean and bright—the engineer is evidently proud of his place. This is on the south vein of the Dives lode. Another similar chamber, but not so large, is found on the north vein, and the same boiler furnishes steam for both. One of these, the first, does the work for the Purdue company, or West End—the other for the East Dives.

We go into the East Dives first. The ladders are dry and safe, and we have time to look about as we pass from one level to another, reaching finally a depth of 520 feet. The material used in timbering is the best to be found in this county; the work done is first-class in every particular. It is surprising to find such good work with such a stormy history. The ore vein is never lost—its value and size changes, but it is always in view and always good and strong. Experts have estimated that it would average two feet through the entire workings, and to us this seems a reasonable conclusion. From the bottom of the East Dives mine we return to the seventh level, pass over into the Purdue mine, and descend to the bottom or to the level of the Diamond tunnel, and come to the surface again. This tunnel is over 1,200 feet long, and has only recently broken into the Dives mine.

We have now passed nine levels, having an aggregate length of 1,840 feet. The work at present is done from above by the two engines alluded to, which are each 45-horse power. The ore passes out through what is called the slide, which is substantially boxed up with heavy plank. An iron bucket attached to a large rope which runs on a great spool, regulated by a friction brake, lifts the ore to the engine room, and a car carries it to the ore house. In the various levels there are similar iron tracks—T-rails—and cars to carry the ore to the main shaft.

The Dives began to attract public attention in 1872. Since that time it has produced a million and a quarter of money. The ore deposit was not only large but rich, running as high as 300 ounces per ton, and as much as eight feet in width. In going down the deep shaft we passed solid blocks of mineral eight feet thick.

The west end of the vein is owned by an Indiana company (the Purdue) organized by John H. McMurdy in Lafayette, Ind.; the east by the estate of John H. McMurdy, John A. Logan and others. Hon. William A. Hamill is the agent and Superintendent for both. An immense amount of money has been spent in working this vein and has all come out of the ore produced. The pay roll of both concerns has been over \$25,000 per month; a whole forest of trees has been used up in timbering this mine; and an army of men employed in doing the work. At times every wagon and teamster in the county has been employed in hauling the ore to market.

The cutting of the vein by the Diamond tunnel ought to be a great benefit, but this will depend upon the good sense displayed by the parties in interest. Should they meet each other with reasonably conservative views, it will be a mutual good thing, and a great public benefit. Should the Pelican, Dives and Diamond tunnel consolidate, it would make the most valuable and productive piece of mining property in Colorado. The engines could be lowered to the Diamond tunnel level, and the vein explored to a depth of 1,000 feet below that point. Meantime, the reserve ground now above that

level would furnish the necessary funds, besides leaving a handsome profit to the owners.

Mr. Hamill's management of this property has compelled the respect and admiration of the general public, and those who have had the best opportunity to examine the mine are loudest in his praise. We cannot close a notice of this mine without a reference to one of the miners who has contributed much towards keeping it in good shape, M. T. Sandals, who has been a lessee on the Dives since 1872.

Manufacture of Ammonia.

In some cases the gases evolved in blast-furnaces used in manufacturing iron and the cyanogen combined with them are allowed to escape into the atmosphere, but in other cases they are conveyed in tubes under steam-boilers to generate steam. With a view the better to utilize them, Messrs. Israel Swindells, of Warrington, and Robert Lancaster, of Widnes, propose to inject superheated steam into the tubes containing the gases and cyanogen, either before or after they act on the steam-boilers, the steam, gases and cyanogen thus combined are passed through incandescent fuel, and the vapors thus formed are condensed by any well-known process to produce ammonia. In carrying out the invention, they take from any conveniently formed blast-furnace for smelting iron, the gases and cyanogen therein generated, and pass such gases in combination with highly superheated steam through any conveniently formed pipe or pipes into a closed and highly-heated iron retort or clay furnace, of suitable size and dimensions, and erected in a vertical or other position, into which incandescent fuel or other material may be inserted. In superheating the required steam, they prefer to adopt the means employed in iron-smelting furnaces for heating the hot blast.

The combination of gases thus emitted in the latter process are further conveyed through any convenient form of pipe into a solution of lime, cream of lime or other caustic base, when it is found needful to absorb all or any portion of carbonic acid which may exist in conjunction with the remaining gases. The residue of these gases are also further conducted through suitably formed pipes into a highly-heated closed vessel or chamber, filled with broken bricks or other material, to combine the latter gases and thereby produce ammoniacal gases, which gases may be passed through, cooled down and condensed in towers constructed of any convenient material, form and dimensions, into which broken bricks or other material may be placed, or by any other known process of condensation. In the manufacture of muriatic or other salt of ammonia, the muriatic or other acid must be poured into the top of the condensing towers to meet the ascending vapors, but without the use of acids, caustic and carbonate of ammonia may be produced. —*London Mining Journal*.

MINES SOLD.—Messrs. Alvin Potter and James Sallee have sold their mine near Teel's marsh to Dr. Webber of Virginia City, Mr. J. R. Murphy, and another party whose name we did not learn. Mr. Sallee informs us that the price paid for this property was \$55,000. For the past few months this mine has attracted considerable attention from the fact that it has been the chief source of the ore supply of the Gen. Thomas mill, where it has been worked to a large profit, and at the same time they have shipped their highest grade ore to San Francisco, with like good results. If the mine is really as good as it is believed to be by the many miners who visited it recently, the price paid is but a small part of its value, while at the same time it is by far the largest sum ever paid for a mine in this vicinity. Messrs. Potter & Sallee well deserve the success they have met. They have worked long and patiently, starting out with poor assays and good indications, they followed their prospect to success. We hope their good fortune will encourage other miners hereafter to stick to their claims until they develop mines which will command purchasers. Since the above was in type we have received a note from "Max" stating that the same parties also purchased the Comanche mine, in the same vicinity, from H. J. Keene. The company intend to build a mill for the reduction of the ore, and have put twenty-five men to work on the mine under the superintendence of J. R. Murphy, who is well-known in mining circles. —*Borax Miner*.

NEW SULPHURET WORKS.—To keep pace with the rapid development of the mineral interest in the northern part of the county, C. J. Garland is putting up sulphuret works, about half a mile from Drytown, on the road leading to New Chicago. The brick for the ovens is being made on the ground. The frame work consists of the building that used to stand on Sutter creek, previous to the construction of the large works near the Lincoln mine. Mr. Garland is thoroughly acquainted with the business of extracting the gold from sulphurets. During the many years in which he has carried on this industry in Amador county, he has given every satisfaction to the mine owners. While the Sutter creek establishment will still continue to be the principal place for the reduction of sulphurets, yet Mr. Garland is enterprising enough to retain the business in his own hands by throwing out branches in keeping with mineral development. The new works near Drytown will be a great accommodation to the mines of Plymouth, Drytown, and around the Grover mine and the lava beds. The item of freight to the Sutter works was so great as to

render the putting up of another reduction works only a question of time. Mr. Garland is shrewd enough to perceive this, and has moved in the matter with commendable promptness. —*Amador Ledger*.

Idaho Mines.

The Owyhee *Avalanche* says: From different sections of the Territory the reports we have relative to the prospects and progress of mining operations this season are quite satisfactory and cheering. While there will not probably be the usual yield from placer claims in consequence of the light snow falls during the past winter, there will nevertheless be a much heavier gold product than was generally supposed, and the present outlook is upon the whole rather favorable. A new impetus seems to have been given to quartz mining operations in the Basin, Alturas, the Heath district and other camps, and it is within reasonable limits to predict that bullion shipments from all the principal mining districts of Idaho will be larger the coming summer than they have been at any corresponding period for the past seven years. One of the principal drawbacks, to the success of mining operations here as well as in other parts of this Territory has been found to consist in the unsuitable character of much of the machinery in use at the mills. Much treasure has been lost from this cause which a different process of reduction, either by roasting or otherwise, might have saved. The attention of parties interested is being directed to this pressing want, and the requisite machinery is being gradually supplied at points where it is needed most.

In this immediate vicinity, the mining outlook remains about the same, with prospects rather cheering than otherwise. There is every prospect that the South Chariot, Empire and Poorman will be in full blast within the next ten weeks. There are fortunes to be made from the judicious working of any one of these mines, and it is a satisfaction to know that such valuable mining properties are not to remain idle much longer. Idaho has better mines to-day than any other country in the world.

A LOST GOLD MINE FOUND.—The great gold mine of Los Cristales, at Cauquenes, in Chile, which has been lost for 40 years, has been found by three Englishmen. It was abandoned at a time when the Chileans were shooting each other and trying to overturn the government. It then filled up with water and an avalanche slid into and over it, and confounded all the geographers for 40 years in regard to its whereabouts. Now that it has been found it will be worked again by English capital.

ADVICES from Victoria, B. C., state that on the 29th ult. the militia companies started for the scene of trouble at the Wellington coal mines, where the miners are on a strike. They went fully equipped for active service. The gunboat *Rocket*, with the Sheriff's party has gone also.

MAY DAY was ushered in at Eureka with eight inches of snow. The storm has been general throughout the eastern portion of Nevada.

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Continued from page 293.

Twenty carloads of ore were delivered at the Eureka Consolidated works yesterday.

HOOSAC.—We are pleased to announce that the efforts of Billy Wernuth to place the Hoosac property in the New York market have been crowned with success. Deeds, conveying the property to the Hoosac gold and silver mining company of New York, were yesterday filed in the office of the County Recorder. We have not been favored with the figures, but take it for granted that the price paid by the New York company was something handsome, as the Hoosac, in days gone by, was one of the most productive and best paying mines in this portion of the State. The reduction works of the company are also extensive and first-class. It will look like old times to see the Hoosac once more in full blast.

WHITE PINE DISTRICT.

LOOKING UP.—White Pine News, May 5: Mining matters in this district are improving. In the fore part of the week Superintendent Fulton put a force of men to work on his company's mines, on Treasure hill—the Ward Beecher Consolidated. He informs us that his company intends to thoroughly prospect their mines the coming summer. Colonel Tyson, of the '76, came up from San Francisco, and the company with intention to immediately commence the erection of a furnace for the reduction of their ores. These new enterprises, together with the old ones—the Eberhardt and Aurora and the Stafford—ought to improve the business of this district greatly the coming season. A very important strike has been made in the west incline of the Jennie A. This had been expected by Superintendent Ford before he left for the bay. Large ore body is now being opened out in this incline, which no longer leaves a doubt as to the true merits of the mine.

Arizona.

HUMBURG DISTRICT.—Arizona Enterprise, May 3: Upon the Tip-Top work is being vigorously carried on. The north shaft is now down 95 feet and the south shaft about 70. The face of the tunnel is in good ore, showing a vein of two and a half feet of antimonial ore and staphanite. There are between 200 and 300 tons of unassorted ore on the dump. About 20 sacks of the first-class ore, which goes over \$300 to the ton, have been sorted out. An average assay of the rock left, after assorting out the first-class ore, went \$221. There are 10 hands now working on the tunnel, taking out ore. This is rapidly rising into prominence as one of the very best mines in the country. The gangue of the mine is spar in formation of granite. Upon the Nevada, which is a small vein, some very high grade ore has been taken out. Three tons from this mine yielded \$670 to the ton. It is situated on Cottonwood creek, about three-quarters of a mile above the Tip-Top. Messrs. Huff & Park are working upon the Silver Star, which has been recently located, and are getting out some very high-grade ore. C. A. Carpenter located, last Saturday, the Jefferson and Robert Lee. The former is a very large ledge, and Mr. Carpenter had two high-grade ore, but the latter is of two different classes of ore from this mine. One sample went \$28.33 in silver and \$180.45 in gold, which is good enough for surface rock on a large vein. Upon the Rescue the shaft is now down 30 feet, showing an ore body of from two and a half to three feet in width, of good chloride ore.

RICH PLACERS.—Arizona Miner, May 5: We are informed by S. Lount, Esq., that near the Stone ranch, on Black Canyon road, several Mexicans are at work on a bar, and are making from \$1.50 to \$3 per day, and are compelled to carry their dirt, from which they wash the gold, about one-quarter of a mile. We are assured by Mr. Lount that the bar where these Mexicans are at work will afford employment for 50 men, six months, with rockers and other means of washing out the precious metal, and that good wages would certainly be the result. The last work done on the bar by white men was several years since, when they were making \$10 per day to the man, and only abandoned the work on account of the hostility at that time of the Apaches.

BIG STRIKE IN BRADSHAW.—We are informed by Mr. C. A. Luke, who is putting up a fine 10-stamp mill, in the basin at Bradshaw mountain, that his workmen have discovered, in the immediate vicinity, where he is erecting his mill, a large body of very rich silver ore. So far, it seems that they have found a well-defined lead, but rather a body of ore, where hundreds of tons can be procured with little expense. The ore is of a blackish color and has been passed over by miners and others, time and time again, without the slightest idea that it contained silver or any other precious metals, it being such a huge mass that no person would, for a moment, give it even a thought. We believe Mr. Luke has made a good investment in the mill, which he is putting up, and the finding of such large quantities of rich ore adjacent thereto is certainly very fortunate.

CEDAR VALLEY DISTRICT is looking up, and quite a number of miners are at work on the different ledges.

The Independence mine, on the Arnold ledge, which is considered one of the best mines in Mojave county, has been bonded.

MOJAVE COUNTY is fast filling up with good miners, and many new discoveries are being made.

PECK DISTRICT.—The Josephine, which was discovered and located a few days since, by E. Gobin and Thomas Holland, is said to be not only extraordinarily rich in silver, but also carries a large quantity of free gold. The Treasure Vault is also one of the latest discoveries, and shows well on the surface. Several loads of rich ore from the Salvadora mine passed through town on its way to the Arizona mill, which, the site of the old Bully Buena mill, for the purpose of working ores from different leads in that vicinity, started in to work on Friday last.

BLACK WARRIOR MILL.—The mill, which was purchased by Mr. S. M. Wessels, in San Francisco, for the Black Warrior mine, has arrived at Ehrenberg, and is there held by the steamboat company for freight.

RICH DISCOVERIES.—A Mexican recently discovered a lead about 50 miles east of Prescott, and located the same for himself and Mr. John G. Campbell. Assays have been made in the different assay offices in this village of the ordinary ore picked up on the surface of the lead, and each agree in putting the value at \$1,500 per ton. The lead is about six feet wide, and is traceable on top the ground for about a mile. The theme of this new discovery is the Mexican. Several parties have been out to this new discovery and made locations, and all agree that it is a "big thing."

DRY WASHING.—Fred Valentine, who has been engaged in dry washing in the Santa Maria country, for over a year, arrived from the placers last night. Mr. Valentine informs us that his new dry washer works to a charm, with the exception of the fire-place, which was too small and did not draw sufficiently to make a heat sufficient to wash the dirt containing gold. During a run of two hours he took out \$11.50. The machine saves 100% in labor. Where six men were formerly required, it now takes but three. Mr. Valentine has had greater experience in dry washing than any man in the Territory, having been engaged for a long time in the mines at the Picacho, on the Gila, and the mines east of Ehrenberg. He represents about 20 Americans as being at work in the placers, at the Santa Maria mines, and that they are all making fair wages. These mines are about 60 miles from Prescott and 20 from Greenwood. Mr. Valentine also informs us that Indian signs are everywhere to be seen.

Idaho.

MINING NOTES.—Idaho Avalanche, May 5: There is no change to record in connection with the mining outlook

here. The prospects for the season are not regarded by any means as unfavorable. As soon as the questions connected with the status and ownership of various mining properties in this vicinity are settled, men will be found who will go to work and aid in an honest development of the mines thus set free.

GOLDEN CHARIOT.—Work is being vigorously prosecuted and everything in and about the mine continues to wear the most cheering complexion. The work of drifting south on the Crane & Briggs ledge from the point of intersection with the cross-drift from the 6th Chariot has resulted in the opening up of a splendid body of high-grade ore, which improves in quality as the operations go forward. The vein grows wider and richer and promises to be of itself a bonanza of magnificent dimensions. The slopes are yielding well, particularly those going south from the winze between the 6th and 7th levels.

The excitement of the past few days has been the rich strike at the Belle Peck, which the workmen encountered on Monday morning. It is a genuine bonanza and no mistake, and comes to light just where Mr. Peck the owner of the mine promised and expected it would. The new development is about 800 feet below the surface, and 110 feet south from the shaft in the direction of the Poorman. Mr. Peck has had to have a large amount of money expended and a great deal of labor performed in order to reach the ledge at this point. Rock is now being taken out at a lively rate and there will be a crushing in a few weeks. This rich strike comes in the "nick of time," and is bound to wield an influence for the better on the welfare of the camp.

This prospects of the Empire as well as the Poorman loom up by the discovery of the rich lead in the Peck, and the Empire company will probably hesitate no longer in prosecuting an enterprise that is morally certain to yield them millions of wealth, and at a comparatively trifling outlay. The ledge at the Empire and in the vicinity is more liberally streaked with gold and carries a heavier proportion of the precious metal than is found in any other ledge in the country.

Work has been actively resumed in the Potosi, the surplus water has been removed and the mine is looking first-rate throughout. There is plenty of rock which will crush all the way from \$40 to \$100 to the ton, and a good season's work is anticipated.

Montana.

DEXTER.—Butte Miner, May 4: Nothing of special interest to report from the Dexter mill this week, the managers still supplying the works with low grade ore. A full set of new stamps and dies are soon to be put in, when a higher class of ore will be furnished, the present condition of the old ones being unfit for use in crushing ores of great value. The shipment of the week was four bars, valued at about \$4,000.

The prospecting that has recently been going ahead on the Uinta ledge claim gives assurance of this being one of the best leads in this camp, the last ore taken from the bottom of the shaft now being worked assays 697.70 ounces per ton in silver, besides showing free gold.

There are 32 or 33 men now employed on the Lexington ledge and five or six on the Copper ledge, the property of A. J. Davis. The Lexington shaft—the deepest one—is down 110 feet, and the water is coming in pretty freely. In fact hoisting works will have to be erected before sinking can be resumed.

One of the new plans was put in motion at the Davis last week and is now running and doing good work, increasing the capacity of the works about one-third and giving the battery nearly full run. The other plan, making five in all, and another settler will be ready to put in in about three or four weeks, when the amalgamating facilities will be increased to all the battery can possibly crush. The mill is now crushing about 10 tons per day.

PONY MINES.—Madisonian, May 3: We found Mallory's 10-stamp mill running night and day. The mill was running on custom ore, and, from all appearances, pretty good ore at the battery nearly full run. The other plan, making five in all, and another settler will be ready to put in in about three or four weeks, when the amalgamating facilities will be increased to all the battery can possibly crush. The mill is now crushing about 10 tons per day.

Mr. Gornley is preparing timbers for the erection of a quartz mill early in the season, and it is safe to estimate that before fall the number of stamps now in operation will be doubled, and there is ore enough for them all.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

FOR WEEK ENDING MAY 1ST, 1877.

190,146. KEY FASTENER.—L. W. Kennedy, Oakland, Cal.
190,210. HARROW.—J. B. Greene, Elliott, Cal.
190,217. REVOLVING ORE ROASTER.—J. Howell, Benton, Cal.

190,224. BUNG AND BUNG INSERTER.—W. Kromer, S. F.
190,225. WINDOW SASHES.—L. Landecker, San Luis Obispo, Cal.
190,234. DEVICE FOR ELEVATING EARTH.—G. E. Milliken, Los Angeles, Cal.

190,244. URINALS FOR INVALIDS.—R. H. Olmstead, Napa City, Cal.

190,245. VALVE MOTION AND CUT-OFF.—Eugene O'Neill, Oakland, Cal.

190,257. MEANS FOR UTILIZING EXHAUST STEAM.—W. H. Thomas, Wilmington, Cal.

The patents are not ready for delivery by the Patent Office until several days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

WINDOW SASH.—Lazare Landecker, San Luis Obispo. The object of this invention is to provide such a construction of window sashes that the panes of glass can be secured in place and removed and replaced whenever desired by any ordinary person, thus avoiding the necessity of employing a glazier to do the work. The improvement also allows the inventor to construct window sashes so that they can be taken apart and compactly packed for shipping after the manner known in commerce as "knock down" articles. The wood work can thus be packed in one package and the glass in another, saving expense not only in the cost of shipping, but also reducing the liability of breaking the glass. The invention consists therefore in constructing the mullions of the sash with simple grooves in which the edges of the panes of glass fit, and in providing slots in the edges of the

outside rails of the sash opposite said grooves, through which the panes of glass can be slid into place in the manner of a drawer. A filling is thus secured in the slot in the sash rail so as to prevent the glass from coming out. In order to render the removal and replacing of the panes more convenient and to permit the sash to be "knocked down" for shipping, the mullions are made in sections so that they can be taken to pieces.

DEVICE FOR ELEVATING EARTH.—Geo. Milliken, Los Angeles. This invention relates to that class of machines which are intended to elevate earth, sand or any other material, and which consists of an endless belt or band passing over pulleys and provided with suitable elevating buckets. The improvement consists in a novel combination of an elevator with suitable operating gearing and shafts and a movable or adjustable crane, whereby the elevator can be shifted so as to work at any desired point within its reach without removing or altering the stand or support. The operation of the device is very simple, as it is only necessary to set it so that the lower end of the elevator belt will rest upon some part of the bank to be excavated, and set it in motion to raise the earth which may either be deposited into carts or upon an endless carrying belt by which it will be removed to any distant parts. The elevator belt may be moved from time to time to new points, and by swinging the arm of the crane around, work may be done in a large circle without changing the locality of the machine.

VALVE MOTION AND CUT-OFF FOR STEAM ENGINES.—Eugene O'Neill, S. F. This is a combination of mechanism for opening and closing steam and exhaust valves in a steam engine; the opening being effected gradually, until the valve has started from its seat, and completed rapidly, while the closing of the valve is controlled by the closing of a cam or cams, which are made to release the valve and allow it to drop, at any desired point in the stroke of the engine; the whole mechanism forming what is known as a variable cut-off. It consists in combination with the vertically acting valve stem, of a horizontally moving bar having a peculiarly shaped curve formed upon its upper side, whereby the lifting of the valve is effected; also in the employment of a cam or cams in combination with the stem so actuated that at any desired point in the piston stroke it will release the valve from the action of the elevating devices and allow it to fall and cut off any further accession of steam to the cylinder.

The Justice Mine.

The annual meeting of the Justice mining company was held on Monday last, and the old management re-elected.—Messrs. Schultz, Von Bargen, Sherwood, Phelan and Richard.

So many conflicting statements have been in circulation relative to this company, that the Directors concluded to give a full exposition of previous managements, as well as the present; and from the President's report we extract the following:

"The Trustees for the past year found the company laboring under financial difficulties of no small dimensions—its credit impaired, by reason of an immense debt, and the value of the company's property misrepresented by parties hostile to the management. To successfully carry the company through its financial troubles, without an appeal to the individual stockholders, was the intention of the new Board, themselves the actual owners of over one-half of the capital stock. That they would have succeeded, there is no doubt, but for unforeseen difficulties thrown in their way by parties who, for their own private ends, were constantly laboring to depress the market value of the company's stock and misrepresent the worth of its property. The Board finally decided to call on the individual stockholders for assistance to sustain the credit of the company, and assessment No. 19 was levied and collected, the total amount of which was \$525,000. This was the only assessment levied by the Board during the fiscal year, and the entire amount was applied in the reduction of the debt incurred by our predecessors in office. While engaged in arranging the affairs of the company in this city, the work of the mine was being pressed with all vigor, and so well were their efforts rewarded, that in less than six months the mine was changed from a non-producing to an ore-producing one, and has been steadily improving, until it ranks third among the ore-producing mines of the Comstock. All ores extracted by the company have been crushed by custom mills in close proximity to the mine, the management deeming it prudent to delay incurring a large debt for the purchase and erection of mills for the company's account until the continuance of the ore body had been fully demonstrated. This is nearly accomplished, and a short time only is required to demonstrate the fact that the Justice mine is a permanent one, and that the yield of ore will be measurably increased, thus enabling the future managers to place the company among the list of dividend-paying mines of the great Comstock lode."

The Superintendent reports that the total number of tons of ore extracted for the year just ended is 80,563½. No surplus of ore was carried over from the preceding year. During the same space of time there has been reduced at the various mills employed by the company, 78,338

tons, yielding bullion to the amount of \$1,755,411.37. This yield is about 80% of the assay valuation of the ore—no deduction having been made for wet ore. Now on hand at the mills and in ore house, 2,220 tons, valued at \$45,000. The entire amount of this ore has been extracted from the 400, 500, 600, 700, 750, 800 and 1,000-foot levels. The most prolific of which have been the 400 and 600-foot levels, these having proved more lucrative than levels below, they being comparatively new levels. On the bottom of the 700-foot level, and for a distance of 380 feet, a body of ore is developed, pierced midway by a winze running through a continuous and broken ore body to the 800-foot level. The present face of the north lateral drift shows a body of fair average milling ore, about 10 feet in width. The company's vein is incased within a fissure, ranging from 300 to 450 feet, with spurs of ore found in all directions, interspersed with clay seams and walls running a certain distance and then entirely disappearing. Invariably, these spurs of ore are small and contain a large percentage of silica, hence the great expense of mining.

The report of the Secretary showed the year's receipts to have been, \$2,617,137, of which \$1,755,411 was the gross product of the mine. They spent \$543,434 for salaries and wages; \$43,000 for hardware; \$63,221 for lumber; \$9,320 for wood; \$62,745 for interest; \$925,171 for reduction of ore, etc. The discount on bullion was \$127,723. An item of \$600,000 called "bills payable," in the disbursements, the Secretary explained included a debt of \$480,000 due for title and equitable rights in a certain quantity of Woodville stock held in trust for the company. Mr. Robinson wanted to know if the assessment of \$525,000, levied September 14, 1876, did not put the company square with the world. The Secretary replied that at that time the company owed about \$680,000, and no one of the management asserted that the collection of the assessment would make all claims good. He did say that it was hoped and expected at the time that the ore would pan out sufficiently well to make up the difference. But for the first six months of the fiscal year the mine ran behind in its expense account, while for the last six months there had been a gain of \$35,000. In reply to a question of economy in salaries and in the reduction of ore, the Secretary stated that as for his own salary it was \$150 per month; that up to last month \$12 per ton had been paid for crushing ore, while for the last month only \$11 had been paid. He did not know that it could be done for nine dollars, as suggested by one stockholder, or even for \$10, as suggested by another.

Confidence Gold Mine.

EDITORS PRESS.—With the mining community generally but little is known of the Confidence quartz mining property, in Fresno county. Until recently it was held by its actual discoverers, who, I might add, were simple, honest, hard workingmen, but inexperienced as to the true rudiments of mining to secure success. I visited the property on the 8th of last January, examined it and fully satisfied myself that it was not only a good but a most valuable property if properly engineered. This I communicated to my friends, chiefly Merced City men, who came up and purchased the entire property. The main shaft is in a three-foot vein the entire distance, except in shaft's bottom, where it has widened to four feet, all first-class ore. Our last crushing netted us \$154.22 per ton. This was rock taken out in our last sinking. We have a first-class water privilege for free milling power, and by last of June hope to have our new mill running in full blast. This section is in its infancy as pertains mining, but I predict the day is not distant when we shall see more enterprising mining men searching Mother Earth to rob her of her treasures than in the past. Our property has been valued by some gentlemen at \$500,000, but its actual value at present cannot be fully estimated. Up to the time of which I am writing no mine can possibly show a better prospectus than can the Confidence. Respectfully,

J. F. Cox, Supt.
Fresno Co., Cal., April 30th, 1877.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

HEMME AND LONG PLANO MANUFACTURING Co.—May 7th. Capital stock, \$100,000. Directors—A. J. Hemme, J. B. Frisbie, S. H. Long and W. C. Hemme.
PACIFIC PLUMBING M. & C. Co.—May 9th. Location—Hermosillo district, Sonora, Mexico. Capital stock, \$2,400,000. Directors—J. J. Mullen, F. T. Gilbert, L. Lanzwert, J. N. Thorne and O. Smith.

Sinking the Chollar-Hale & Norcross combination shaft is going forward at the rate of three feet per day, which considering the immense size of the shaft, is as good work as has ever been done in any mine on the Comstock.

"CRAZY HORSE" has surrendered to General Crook with 1,300 Indians, about 3,500 ponies and all the arms.

The working force at the Jefferson mine, Nev., has been reduced, but the mine has not shut down as reported.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

New Style of Portable Engine.

One of the new things in the way of machine making, which our readers will be interested to hear of, has been brought about by Mr. H. W. Rice, who is well-known as a manufacturer of portable engines. Not long ago Mr. Rice moved his works from Haywards, Alameda county, to this city and erected a commodious shop on Bluxome street, near the freight depot of the C. P. R. R., corner Fourth and Townsend. During a recent visit to the shop we saw upwards of 25 engines, straw-burners, wood and coal-burning, portable and stationary engines in various stages of construction. The most attractive looking engine we saw was a small-sized portable threshing engine with an entirely new form of boiler. Mr. Michener, foreman, says that this boiler has more heating surface according to its weight than any other portable engine of its size. The boiler is 36 inches in diameter, and has 28 tubes two and a half inches in diameter and six feet long, which would give 140 feet heating surface. There is a large ash pan underneath the fire. In the large size straw-burning engine the ashes fall on the bottom of the main flue, which allows a limited space, but in this new style of boiler about one-fourth of the lower side of the main flue is cut away its whole length, also about one-third of the length of the shell of boiler under the fire end. The ash pan is riveted under this portion of the boiler. This cutting away of the main flue allows it to come down so as to leave room for an additional row of tubes on top of the flue. This makes the boiler much lighter and equally as strong. These engines are all fitted with Michener's hollow valve, which Mr. Rice claims to be very valuable and economical. Steam is admitted to the cylinder at the end. The steam chest is very long. The space from the valve seat into the cylinder is only seven-eighths of an inch, and the length of port is the same as the diameter of the cylinder, which is (six inches). The cylinder stroke is 12 inches. The engine is on a bed plate.

The manufacturer tells us that great care is taken to make the boiler as strong as possible. It may be believed that the less holes in a steam boiler the better. Working on this idea, the glass water gauge, safety valve, spring balance, whistle, blower and steam gauge are put into the boiler and connected to one pipe. This requires only two holes to be made in the boiler. Both sides of the water space are connected by a pipe under the boiler, in which is placed the blow-off cock and a union connection. The fly-wheels of the engine are 36 inches in diameter and seven inches face, and made crowning, so that the belt will not blow off in windy weather. The engine is fitted with a Gardner governor. The wheels and pole are painted a very appropriate straw color, with black stripes; the boiler and smoke-stack black, and the engine is a bright red. The total weight is about 4,500 pounds. It is claimed to excellently adapted for hill work. It sets low on wheels, with wide tires, and will ride well on side-hills without danger of upsetting. It will run a 36-inch separator, and burn any kind of fuel desired by changing grate bars.

CHEROKEE.—A visit to this famous mining town a week or two since—the first for three or four years—shows but little change in the place, except in the way of washing out huge places in the face of Sugar Loaf hill and the butt end of Table mountain. The face of the claim seen from the valley, is that of Sugar Loaf. The much larger face washed out of Table mountain faces more to the east, and is visible from the valley. A narrow strip now divides what we suppose to be the upper and lower claims. Hydraulic giants are playing upon it, however, and giant powder is tearing it to pieces, and soon the operations of the Cherokee mining company will show a continuous line of washed gravel for a mile or more in length, and varying from a few rods to half a mile in width. Winding away down the ravines, to the dump in Messilla valley, extends the flume of the company, with their under-currents and other devices for saving the gold. The water, brought on to the claim by huge pipes and under a heavy pressure, is hurled against the bank with irresistible force and power. A large force of men are occupied during the day, working from 7 A. M. until 6 P. M., when a night shift is put on to attend the flume and the hydraulic chiefs, and the water is thus made to do constant service. Those who remember the amount of debris sent into the valley, and the hill whereon stood the store and hotel of Moore & McDaniels, can form some idea of the amount of earth worked out by this company. What will be accomplished in the future can only be estimated by the size of Sugar Loaf and Table mountains, and adjacent hills.—*Butte Record.*

The New York Gold Exchange, with the close of business on the 20th ult. ceased to exist. The business of the gold room will hereafter be under the charge of the New York Stock Exchange, and will be carried on in all particulars as now. At the time of dissolution there were \$123,000 in the treasury.

A few days ago the employees of the Virginia & Truckee railroad, between Virginia and Gold Hill, were notified of a reduction of wages from \$3 to \$2.50 per day. The Labor Union is taking the matter in hand, and have announced their intention of striking if the reduction is carried into effect.

General News Items.

ADMIRAL POPOFF will take command of the Russian armament in the Black sea.

At a recent meeting of American glass manufacturers, prices were advanced five per cent.

The largest carpet-mills in the United States, those of Dobson, at Schuylkill Falls, will close, thus throwing out of work some 1,400 hands.

ONLY about half of the canneries on the Lower Columbia are in operation, owing to the light run of salmon. The warm weather will soon cause a rise in the river, when the fish will commence running in great numbers.

The financial earnings of the Central Pacific railroad company for the first four months of this year, amount to \$4,734,600. This is an increase of \$111,000 over the corresponding months of last year.

A SPECIAL to the Union from Tucson, Arizona, says: Indian agent Clum left Hot Springs, May 1st, with 423 Indians for San Carlos. The military authorities of New Mexico and Clum, agree that a complete removal has been made.

The Grand Jury, in relation to the recent post office accident in New York, find nobody individually responsible, but charge negligence, inefficiency and inexperience on the Supervising Inspector and assistants, and recommend a thorough inspection of the whole building by experts.

The Archbishop of Quito was poisoned on Good Friday, at Panama, while saying mass, by means of strychnine introduced into the wine in the ceremony. There was great excitement and indignation over the sacrilege. The perpetrators have not been discovered.

EX-PRESIDENT GRANT, on his arrival in London, will have a special audience with Queen Victoria and be the guest of Disraeli and other eminent men. It is said that in deference to the high office he has filled, the Queen will pay him a visit.

The Postoffice Department has contracted with Clarence Van Tassel, of Dakota, for a mail service from Fort Pierre, on the Missouri river, to Deadwood, 180 miles, tri-weekly, until September 30th, at the rate of \$9,919 per annum. It is established in compliance with a general demand, to give the people of the Black Hills country direct communication with Yankton.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening last.

Professor Davidson read a paper on "Breakwaters and Harbor and River Improvements in Europe and Asia."

Dr. George Bennett, of Sydney, New South Wales, was introduced to the Academy, and called attention to a new beetle discovered in New Guinea, and other interesting points.

Prof. Davidson read a short essay on A. F. Goddard's objections to the treatment extended to his theories of the transit of Vulcan, maintaining that they were baseless.

The following resolution, prepared by Henry Edwards, Esq., was read and adopted (Dr. Kellogg in the Chair *pro tem*):

WHEREAS, Under the laws of the State establishing the University of California, in addition to certain State officers, who are made Regents of said University *ex officio*, the President of the State Agricultural Society and the President of the Mechanics' Institute, for the time being, are also made Regents, by virtue of their official positions in said societies; that through in-advertence or otherwise, the California Academy of Sciences, an independent organization, founded before either of the foregoing, and whose objects and transactions cause it to be more nearly related to the University than the other societies named herein, though honorably recognized by the leading scientists and by all of the prominent scientific societies and institutions throughout the world, has no formal recognition by the State or representation in said Board of Regents; and

WHEREAS, Said Academy cannot be legally and authoritatively placed in the same position as the said Mechanics' Institute and State Agricultural Society without an amendment of the organic law upon which said University rests; therefore,

Resolved, That the California Academy of Sciences respectfully, but urgently, requests his Excellency, Governor William Irwin, to appoint Professor George Davidson, President of the Academy, as a member of the Board of Regents, to fill the vacancy created by the death of the late Hon. John B. Felton, and unhesitatingly recommend said appointment as being honorably just to the Academy of Sciences, and creditable alike to His Excellency and to Professor Davidson, whose education, ability and enthusiasm make him an eminently fit man for the place and for the interests of the University.

Gold, Legal Tenders, Exchange, Etc.

(Corrected Weekly by SUTRO & Co.)
SAN FRANCISCO, May 9 3 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 94@95. SILVER, 57@58.
Gold in New York, 107.
Gold Bars, 88@90. SILVER Bars, 10@15 per cent. discount.
Exchange on London bankers, 49; Commercial, 49; Paris, five francs @ dollar; Mexican dollars, 94@95.
LONDON Consols, 96; Bonds, 102.
QUICKSILVER IN S. F., by the flask, 41@42.

METALS.

WHOLESALE.]

THURSDAY, M., May 10, 1877.

IRON—		
American Pig, ton	32 00	@33 00
Scotch Pig, ton	32 50	@34 00
White Pig, ton	31 00	@—
Oregon Pig, ton	—	@—
Belgian Pig, ton	—	@—
Horse Shoes, keg	5 00	@51
Nail Rod	—	@71
Norway, Oval	—	@—
Roller	—	@—
Copper—		
Copper Tinned	37 00	@40
Sheeting, lb.	37 00	@40
Sheeting, Yellow	21 00	@22 1/2
Sheeting, Old Yellow	10 00	@11
Composition Nails	—	@—
Composition Bolts	24 00	@—
STEEL—		
English Cast, lb.	14 00	@25
Anderson & Woods, ordinary sizes	16 00	@—
Drill	16 00	@—
Flat Bar	15 00	@20
Plow Steel	84 00	@121
TIN PLATES—		
10x14 C Charcoal	9 00	@9 50
Banca Tin	24 00	@—
Australian	19 00	@20
ZINC—		
By the Cask	11 00	@—
Zinc Sheet, 7x3 ft, 7 to 10, lb.	11 00	@—
7x3 ft, 11 to 14	11 00	@—
8x4 ft, 8 to 10	12 00	@—
8x4 ft, 11 to 10	12 00	@—
NAILS—		
Assorted sizes	3 25	@3 37 1/2
QUICKSILVER—		
By the lb.	42 00	@—

LEATHER.

[WHOLESALE.]

WEDNESDAY, M., May 9, 1877.

Sole Leather, heavy, lb.	26 00	@29
Light	22 00	@24
Jodot, 5 K, doz.	48 00	@50 00
11 to 13 Kil.	58 00	@59 00
14 to 19 Kil.	52 00	@54 00
Second Choice, 11 to 16 Kil.	57 00	@74 00
Cornellian, 12 to 18 Kil.	57 00	@70 00
Females, 12 to 13 Kil.	53 00	@57 00
14 to 16 Kil.	58 00	@62 00
Simon Ulmo, Females, 12 to 13 Kil.	58 00	@62 00
14 to 15 Kil.	56 00	@70 00
16 to 17 Kil.	72 00	@74 00
Simon, 18 Kil.	51 00	@53 00
20 Kil.	51 00	@53 00
24 Kil.	72 00	@74 00
Robert Calif, 7 and 9 Kil.	35 00	@40 00
Kipa, French, lb.	1 00	@1 35
Cal, doz.	40 00	@45 00
French Sheep, all colors	8 00	@15 00
Eastern Calif for Backs, lb.	1 00	@1 25
Sheep Roans for Topping, all colors, doz.	9 00	@13 00
For Linings	5 50	@10 50
Cal, Russot Sheep Linings	1 75	@4 50
Boot Lugs, French Calif, pair	4 00	@—
Good French Calif	4 00	@4 75
Best Jodot calf	4 50	@5 25
Leather Harness	58 00	@72 00
Fair Bridle	48 00	@72 00
Skirting, lb.	33 00	@37
Welt, doz.	30 00	@50 00
Buff	18 00	@20
Wax Side	17 00	@18

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This book is free from trash, and solid throughout; all its matter is intelligible to men of ordinary education, and all of it is valuable to miners.—*S. F. Daily Alta.*

In the several sections the work is eminently practical. Is very comprehensive, and contains a great deal of useful information which cannot be obtained from the previous books that have been written on these subjects.—*S. F. Daily Examiner.*

It affords a vast quantity of information as to the appearance and value of different ores.—*S. F. News Letter.*

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OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. TITIAN—San Francisco.
B. W. CROWLEY—Amador, Placer, Calaveras and Tuolumne counties.
G. W. McGREW—United States.
A. C. KNOX—Plumas, Sierra, Lassen, Placer and Nevada counties.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMBER—Sonoma, Marin and Mendocino counties.
A. U. STRONG—Lake, Napa and Solano counties.
W. D. WHITE—San Bernardino and Los Angeles counties.
ED. T. PLANK—Dakota Territory (Black Hills).
JOSEPH DIMMICK—Mendocino county.

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Mining and Other Companies.

Booth Gold Mining Company.—Location

of works, Auburn, Placer county, California. Notice is hereby given that at a meeting of the Board of Directors, held on the thirtieth day of April, 1877, an assessment (No. 2) of five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, No. 320 California Street, Room No. 3, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the fourth day of June, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on the twenty-fifth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors, GEO. R. SPINNEY, Sec'y.

Office, 320 California St., Room 5, San Francisco, Cal.

California and Arizona Mining Company.—

Location of principal place of business, 507 Montgomery Street, San Francisco, California. Location of works, Mohave County, Territory of Arizona.

Notice is hereby given that at a meeting of the Board of Directors, held on the third day of April, 1877, an assessment (No. 2) of two cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company, 507 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the thirtieth day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fourth day of June, 1877, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors, T. E. JEWELL, Secretary.

Office, 507 Montgomery Street, San Francisco, California.

California Fruit Growing Association.—

Location of principal place of business, San Francisco, California. Location of property, El Dorado county, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the 14th day of April, 1877, an assessment No. 4, of \$2.00 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, 331 Sansome Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 21st day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday the 9th day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, HORACE JONES, Secretary.

Office, 331 Sansome Street, San Francisco, Cal.

Consolidated Bonanza Silver Mining Co.—

Principal place of business San Francisco, California. Location of works in Eagle and Washoe Valley Mining District, Ormsby county, State of Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 19th day of April, 1877, an assessment No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Tuesday the 23rd day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 19th day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, WM. MARTIN, Secretary.

Office No. 19 First Street, San Francisco, Cal.

Dolores Consolidated Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Blasdel, H. G., Trustee	16	10,000	\$1,000 00
Blasdel, H. G., Trustee	17	5,000	500 00
Blasdel, H. G., Trustee	18	5,000	500 00
Blasdel, H. G., Trustee	19	5,000	500 00
Drexler & Co., Trustee	8	2,500	250 00
Fraser & Co., Trustee	9	10,000	1,000 00
Keene, J. R., Trustee	7	10,000	1,000 00
Talbot, W. C.	3	100	10 00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.

J. W. CLARK, Secretary.
Office, 418 California street, San Francisco, California.

Empire Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, War Eagle Mountain, Owyhee County, Idaho Territory.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-sixth day of April, 1877, an assessment No. 13, of \$1 (one dollar) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 330 Pine Street, Room No. 5, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the thirtieth day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the eighteenth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, W. H. MCCLINTOCK, Sec'y.

Office, 330 Pine Street, Room No. 5, San Francisco, Cal.

Excelsior Silver Mining Company.—Prin-

cipal place of business, San Francisco, Cal. Location of works, Potosi District, Lincoln County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-fourth day of April, 1877, an assessment of ten cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold and silver coin, to the Secretary, at the office of the company, 306 Post Street.

Any stock upon which this assessment shall remain unpaid on the thirty-fifth day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the eighteenth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, A. KOLLMYER, Secretary.

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Baths cleanse the system from Lead, Arsenical, Mercurial
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Wherever introduced, because it can be run with less
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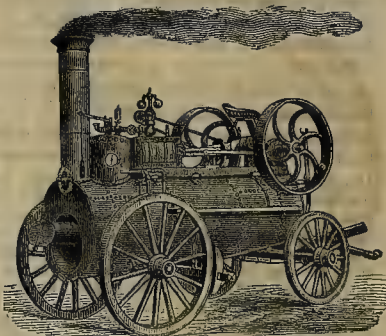
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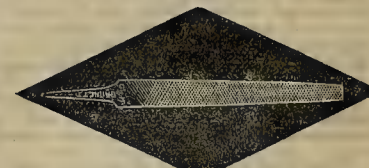
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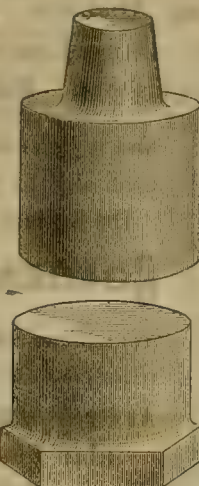
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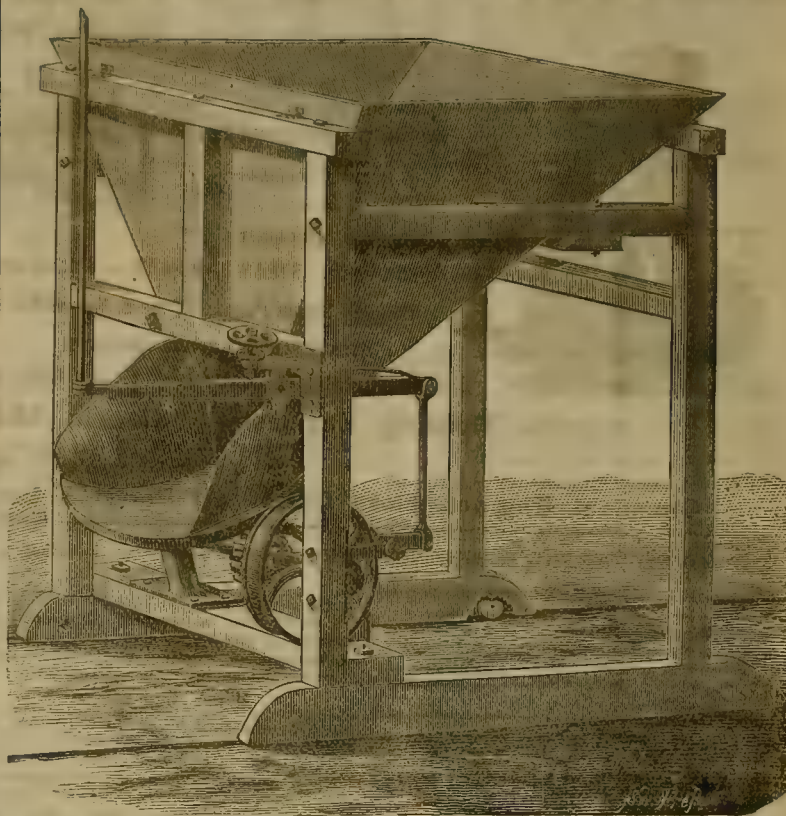
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A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them." A letter from Mr. C. C. Belding, of Amador County, speaks in the highest terms of them. Two of the machines were shipped to the Sunkers Hill Mill, also Gover Mill, Amador County. Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen. Soulsby Mill, Tuolumne County. California Company, Nevada City. Omaha Gold Mining Company, Grass Valley. St. Patrick Mill, Placer County.

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In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

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Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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We have superior artists in our own office, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, MAY 19, 1877.

VOLUME XXXIV.
Number 20.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

SEWING MACHINES.—Wm. A. Dawson, S. F. This improvement relates to that particular class of sewing machines in which two or more needles, operated by the same needle arm, are used for sewing two or more parallel seams. The needles used in this class of machines have heretofore been made stationary, so that the space between the seams could not be varied, whereas it is often necessary or desirable to run the seams closer together or farther apart according to the character of the work being done. This invention provides an arrangement for adjusting these needles so that the operator can set them to suit any character or class of work. The invention can be applied to any of the double-thread sewing machines now in use. In a shuttle machine the shuttle-races can also be made adjustable, corresponding to the adjustment of the needles; but the inventor has discovered that this is not necessary, as he can obtain a sufficient width of space for ordinary work by a simple adjustment of the needles, and the employment of a looper which will insure the passage of the shuttles through the loops, even when the needles are set at a distance from them. This invention provides an important improvement in this class of sewing machines by adapting each machine to sew parallel seams at varying distances apart as desired. Double seam stitching is now being generally adopted in sewing heavy materials, and this improvement is intended to adapt the machines for this work.

WINDOW SASH.—Reed, Hoagland & Newsom, Brooklyn, Alameda county. The nature of this invention is to provide an improved screen attachment for the upper and lower sashes of windows, so that when the windows are opened the screens will automatically and simultaneously be drawn across the opening and thus prevent the entrance of insects. The improved window screens are arranged to slide like drawers into vertical boxes or recesses in the casing or wall, one of which is arranged above and one below the window opening, so that the screens can be attached to and operated by the window sashes. For upper windows this screen is provided with a suitable frame on its two ends and upper edge, while its lower edge is attached to the upper rail of the upper sash, so that when the sash is lowered the screen will be drawn out of its recess so as to cover the opening between the upper rail of the sash and the top of the window opening. The lower sash is arranged a little differently but on the same principle, except that the screen is not attached to the window permanently, so that the window can be raised if desirable without raising the screen in the upper sash. However, it is a permanent fixture, and there are no detachable fastenings to give burglars a chance to get in at night in case the window is open.

TRACE FASTENER.—Chas. S. Crittendon, S. F. This improved trace fastening is intended more particularly for coaches or hacks, although it can be used on all classes of vehicles. Around each end of the whiffletree is made a groove as wide as the trace to be fastened on it. The end of the trace is formed into a loop to fit in the groove. Upon the trace is a metal or other loop which can be slipped up against the whiffletree after the trace loop has been placed in the groove, and thus by reducing the size of the trace loop it is made to clasp the reduced portion of the whiffletree so that it cannot get out of the groove. A strap keeps the sliding loop in place and holds the sliding loop up against the whiffletree, preventing the trace loop from sliding off the groove. This trace fastener allows the pull upon the trace to come straight from the whiffletree without cramping or straining any particular part of the trace, so that it will last as long as any other part of the harness, whereas, with the ordinary fastening now in use, the trace is cramped by the fastenings so that it soon becomes broken at that point, requiring to be frequently repaired.

The Knight Water Wheel.

The engraving which we herewith present of the Knight water wheel, shows a very plain and practical piece of machinery; but, notwithstanding its simplicity, it is said to give more power for a given percentage of water than any wheel yet invented. Possessing as it does so much usefulness at a comparatively trifling cost, we have deemed it of interest to our readers to thus represent it. The buckets and the rim of the wheel are one solid piece of iron, so that that there are no parts to become at any time disarranged. The buckets receive the force of the water in the center from a slotted nozzle with three subdivisions, and the discharge is instantaneous.

This wheel was patented through the MINING AND SCIENTIFIC PRESS Patent Agency in January, 1875, and within the past year has had an unusual run, particularly in Amador county in this State, where it is best known. This is shown by the following list of mills and hoisting works

Mining Co's mill, Amador Co., Cal.; 10 stamps. J. C. Goodman, Supt.

One 8-foot wheel, hoisting from 1300-foot level, Gwin mine, Calaveras Co., Cal. Wm. Gwin, Supt.

One 6-foot wheel, running St. Patrick's mill, Newcastle, Placer Co., Cal.; 15 stamps. John Townsend, Supt.

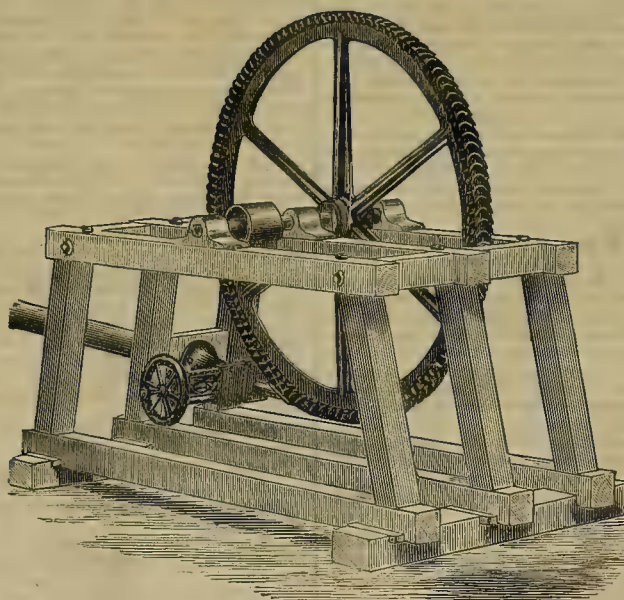
One 8-foot wheel, hoisting and running pump, compressor and hoisting at Sheba Silver Mining Co's mine, State of Nevada.

One 8-foot wheel, running 24-stamp mill, Green Mountain Mining Co., Plumas Co. C. G. Rogers, Supt.

One 4½-foot wheel, running Luck Q. M. Co. mill; 10 stamps; Oregon.

One 8-foot wheel, running No. 3 improved Burleigh Compressor at Pittsburg and California Gold Co's mine, Smartsville, Yuba Co., Cal. Jas. Watson, Supt.

By way of further explanation it may be stated that the wheel is a hydraulic pressure one, acting by force, instead of weight of water, though of course it gets the benefit of some weight. Parties who may be interested in such machinery can gain further information, and such particulars as they may desire, by addressing Knight &



KNIGHT'S IMPROVED WATER WHEEL.

which are now using the wheel, and which we give so that those interested may communicate with any of the companies referred to as to the actual work performed, amount of water used, etc.:

One 8-foot wheel, running Oneida Co's mill, Amador Co., Cal.; 60 stamps. Rob't Robinson, Supt.

One 8-foot wheel, running Con. Amador Co's mill, Amador Co., Cal.; 40 stamps and two Hepburn pans. David Davis, Supt.

One 8-foot wheel, running Lincoln Gold Mining Co's mill, Amador Co., Cal.; 40 stamps.

One 8-foot wheel, running pump at same company's mine. S. D. R. Stewart, Supt.

One 8-foot wheel, running Keystone Con. Mining Co's mill, Amador Co., Cal.; 40 stamps.

One 4½-foot wheel, used in hoisting by reversible water power at same company's mine. O. C. Hewitt, Supt.

One 4½-foot wheel, running Original Co's mill, Amador Co., Cal.; 40 stamps, one pan, and one rock-breaker. J. R. Johns, Supt.

One 8-foot wheel, running Gover Mining Co's new mill, Amador Co., Cal.; 20 stamps.

One 8-foot wheel, running same company's old mill; 10 stamps. John Palmer, Supt.

One 6-foot wheel, running Talisman Mining Co's mill, Amador Co., Cal.; 10 stamps.

One 8-foot wheel, hoisting and driving pump at same company's mine. John Tregloan, Supt.

One 4½-foot wheel, running Bunker Hill Mining Co's mill, Amador Co., Cal.; 10 stamps. John Palmer, Supt.

One 4½-foot wheel, running Gold Mountain

Co., Sutter Creek, Amador Co., Cal.; or Almarin B. Paul, agent for the wheel, room 20, Safe Deposit building, San Francisco.

MINING SUIT.—In the Supreme Court this week the hearing on appeal was argued and submitted in the case of Silas A. Stone vs. the Geyser quicksilver mining company et al. The grounds urged for a new trial are that the evidence which went to the jury clearly showed that he had acquired a title, which had never been forfeited, to the premises in controversy; that the title neither by mining rules or regulations had been rendered void nor abandoned intentionally; that all facts showed for the defendants were, that they audaciously and illegally intruded upon plaintiff and openly endeavored to improve him out of his estate by improvements deliberately made for that purpose, after due notice of his rights. The defendant set up no pretension to title other than by locations made in the fall of 1871, and later. Therefore it was claimed that the verdict of the jury in favor of the defendant was against the law and evidence, under these points. The admission of certain testimony and the allowing of certain instructions proposed by defendants to go to the jury, are also grounds for a new trial. The respondent's counsel argued a general denial, and reviewed the testimony of the case to show that the verdict was a proper one.

The Grand Prize company, of Tuscarora district, shipped \$6,518 last Monday; the Leopard shipped \$6,130.

The Crown Point Investigation.

There was a very large meeting of the dissatisfied stockholders of the Crown Point mine, held at Mercantile Library hall, on Tuesday evening. The meeting was called to order by Dr. Cachot, who stated briefly the object of the movement. The committee appointed at a previous meeting to investigate the affairs of the company, presented an elaborate report, which was read to the stockholders. They charge the Trustees with being guilty of the grossest mismanagement and carelessness. The receipts of the company during 1875 and 1876 amounted to nearly \$5,000,000, including \$750,000 in assessments, nevertheless the mine was in debt \$135,000 on the 1st of January last, and had ceased to pay dividends. It was reported that the water had prevented the working of the lower levels; but disinterested experts had informed the committee that the trouble from this source had been greatly exaggerated, and, from this and other circumstances, the committee had concluded that interested parties were trying to freeze out the stockholders and gain control of a valuable piece of mining property. At the time when the mine ceased to pay dividends, there was sufficient low-grade ore on hand in the drifts to keep the company's mill, which is one of the best on the Pacific coast, at work for 10 years, but instead of working it at a cost of \$7 per ton in their own mill, the company had sent it all to the Nevada mills, to be reduced at an expense of from \$11 to \$13 per ton. The committee explained this state of affairs by remarking that John P. Jones is the principal owner of the Nevada mills, and John P. Jones's brother is the Superintendent of the Crown Point mine, and what is more, John P. Jackson, agent for John P. Jones, is one of the Crown Point Trustees. The committee produced a letter written by the Superintendent, S. L. Jones, to the President, John D. Fry, on the 25th of last January, in which he says that he run the low-grade ores to the Nevada mills "because the mills were under heavy expense when idle, and he thought they should be kept employed." The committee were of the opinion that the mine had been worked in the interest of the Nevada mill owners instead of the Crown Point stockholders.

The committee are of the opinion that it was time a change was made and the mine run on a better basis, which is probably the opinion of almost any body who is in favor of economical mine management. As the books of the company close on the 25th instant, the committee request all stockholders to transfer their stock before that time, so that it can be used to turn out the present managers at the annual election. The committee stated that after the present assessment has been applied to the debts of the company there will still remain a debt of \$65,000, which will necessitate another assessment of \$1 per share, if a change is not effected.

The Crown Point mine made for itself in times past an enviable record as a bullion producer and dividend payer, and it is greatly to be regretted that it should have fallen into the list of assessment levying mines. Still, if the statements of the committee are to be credited, it is small wonder that the mine was unprofitable. It is the old cause of complaint over again, that the managers were looking out more for the interests of mills which they owned, than for the interests of the stockholders whom they represented. This sort of thing will continue of course, until the persons doing it are brought up with a round turn and properly punished. People will not stand any such nonsense much longer, and this special abuse, one of the greatest connected with mining matters on the Comstock, must be put a stop to summarily. Just at this moment when mining stocks are at a low ebb and the confidence of the people shaken in mining matters, it is a good time to bring the matter forward so that the practice may be abolished forever and a reform made in this as well as other things.

The Ophir mine report for April shows 642 tons of ore shipped to the mill; 410 tons worked, yielding \$11,731, or \$28.75 per ton, and 232 tons carried over into May account. Only one mill was employed last month on selected ore at a special rate of \$7 per ton.

CORRESPONDENCE.

Mining Items from Siskiyou County.

EDITORS PRESS.—We had a frost last night and ice this morning, a slight shower yesterday, cloudy to-day. Last Tuesday, the 1st, I paid a flying visit to Oro Fino, a little burg about 16 miles distant. Oro Fino, in 1862, was a flourishing mining town. There were five saloons in full blast, four stores, etc. The mines were then placer for gold, now quartz is all the go. There are several claims near the town that prospect well. Madam rumor has it that five or six mills will be erected there this summer. I found one store just opening; first they have had for four or five years, I am told. I expect to pay Oro Fino another visit soon, and, if I can find the time, will visit Quartz valley and the numerous mines in the vicinity, and may be, pick up an item of interest.

Last week, I had the pleasure of visiting South Fork. This is another old mining town, and is to-day one of the best mining camps in this vicinity. Some of the best claims are owned and run by Chinamen. I learn that all the claims are paying. My friend Cogings owns one of the best claims on the creek. The people here are as sociable and well informed as any I ever met, believing in living while they do live, and they surely enjoy life as they go along. I expect to visit South Fork in a week again, and will have more to say about it, the mines and people, etc.

Cory & Kingry passed, this afternoon, with two loads of quartz, bound for Johnston's mill, Oro Fino, to be crushed. They promised to let me know how it "panned out" as soon as the results are known. I picked up a piece of rock at random, and saw several colors in it.

R. D. NUNNALLY.

French Creek, May 7th, 1877.

Prospects of Eureka District.

In an interview with a gentleman prominently identified with mining affairs in this section, who has just returned from a business trip to San Francisco, we were informed that Eureka district is taking a rank in mining circles commensurate with the importance of developments made all along the line. He informs us that he was overwhelmed with inquiries in regard to the nature of the deposits, their extent and formation, and he has no doubt that a large flow of capital will be turned this way as soon as the market experiences a reaction. At present there is no money obtainable for the purpose of developing or working any mine, no matter how safe or profitable an investment it may be. People have become so frightened at the outlook that nothing will persuade them to let go of their purse strings. In this connection it is pleasant to note that Eureka stocks have not participated in the distrust, but instead have bravely held their own during the depreciation in values. Coming nearer home and feeling the public pulse on the situation, we are impressed with the general hopefulness expressed on every side. All concede the present stagnation, and admit the dull times, but while taking in sail to baffle the untoward winds, agree that it can be but temporary. Wait until the settlement of the suits, and you will see things booming, is the usual commentary, and that event is looked forward to as the end of all troubles, and the dawn of a better day. We are inclined to accept this view, and we think that no one can survey the district, and take into account the prospects and developments, without conceding the fact of its ultimate importance in the mining world.

The Ore Channel.

Commencing at the Hamburg on the south extremity of the vein as far as explored, we find a mine that in itself would, if situated in any other district, give it fame and prominence at once. We gave a mere sketch of a portion of the mine in our columns a short time ago, and our statements were not exaggerated in the least. The section of the mine that we visited was one mass of high grade ore from the grass roots to the lowest depths explored, and there is enough ore in sight, provided that no further developments were made, to keep four furnaces steadily employed in reducing it for the next 12 months to come. There are 2,000 tons on the dump, and teams are employed in transporting it from the mine to the furnace. On the completion of the hoisting works, stoping and extracting will commence, and the Hamburg will employ 200 men about the mine and works.

Along the Vein.

And a short distance to the north, lies the Connolly. The litigation that has retarded the development of this mine has been settled, and we believe that active operations will soon be commenced. It is a notorious fact that there is a large ore body uncovered, and the Connolly will soon become a bulwark producer of some magnitude. From the Connolly to the Dunderberg and Atlas is but a stone's throw. Here is another rich property that is involved in litigation. The mine is known to contain permanent and high grade bodies of ore, and the settlement of the question of title will set loose a stream of wealth from its shaft and levels. The Jackson is the next developed mine, and its lowest levels are teeming with ore awaiting the starting

up of the Eureka furnaces to add its quota to the bulwark product. The K K steadily turns out 60 tons of ore per day from the mine, and the smoke from its furnaces never ceases only when it is necessary to repair them. The Eureka Consolidated is too well known for us to comment on, or boast of. There is no doubt that there is more ore in sight and awaiting the labors of the pick and drill than has ever been found in its hidden depths at any previous time since its discovery. The settlement of the mining suit between it and its neighbor on the south will unlock treasures that will make the "Bonanzas" look to their laurels. The Richmond comes to the front with new discoveries in the western part of its mine, a section removed from all ground in dispute. No matter which way the suit will be decided, it will remain one of the chief mines of the district. Crossing over to Adams Hill, we find that mine steadily producing ore. Even the very low grade vein matter in this mine is valuable, from the fact that it is a splendid flux for the more refractory ores of other mines, and for that reason is sought for and purchased at the various furnaces at rates far above the usual prices allowed for ores from outside mines.

Prospect Mountain.

Thus in a general way we have alluded to some of the more prominent mines on the great vein that can be traced for a distance of five miles. Every one of them have the brightest prospects before them and will be adding their accumulated wealth to the coffers of the world in the near future. We have not taken into account the great ore deposit existing on Prospect mountain. That portion of the district is still in embryo, and although it has produced thousands of tons of high grade ore, yet it is a fact that the deepest shaft on the mountain has only gone down 280 feet. Such a vast network of veins and ore deposits is not to be found in any other section of the State, and of itself is sufficient to establish the fame of Eureka. It is not strange, that with all this wealth laying at our doors, that the abiding faith of the business men of Eureka in the permanence and future prosperity of the country should be firm and hopeful, nor that our district should meet with the recognition abroad that its splendid showing merits? Forty million dollars added to the grand aggregate of bullion produced by the State of Nevada is not a bad showing for seven years' work, and there is no reason why treble that amount should not be sent forth from the mines of Eureka in the next seven years. We predicate our statements and prophecies on what is actually in sight, and any one acquainted with the status of the mines will indorse us. A great vein, vast ore deposits, permanence assured by deep working, continued developments and the endorsement of those best qualified to judge, enables us all to tide over the temporary dullness caused by litigation, and not from any giving out of the vast wealth that nature has so lavishly bestowed on this portion of the base range.—*Eureka Sentinel.*

Milling Improvements.

The Virginia Enterprise says: The new tailings mill, known as the Omega, situated at the junction of Six and Seven-mile canyons, has been completed and will start up to-morrow. For the purposes for which it was designed, it is one of the completest and most convenient mills on the Comstock. It was built in accordance with plans and specifications furnished by Mr. Patten, architect, and, as will be remembered, is on the site of the old Gould & Curry mill, the engine itself resting on the old engine-bed. The mill is provided with 20 large-size pans and 10 settlers, and has a working capacity of about 200 tons per day. It will furnish employment for 100 men in all. The machinery is driven by a

Corliss Engine

Of 400-horse power. The engine, which is one of the finest on the coast, was purchased a short time ago from the Savage mining company. It cost originally \$60,000. The machinery of the mill is entirely new, and combines all the modern improvements tending to economy and convenience. The mill is supplied with tailings from the Consolidated Virginia and California mines, and has a set of sluices 1,200 feet long and 24 feet wide. It is also provided with three of Towle's concentrating tables. The owners of the mill chose for

Superintendent,

James Woodbury, who for several years past has acted Superintendent of the Mariposa mill, to the successful management of which Mr. Woodbury owes his appointment to the new position. The working of slimes and tailings involves a heavy expense in the line of chemicals, and a large amount of experience, skill and prudence on the part of the management to make the business at all profitable. The heaviest item of expense is for sulphate of copper, the consumption of which at the Omega for a month of 31 days, at 10 cents a pound, amounts to over \$27,500. There are required in addition from 15 to 18 car-loads of salt per month, with a daily consumption of quicksilver, amounting to 225 pounds, at 40 cents per pound.

Unhealthy Work.

The men employed about the mills, who receive the highest wages, are the amalgamators, owing to the unhealthy character of their work. Men are seldom found who are able to follow the business for a period of over two or three years, their systems becoming so thoroughly charged with mercury and other chemicals that

they become subject to the "shakes." After working in the open air for a time the poison is eliminated from the system. The high wages paid to amalgamators is the only temptation for a man to engage in the business. Among the amalgamators we noticed a son of Dr. Berthier, lately of this city. The

Pay-Roll

Of the Omega, for construction purposes for the past month, amounted to \$12,000; Mariposa mill, for labor, \$3,000. The chief engineer at the Omega is Joseph McNab, a young man well fitted for the position. The general manager of the new mill, as well as all the other mills running on Consolidated Virginia or California ore, is Mr. D. B. Lyman.

Other Mills.

All the mills in Six and Seven-mile canyons, with the exception of perhaps the Lady Bryan, are running—the Mariposa on tailings. The Land mill crushes 45 tons per day of Chollar rock; the Winfield 45 tons of Ophir. Parke's Railroad and Express mills are running on tailings; the Empire State mill on Chollar ore; the Nevada mill on tailings. The Sacramento mill, on the Geiger grade, is being thoroughly overhauled and will start up in a week, under the superintendency of W. J. Westerfield. The large mill known as the Eureka, is running on Justice ore; a majority of the smaller mills at Silver City being hung up for the present.

Wet Treatment of Silicate Ores.

The invention of Mr. Mieczyslas Kaminski, of Paris, relates to improvements in the wet treatment of silicate ores of copper, nickel, and cobalt, to obtain the metals or metallic salts. The natural silicates of the form $\text{Cu O Si O}_3 \text{ H}$ are treated with strong acid, which displaces the silica, and produces a soluble salt of the metal. The hydrate of silica, which results from the reaction, is also soluble. This silica is separated by dehydrating it at a dull-red heat. The heat ought to be such that the metallic salt will not be decomposed whilst the silica is dehydrated. The dehydrated silica, now being insoluble, is precipitated when water is added, and it is now only necessary to decant or filter and wash the precipitate of silica, and the whole of the metallic salt is thus separated; such is the system of treatment. Suppose that silicate of copper ($\text{Cu O Si O}_3 \text{ H O}$) is to be treated, the mineral is ground, and a quantity of sulphuric acid proportional to the amount of copper in the ore is mixed with it; it is then exposed to the air for the time necessary for it to form into a pasty and gelatinous mass. The magma is then placed in an iron pan, and submitted to a dull-red heat in any convenient furnace. The completion of the reaction is shown by the cessation of all volatilization vaporization of water or acid in excess in the magma. The resulting cake is treated with water; it disintegrates, the sulphate of copper dissolves, the temperature augments, the silica, which has been dehydrated by the heat, and has become insoluble, remains in the form of an excessively fine white powder. All that now need be done is to filter with bags, and a limpid liquor is obtained, which contains all the copper in the form of sulphate. The precipitate of silicate is easily washed without the necessity of agitation, so as to remove the last traces of sulphate of copper. The bags, if they are sufficiently large, can, before the final washing of the precipitate, receive successively large quantities of the silica. Sulphuric acid, nitric, hydrochloric, acetic, etc., may be used indifferently, but will produce the corresponding metallic salts.

If it be required to treat silicate of nickel, such as is found in the minerals of New Caledonia, having the composition of a double salt, silicate of nickel with the silicate of magnesia mixed with the oxide or the silicate of iron, the mineral in question is dissolved in muriatic acid of commerce, diluted with double its weight of water. For this operation the mineral should be finely powdered, and passed through a sieve. The quantity of acid should represent the equivalent corresponding to the nickel, the magnesia, and the iron contained in the mineral. The solution is made in stoneware vessels heated by an oil bath. The operation is complete when the residue, carefully washed, has lost its green color. The solution is allowed to settle and is drawn off; it contains chlorides of nickel, of magnesia, and of iron. After it has been allowed to stand for some hours the iron is peroxidized by adding an aqueous solution of chlorine, in such quantity that there may be chlorine equivalent to the iron requiring to be peroxidized. This quantity of chlorine will be quite small, for it has only to peroxidize the iron found in a state of protoxide. The rest of the iron exists as peroxides in the mineral. The iron thus oxidized is precipitated from the solution by carbonate of magnesia, the magnesia combines with the chlorine of the chloride, and disengages the peroxide. The quantity of carbonate of magnesia required is an equivalent of magnesia for each equivalent of iron to be precipitated. This carbonate of magnesia is obtained in a pure state from the mineral under treatment in the manner hereinafter described. Air is employed to agitate the liquid, and to remove excess of chlorine to prevent peroxidation of the chloride of nickel.

After that the liquid has been freed from carbonic acid by the action of the air or by agitation, the oxide of iron is found to be completely precipitated. After it has been left for about 12 hours the liquid is passed through a filter; it then only contains chloride of nickel and chloride of magnesia, and it is quite neutral. It

is placed in copper bowls, and carbonate of soda is added in quantity almost equivalent to the nickel contained, and it is heated. The carbonate of soda precipitates both the nickel and the magnesia in the form of carbonates, but the carbonate of magnesia becomes decomposed by heat in the presence of the chloride of nickel contained in the liquid, and returns as chloride into the solution, depositing the nickel in the form of carbonate. It should be observed that to avoid having carbonate of magnesia in the deposit it is necessary to have a little less soda than there is nickel in the solution. The remaining nickel will be recovered, as hereinafter described.

The liquid with the deposit is passed a second time through the filter press; the deposit, which is carbonate of nickel, is carefully washed with water free from earthy salts; then pressed, dried, and set aside for reduction with wood charcoal in a close crucible at a white-red heat continued for two hours or more. The carbonic acid of the carbonate of nickel, as well as its oxide, at this heat is reduced by the carbon forming oxide of carbon, which burns, leaving in the crucible pure metallic nickel mixed mechanically only with carbon, which separates from it when it is thrown into water. The nickel thus obtained in a spongy state is quite pure, and may be melted with other metals to form well-known alloys, or it may be employed in the metallic state. The liquid obtained from the second filtration containing traces of nickel besides chlorides of magnesia and of sodium is again treated by carbonate of soda for the precipitation of the rest of the nickel and of a part of the magnesia; it yields carbonate of magnesia and of nickel, which serves in the next operation for the precipitation of the iron, as has been already described. The remaining liquid, when submitted to evaporation, yields common salt, which represents all the soda employed as carbonate, the mother liquor (which is but chloride of magnesium) further evaporated and heated in stoneware vessels to a temperature of about 150°. Where a jet of steam is passed through the mass yields hydrochloric acid. The magnesia thus obtained is also a useful product.—*London Mining Journal.*

Uniting Iron and Steel.

It is well known that in employing either iron or steel for various purposes of manufacture, the result desired is frequently only partially attained; as, for instance, tools and other articles made entirely of steel, though possessing great hardness, do not combine therewith the requisite degree of tenacity, while articles made entirely of iron, though possessing great tenacity, are completely wanting in the necessary hardness and elasticity. These inconveniences can only be removed when both steel and iron are so intimately combined as to form a perfect union, whereby the deficiencies existing in either metal are atoned for by the qualities of the other. For this purpose Messrs. Asbeck, Osthann, Eicken, of Hagen, Westphalia, manufacture a mass consisting partly of steel and partly of iron, and which they call steel-iron. The novelty, if any, consists in introducing a thin plate of iron at the junction. A chill of cast-iron is divided into two compartments, either by a transverse plate or by standing a tube within it, and the metals to be united are poured into the separate compartments. Previous to fusion, both metals are refined and purified from all substances pernicious to their welding, after which the steel in fusion, as also the soft iron in fusion, are at the same time and in similar proportions cast into the divided chill, the dividing plate of sheet-iron in which welds both the steel and iron so intimately together that they form a perfect union, the sheet-iron serving at the same time not only as a preservative against the compounding of the two metals, but also as a means of their welding. The success of the proceeding depends greatly upon the careful and peculiar preparation of the materials and upon their quality and fitness for welding, as also upon the thickness of the sheet-iron plate, which must be sufficiently thick to resist the burning influences of the metals in fusion, and yet not too thick, otherwise the materials in fusion during their rising in the chill, will not bring the plate to welding. The requisite thickness of the sheet-iron is determined by experience, and the dimensions differ naturally in proportion to the transverse cut of the different blocks to be made. The steel and iron are placed on one or other of the dividing sheets or tubes, according to the purposes for which the mass is required. The combination is said to be applicable to various purposes. It is explained, for instance, that it will be advantageous to employ steel-iron for rails, anvils and armor-plates, as the hard steel will diminish the wearing; and armor-plates for safes, to render them burglar-proof, when made of this improved material, will, owing to the steel therein, resist the hardest drill, while at the same time the iron preserves such plates from all danger of fracture from blows. All such parts of machinery or tools as have either to resist or produce a strong pressure or strong concussion, such as rollers or axles, are greatly superior when made of this improved material, which combine great internal tenacity with external hardness. The wear of the external material is reduced to a minimum, whilst its internal softness gives it considerable tenacity, and prevents breaking.—*London Mining Journal.*

MECHANICAL PROGRESS.

Science and Practice in Building.

From an article on "Theory and Practice in Architecture," by James C. Bayles, in the current number of the *International Review*, we take the following, showing the need of progressive ideas in this department of industry: "Of the evils incident to cheap and temporary construction, the most serious are our heavy annual losses from fire. The valuation of the property annually destroyed by fire in the United States may be roughly averaged at \$100,000,000. In addition to this enormous destruction of values, we must bear the cost of fire protection systems and of insurance. As regards fire-proof construction, there exists no very close relation between the knowledge we have gained from experience and the methods and materials we commonly employ in house building. That so many buildings popularly considered fire-proof were destroyed in Chicago and Boston, and that in the furnace breath of those great conflagrations even the most incombustible materials fell in crumbling ruin, cannot be accepted as proof that it is useless to seek security from fire.

"It is too much to expect that there will ever be, in our average architectural practice, a close approximation to the measure of our scientific knowledge. If it follows, even a long way behind the footprints of invention and discovery, it will be as rapidly progressive as we can hope to see it. Generally speaking, we gain knowledge a good deal faster than we can apply it practically, and our progress toward higher standards in architecture will, and should be, characterized by a judicious conservatism. The material interests involved are large, and should be carefully guarded by the conscientious architect. We cannot, therefore, expect that he will make haste to utilize every new fact which may be added to the sum of the world's knowledge; but we have a right to insist that he shall not carry his conservatism too far, and cling to systems and methods entailing evils from which we naturally and properly look to him for protection. In these matters there should be a much closer relation than now exists between theory and practice in house building, and if the conscientious architect will first educate himself in those branches of his art in which the disparity is greatest, he will find it an easy task to bring about the desired reforms. In thus educating the public, by placing before them the results of his education, he will open for himself a broader and nobler field of usefulness, with fewer restrictions and limitations than now hamper him."

IMPROVED MANUFACTURE OF SAWS.—Circular saws of all sizes are now produced without hammering, and this, too, of a quality alleged to be superior to anything heretofore produced. By the ordinary method, the saw after being hardened and tempered, has been through the hands of smiths, hammerers and blockers, as they are termed, for the purpose of removing the irregularities, as far as possible, by hammering them with heavy hammers on anvils, leaving the saw, when complete, irregular in its tension—a source of continual expense and annoyance to the user, involving serious interruptions to business. In avoiding the system of hammering, and by means of improved processes and appliances, an article is now produced which possesses the great advantage of being entirely free from uneven strain or buckle—a result never before attained. The hammering process required the use of a very mild quality of steel, or the percentage of loss by breakage would be ruinous. By means of the improved process, a very high quality of steel is available, the result being that saws are produced which, by actual tests, hold an edge twice as long. The success of the process requiring a perfectly uniform heat, insures an absolutely uniform temper, and the same file and set in a more satisfactory manner. Being also free from uneven strain or buckle, they stand up to their work better than a hammered saw, and, as they are reduced in size, they retain their original shape or position. *Cincinnati Trade List.*

WIRE WORKING.—Iron says that a machine for corrugating or indenting iron wire for trellis work has been patented by Mr. P. Joannes. By means of this machine crude iron wire, in other words, not annealed, can be prepared for putting together in diamond-shaped or square lattice work, without riveting or twisting, as is the custom at present. Wire of unusual thickness can be used, up to, say, half an inch in diameter, and when prepared by the machine the lattice can be manufactured with great rapidity. No lattice work heretofore made can compare with the product of this machine in point of solidity, strength and durability.

INDUSTRY IN SOUTH AUSTRALIA.—Manufactures are extending rapidly in this colony. There are engineering plants, besides those of the government, of no mean order, boiler-makers, with steam-riveting machines and other machinery of the first order. There are no fewer than 86 agricultural-implement works, where large numbers of "strippers" are turned out annually. To these machines, South Australia owes very much, as without them wheat growing would not be of much profit; they save labor immensely.

Brains in American Machines.

A public dinner was recently given in Cincinnati to the Hon. A. T. Goshorn, Director-General of our late Centennial exhibition. In response to the toast, "American Industry," Mr. Goshorn made an interesting speech, from which we extract as follows: "The London *Times* is the expression of the highest public opinion, and therefore the best authority, in England. The leading article of the *Times* of March 1st is a discussion of the importance of the representation of England at the Paris exposition. It speaks of the superiority of the trained intelligence of the workmen of Germany and America—and so 'the competition at Philadelphia was not altogether satisfactory to us.' The fineness of the mechanical work shown at Philadelphia 'could not have been exceeded if every man who had any share in its production had originally conceived it and had been solely interested in its success.'

"The Thunder of London is right. There are brains in American industry. Why, the great Corliss engine at the Centennial exhibition had brains, for I saw it pick up its own valves and drop them when there was just steam enough on, and very few men can be trusted to do that. It had so much sense it would not waste one pound of steam, for it knew that steam cost money. American brains shine in the finish and fitness of the work that is commanding even the markets of Asia. It is the busy brain behind the cunning hand that guides the great artisan to perfect his workmanship, just as the colors of the artist must be mixed with brains if they are to be radiant forever.

IRON AND STEEL FROM THE ORE.—A European journal reports that at the recent meeting of the Technical Society for Metallurgists in Dusseldorf, engineer Blair made some remarks on this interesting topic, mentioning, among other facts, that this recently devised process had found greater application than that of Chenot, Gault or Siemens. After explaining the principles upon which the reduction of the ore was based, he remarked that the sponge obtained was melted in a cupola furnace and then mixed with molten cast-iron in a Martin's furnace. Unfortunately the sponge, as it floats on the surface of the cast-iron, is greatly subjected to the oxidizing influence of the air. The cost of production is about \$35 per ton, exclusive of the cost of the ore, and requires about a ton of combustibles per ton of iron. The product is said to be of the finest quality. Owing to the fact that the temperature in this process does not rise as high as in that of Chenot, Siemens and others, the phosphorus, sulphur, and other impurities are not extracted from their combinations in the ore, and consequently do not contaminate the iron. This utilization of poor ores makes the Blair process preferable to the others—although even in the Blair the quality of the product depends much on that of the ore, the best ores yield the best iron.

STEAM POWER.—Dr. Engel, the eminent and well-known head of the Statistical Bureau at Berlin, in a recent work estimates the labor saving effects of the steam motive power at present in use as follows: "The aggregate steam power in use in the world is at present three and one-half millions horse-power employed in stationary engines, and ten millions horse-power in locomotive engines. This force is maintained without the consumption of animal food, except by the miners who dig the coals, and the force maintained in their muscles is to the force generated by the product of their labor about 1 to 1,000. This steam power is equal to the working force of 25 millions of horses, and one horse consumes three times as much food as one man. The steam power, therefore, is equivalent to the saving of food for 75 millions of human beings. Further, three power-looms, attended by one man, produce 78 pieces of cotton fabric, against four pieces produced by one hand-loom, worked by one man in the year 1800. A carpenter's planing machine does the work of twenty men."

PROGRESS OF AMERICAN MANUFACTURES.—American manufacturers are penetrating Europe to such an extent as to cause a panic in a direction heretofore unheard from. They are sending soaps abroad in large quantities, which are selling there in preference to all others. American toilet soaps are replacing the French toilet soaps in their own markets. Partly on this account, as well as from other causes, there is a "soap panic" reported from Marseilles. There were 35,000 people employed there in that industry, and some of them are thrown out of work by the enforced idleness of the factories. American-made boots are making inroads upon Europe, and the clamor at the invasion is heard from the shoemakers of Switzerland and other continental countries. The Berlin *Shoemakers' Gazette* says that American boots are sold in Switzerland at \$2.90 per pair, and this has suddenly put a stop to the exportation of boots and shoes to America, by opening competition on their own ground.

LIFE OF CORNISH MACHINERY.—An interesting fact connected with the life of Cornish machinery was mentioned by Mr. West, at the recent meeting of East Caradon and Marke Valley mines. He said he had erected, about 40 years since, the first steam-engine on the mines, and it was now looking almost as good as new. The machinery generally was in very good condition, and would be of little expense for some time to come.

SCIENTIFIC PROGRESS.

The Physical Condition of Jupiter and Saturn.

Prof. R. A. Proctor comes to the defense of his views that Jupiter and Saturn are hot planets, and the *Polytechnic* has a summary of his claims. His view has been attacked by Prof. Vogel in an essay describing researches with the spectroscope as to the light of those planets—researches which have won for Prof. Vogel a prize from the Copenhagen Academy. The attack was based on the evidence that the spectra of bands and lines in those planets were similar to those of our own atmosphere, occasioned by the presence of aqueous vapor. Prof. Proctor argues with force against the conclusion that aqueous vapors constitute the chief envelope of the larger planets. According to the accepted theory of their formation, those planets are much older than the earth, but Professor Proctor shows, by estimate, have not yet had time to cool, owing to their enormous bulk. Their lack of density can be best explained by supposing that their condensation is still prevented by internal heat. Such atmospheres as they evidently have would be, unless continually expanded by heat, compressed and solidified by the gravity of such great masses. The cloud-belts present aspects and changes which can be explained best if we believe that they exhibit the surface of up-rusting heated vapors, with cloud-like summits. These clouds and belts bear no relation to the diurnal or annual exposure of the surface to the sun's rays, and hence their changes must be referred to local causes. The outlines of these planets have frequently been noticed as varying from a circular form, and a satellite occulted by the edge of the planet has reappeared briefly, just after concealment; such facts may be readily explained if the surrounding atmosphere is more than 2,000 miles deep and is subject to great mutations. Finally, the light of the planets is two and one-half times greater than that which pure sandstone would reflect; hence it seems probable that they produce light. Prof. Proctor thinks that those planets will not be in condition to support life for many millions of years.

DETERMINATION OF IODINE BY THE BLOWPIPE.—At a late meeting of the New York Academy of Sciences, a paper was read on this subject by Mr. Walter B. Devereux. The determination of iodine in the presence of the other halogens, chlorine and bromine, has hitherto been a difficult and uncertain operation in blowpipe analysis. Mr. Devereux takes advantage of the well-known property which sulphate of copper possesses, of decomposing metallic iodides and liberating the iodine. The substance to be tested is mixed with one-third its weight of pulverized sulphate of copper, and the mixture is introduced into a glass tube closed at one end and heated. The iodine is easily recognized by the violet color of its vapor, or by holding a piece of moistened starch paper at the open end of the tube, taking care that the paper does not become heated, which would destroy the blue color of the iodide of starch. This precaution is more especially necessary in the case of iodide of silver, which requires a high heat for its decomposition. At the close of Mr. Devereux's remarks, Professor Eggleston spoke of the great value of this test, and expressed the hope that equally simple tests might be found for chlorine and bromine when mixed together.

ELECTRICAL EXPERIMENT.—We find the following in the *English Mechanic*: If an ebonite electrophorus be whipped with a fox-tail, it is negatively excited, and the condenser gives positive sparks. If, again, the electrophorus be rubbed with leather on which is some mosaic gold, the ebonite disc is positively excited, and the condenser gives negative sparks. It is stated by M. Schlosser, however (*Pogg. Ann.*), that if the same ebonite disc be excited on one side with the fox-tail, on the other with mosaic gold on leather, one may at any moment obtain from the same disc positive or negative electricity, according as the one or the other surface of the electrophorus is used as the source. The most important point in this double excitation is the very much greater length of spark, as is readily observed by the eye. On the other hand, considerably shorter sparks are obtained from the same electrophorus when both sides are similarly excited; for example, whipped with the fox-tail.

THE DOG STAR.—From an examination of the observations of the minute star, around which Sirius is revolving, Mr. Wilson, of Rugby, concludes that its period of revolution is 200 years, in an orbit 50 times that of the earth. He also shows that while the sum of the masses of Sirius and its companion is about three times that of the sun, its light, according to the old method of calculation, is more than 200 times that of the sun.

COAL IN ALABAMA.—Dr. Eugene A. Smith, State Geologist of Alabama, in his report of progress for 1876, presents a new map of the Coosa coal field, from which it appears that at least 300 square miles of territory should be added to the previously-known limits of the coal measures. This is equal to five-eighths of the total anthracite areas of Pennsylvania.

The Gastric Fluid.

Dr. Charles Richet read a paper before the French Academy of Sciences recently, in which he treated of the acidity of the gastric juice in man. For some time Prof. Verneuil had a young patient under his care, who labored under the strange affection of having his oesophagus, or upper extremity of the alimentary canal so contracted as to render the passage not only of food or drink, but even of an instrument, quite impossible. The Professor had recourse to gastrotomy, an operation until then considered mortal, but which, in this case, succeeded perfectly. An incision made in the stomach, and kept open artificially, has been transformed into a regular fistula, through which food and drink are administered; and in this state the young man not only lives, but is a useful servant of the hospital. Dr. Richet, having devoted particular attention to this subject, and examined the working of the stomach day by day, through the fistula in question, last week communicated the results obtained to the Academy.

They are as follows: (1) The average acidity of gastric juice, whether pure or mixed with food, is equal to 1.7 grammes of hydrochloric acid per 1,000 of liquid. It has never been observed to be lower than 0.5 or higher than 3.2. (2) The quantity of liquid contained in the stomach exercises no influence on its acidity, which remains nearly invariable, whether the stomach be empty or filled with aliment. (3) Wine and alcohol increase the acidity of the stomach; cane-sugar diminishes it. (4) If acid or alkaline liquids be injected, the gastric ones tend rapidly to resume their normal acidity, so that, about an hour after the injection, the stomach has regained its average acidity. (5) The gastric juice is more acid during digestion than before or after. (6) There is a slight increase of acidity toward the end of digestion. (7) The sensations of hunger and thirst do not depend either on the state of acidity or on that of vacuity of the stomach. Such are the results as to acidity, but there are a few others of some interest. Thus fecula, fat and meat may stay in the stomach for three or four hours, milk is digested in the course of an hour and a half; water and alcohol are absorbed much faster, in the course of from 35 to 45 minutes. Food is not transmitted to the pylorus successively, but all in a block.

THE POWER IN NATURE.—The power actually at work at present in producing rain, and so, indirectly, in leveling the earth's surface, is enormous. The amount of heat required to evaporate a quantity of water which would cover an area of 100 square miles to the depth of one inch, would be equal to the heat which would be produced by the combustion of half a million tons of coal, and that the amount of force of which this consumption of heat would be the equivalent, corresponds to that which would be required to raise a weight of upward of 1,000,000,000 of tons to a height of a mile. When we remember that the land surface of our earth amounts to about 50,000,000 of square miles, we perceive how enormous must be the force-equivalent of the annual rainfall of our earth. We are apt to overlook, when contemplating the silent and seemingly quiet process of nature, such as the formation of the rain-cloud, or the precipitation of rain, the tremendous energy of the forces really causing these processes. "I have seen," says Professor Tyndall, "the wild stone-avalanches of the Alps, which smoke and thunder down the declivities with a vehemence almost sufficient to stun the observer. I have also seen snow-flakes descending so softly as not to hurt the fragile spangles of which they were composed; yet to produce from aqueous vapor a quantity which a child could carry of that tender material, demands an exertion of energy competent to gather up the shattered blocks of the largest stone-avalanche I have ever seen and pitch them to twice the height from which they fell."

SUGAR MAKING.—On the subject of sugar making, the Ipswich *Observer* writes: "Mr. Eastes, of Beenhedge, has made a most astounding discovery in sugar making. He claimed to be able to crystallize the whole of the juice and leave no molasses. He tested his discovery at Dart's mill, near Brisbane and the result was astonishing. He experimented on Chigacca ratoon juice marking 10° Beaume, and from 1,900 gallons was produced 2,400 pounds of beautiful white sugar, equal to the refined of Yengarie, and not a pint of molasses! It was finished in vacuum pans, and came out with only a little moisture, which the centrifugal soon removed. This is assuredly the precursor of a revolution in sugar making, and the magnitude of its importance is tremendous."

PRIZE FOR A METHOD OF DETECTING ADULTERATIONS OF BUTTER.—*Dingler's Journal* announces that the bureau of the Leipzig Pharmaceutical Union, offers a prize of 300 marks for discovery of a sure and practical method for the detection of adulteration of butter by other fatty substances. Professors Dr. Heintz, in Halle, and Dr. Knop, in Leipzig, have consented to act with Herr Kohlmann as judges in awarding the prize. Each competing essay is to be provided with a motto and accompanied by a sealed note, containing the motto on the outside and the author's name on the inside, and both are to be forwarded to Herr Kohlmann, apothecary, in Leipzig-Reudnitz, before September 30th, 1877.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Apr. 26.	Week Ending May 3.	Week Ending May 10.	Week Ending May 17.
Alpha.	143 113	121 8	111 63	81 57
Alta.	11 11	90c	50c	30c
Andes.	80c	60c	35c	50c
Baltimore Con.	25c	10c	15c	40c
Belcher.	61 5	5 3.50	4.50	31 2.45
Belmont.	1 11	11c	50c	30c
Best & Belcher.	213 191	204 11	164 104	10 74
Bullion.	8 64	64 1.40	3.70	11 2.00
Caledonia.	34 2.65	2.60	2.10	30 1.95c
California.	371 33	240 251	311 251	11 251
Challenger.	371 33	240 251	311 251	11 251
Chollar-Potosi.	39 341	37 27	33 20	211 153
Confidence.	5 4	4 2	3 24	21 153
Con Imperial.	1.25	1.05	60c	90c
Con Virginia.	353 32	35 21	21 27	221 221
Crown Point.	81 7	61 4	6 4.20	4.20 3.50
Coso Con.	10	10c	10c	10c
Dayton.	10c	5c	10c	5c
Eureka Con.	221 191	19 16	17 151	15 121
Eschschuer.	221 191	19 16	17 151	15 121
Geddes & Bertrand.	4.10 3.85	3.95 3.20	3.50	2 4 2.60
Gen Thomas.	20c	15c	30c	20c
Grand Prize.	20c	15c	30c	20c
Globe Con.	21 21	21 21	21 21	21 21
Golden Chariot.	21 21	21 21	21 21	21 21
Gould & Curry.	81 74	74 3.20	5 24	4.70 2.90
Hale & Norcross.	21 21	21 21	21 21	21 21
Hussey.	1.65 1.10	1.20 20c	1.05 15c	11 90c
Justice.	91 81	81 5	64 4	4.05 21
Jackson.	34 34	3 3	3 21	21 21
K K Con.	54 41	41 2	34 21	21 21
Knickerbocker.	54 41	41 2	34 21	21 21
Kossuth.	54 41	41 2	34 21	21 21
Lady Bryan.	2.20 2	2 11	1.20 90c	11 1
Lady Wash.	34 21	21 11	1.20 90c	11 1
Leopard.	50c	40c	30c	25c
Leviathan.	2.10 1.90	1.85 95c	1.40 95c	1 75c
Leeds.	2.40 2	2 40	3 5	2.40
Modoc.	71 71	71 71	71 71	71 71
Manhattan.	71 71	71 71	71 71	71 71
Meadow Valley.	94 84	84 4.90	7 5	4.80 3.20
Mexican.	35c	30c	15c	10c
New York.	25c	20c	15c	10c
Niagara.	19 16	151 131	151 131	14 12
Northern Belle.	4.60 4	4.15 35	4.05 31	34 3.10
Occidental.	151 141	141 91	131 81	81 61
Ophir.	24 19	181 91	131 71	71 4
Overman.	30c	25c	20c	15c
Pacific.	51 51	51 51	51 51	51 51
Phil Sheridan.	30c	25c	20c	15c
Pioneer.	30c	25c	20c	15c
Poorman.	35c	40c	25c	20c
Prospect.	15c	10c	5c	5c
Rock Island & Ely.	15c	10c	5c	5c
Sage.	31 21	21 10	18 13	15 11
Seg Silver.	4.10 31	31 2	2.60 1	1.25 75c
Sierra Nevada.	1.60 11	60c 15c	50c 10c	1.25 75c
South Chariot.	31 21	21 10	18 13	15 11
Succor.	65c	60c	50c	35c
Trojan.	4.35 41	41 2	3.10 2.50	2.55 12
Union Con.	12 101	11 5	7 5	61 2.90
Wells Fargo.	35c	20c	20c	20c
Woodville.	81 7	61 34	6 3.90	5 3.20
Yellow Jacket.	81 7	61 34	6 3.90	5 3.20

Sales at S. F. Stock Exchange.

FRIDAY, A. M., MAY 11.	370 Mexican.....	4.60 @ 3.20
220 Alpha.....	200 Modoc.....	23
230 Andes.....	245 Northern Belle.....	12 @ 13
1915 Best & Belcher.....	100 New York.....	10c
50 Belcher.....	100 North Con Virginia.....	5c
320 Bullion.....	730 Overman.....	41 @ 5c
1080 Con Imperial.....	115 Ophir.....	61 @ 6c
1515 Crown Point.....	3760 Prospect.....	25c @ 30c
1870 California.....	305 Raymond & Ely.....	3 @ 3.34
690 Con Virginia.....	1000 Seg Silver.....	35 @ 40c
255 Chollar.....	55c Seg Belcher.....	11 @ 13 1/2
70 Confidence.....	275 Savage.....	21 @ 24c
95 Caledonia.....	200 Trojan.....	40c
840 Challenge.....	735 Union Con.....	2 @ 2.81
1565 Gould & Curry.....	360 Yellow Jacket.....	2 @ 2.90
825 Hale & Nor.....	MONDAY, A. M., MAY 14	
1730 Justice.....	150 Andes.....	40 @ 30c
300 Julia.....	45 Alta.....	50c
70 Kentuck.....	220 Best & Belcher.....	10 @ 9c
125 Leviathan.....	1025 Best & Belcher.....	10 @ 9c
725 Mexican.....	400 Belcher.....	3
1000 New York.....	1150 Bullion.....	3 @ 2.80
635 Ophir.....	400 California.....	45 @ 50c
725 Overman.....	920 Con Imperial.....	45 @ 50c
350 Prospect.....	25c @ 20c	120 California.....
875 Savage.....	21 @ 24c	500 Chollar.....
355 Sierra Nevada.....	100 Con Virginia.....	21 @ 22c
15 Seg Belcher.....	150 Belcher.....	1 @ 60c
450 Trojan.....	370 Caledonia.....	1 @ 40c
755 Union Con.....	520 Eschschuer.....	1 @ 45c
155 Utah.....	830 Gould & Curry.....	4 @ 4.70
630 Yellow Jacket.....	80 Hale & Nor.....	1 @ 1.60
AFTERNOON SESSION.	1025 Justice.....	3 @ 3.85
715 Best & Belcher.....	445 Julia.....	11 @ 20c
50 Belmont.....	455 Mexican.....	4 @ 60c
575 Bullion.....	350 Morning Star.....	2 @ 70
470 Caledonia.....	300 Ophir.....	60c
695 Con Virginia.....	730 Overman.....	6 @ 53c
125 Chollar.....	210 Prospect.....	30c
1485 California.....	250 Savage.....	24 @ 26c
690 Crown Point.....	50 Seg Belcher.....	15 @ 14
760 Con Imperial.....	515 Sierra Nevada.....	1 @ 1.15
100 DeFrees.....	105 Trojan.....	40c
100 Eureka Con.....	750 Utah.....	51 @ 55c
80 Eschschuer.....	750 Union Con.....	21 @ 25c
100 General Thomas.....	515 Sierra Nevada.....	1 @ 1.15
2350 Grand Prize.....	220 Alpha.....	20c
430 Gould & Curry.....	220 Alpha.....	20c
55 Golden Chariot.....	495 Best & Belcher.....	91 @ 9c
40 Gila.....	100 Belmont.....	50c
155 Hale & Nor.....	440 Bullion.....	27 @ 26c
1425 Justice.....	570 California.....	27 @ 26c
300 Jackson.....	250 Caledonia.....	1 @ 3.30
1000 Leopard.....	545 Con Virginia.....	25 @ 25c
940 Modoc.....	400 Chollar.....	2 @ 2.60
400 Manhattan.....	100 DeFrees.....	1 @ 1.30
460 Mexican.....	200 Eureka Con.....	12c
485 Northern Belle.....	435 Eschschuer.....	1 @ 1.60
700 New Coso.....	400 Empire Id.....	25c
325 Overman.....	500 Grand Chariot.....	21
105 Raymond & Ely.....	400 Grand Prize.....	3 @ 3c
200 Rye Patch.....	785 Gould & Curry.....	4 @ 4.55
645 Sierra Nevada.....	100 General Thomas.....	20c
795 Union Con.....	100 Gila.....	20c
400 Yellow Jacket.....	800 Hale & Nor.....	1 @ 1.60
545 Yellow Jacket.....	905 Justice.....	3 @ 3.80
SATURDAY, A. M., MAY 12.	250 Leeds.....	25c
40 Alpha.....	100 Leopard.....	1 @ 1.11
250 Andes.....	170 Manhattan.....	61 @ 61c
230 Alta.....	295 Mexican.....	4 @ 4.4c
545 Best & Belcher.....	145 Modoc.....	2 @ 2.4c
220 Belcher.....	320 New Coso.....	13 @ 13c
100 Belmont.....	285 Northern Belle.....	12 @ 12c
2435 California.....	455 Overman.....	44 @ 44c
495 Crown Point.....	210 Ophir.....	71 @ 71c
2225 Con Virginia.....	110 Raymond & Ely.....	21
175 Chollar.....	300 Sierra Nevada.....	1 @ 1.15
1730 Con Imperial.....	50 Seg Belcher.....	13 @ 13c
75 Confidence.....	220 Savage.....	21
8145 California.....	225 Union Con.....	2 @ 2.30
50 Challenge.....	250 Utah.....	3 @ 3.20
10 Eureka Con.....	560 Yellow Jacket.....	4 @ 4.4c
890 Eschschuer.....	TUESDAY, A. M., MAY 15.	
930 Gould & Curry.....	170 Alpha.....	61 @ 71c
2760 Grand Prize.....	140 Andes.....	25c
10 Gen Thomas.....	345 Bullion.....	21 @ 25c
470 Hale & Norcross.....	300 Belcher.....	2 @ 2.60
155 Julia.....	895 Best & Belcher.....	8 @ 8c
1735 Justice.....	485 Con Virginia.....	23 @ 23c
85 Kentuck.....	340 Con Virginia.....	23 @ 23c
200 Leviathan.....	235 Confidence.....	2 @ 2c
300 Leopard.....	90 Caledonia.....	1 @ 1.10

1180 California.	231 @ 231c
380 Chollar.	17 @ 16c
475 Crown Point.	31 @ 31c
720 Eschschuer.	1 @ 40c
885 Hale & Nor.	1 @ 1.21
260 Julia.	1 @ 1.10
740 Justice.	34 @ 33c
20 Kentuck.	2 @ 2.30
250 Morning Star.	2 @ 2.05
440 Mexican.	4 @ 10c
280 Ophir.	7 @ 6c
710 Overman.	4 @ 6c
600 Prospect.	30c
600 Savage.	30c
110 Seg Belcher.	14
1075 Sierra Nevada.	30c @ 1c
200 Utah.	6 @ 6c
245 Union Con.	2 @ 2.05
265 Yellow Jacket.	4 @ 4.00
AFTERNOON SESSION.	
60 Alpha.	7 @ 7c
400 Belmont.	50c
245 Best & Belcher.	81 @ 81c
285 Bullion.	21
140 Belcher.	3 @ 2.95
1400 California.	231 @ 231c
310 Chollar.	17 @ 16c
210 Crown Point.	3 @ 3.05
200 Con Imperial.	50c
230 Caledonia.	11
300 Chollar.	17 @ 16c
210 Eureka Con.	12c
710 Gould & Curry.	4 @ 10c
350 Grand Prize.	3 @ 3c
50 Golden Chariot.	2 @ 2c
50 Hale & Nor.	1 @ 1.55
200 Eschschuer.	2 @ 2.10
70 Justice.	3 @ 3.00
200 Leeds.	50c
655 Leopard.	1 @ 1.10
270 Manhattan.	6 @ 61c
165 Mexican.	4 @ 4c
120 Modoc.	2 @ 2c
350 Northern Belle.	12 @ 12c
50 New Coso.	30c
160 Overman.	4 @ 4c
345 Ophir.	71 @ 71c
50 Prospect.	30c
55 Raymond & Ely.	21 @ 21c
35 Sierra Nevada.	1 @ 1.02
320 Savage.	2 @ 2.35
275 Utah.	61
245 Union Con.	2 @ 2.02
35 Yellow Jacket.	4 @ 4.00
WEDNESDAY, A. M., MAY 16.	
100 Alta.	25c
100 Andes.	25c

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M., MAY 10.	THURSDAY, A. M., MAY 17.
500 Alpha. 7 @ 24c	240 Alpha. 3 @ 81c
555 Andes. 20 @ 25c	70 Alta. 35c
850 Bullion. 3 @ 34c	120 Andes. 35c
100 Baltimore Con. 25c	510 Best & Belcher. 31 @ 31c
1415 Best & Belcher. 11 @ 11c	135 Belcher. 2 @ 2.70
160 Belcher. 31	135 Bullion. 2 @ 2.70
80 Crown Point. 41 @ 41c	1430 California. 24 @ 25c
1690 Con Imperial. 50 @ 55c	1345 Con Imperial. 45c
145 Confidence. 15c	60 Confidence. 21
1940 California. 27 @ 27c	35 Chollar. 15 @ 15c
985 Con Virginia. 27 @ 27c	795 Con Virginia. 24 @ 24c
50 Confidence. 21	50 Caledonia. 11
185 Chollar. 21 @ 21c	400 Crown Point. 4 @ 4.20
720 Caledonia. 1.30 @ 4.10	665 Eschschuer. 1.70 @ 5.90
875 Eschschuer. 1.60 @ 2.10	800 Gould & Curry. 4 @ 4.70
610 Gould & Curry. 4 @ 4.50	815 Hale & Nor. 1 @ 1.65
140 Hale & Norcross. 1.80	45 Julia. 1.10
955 Justice. 4.10 @ 4.20	1000 Justice. 4 @ 4.05
735 Kentuck. 2 @ 2.10	735 Kentuck. 2 @ 2.10
120 Kentuck. 21	45 Leopard. 1 @ 1.20
500 Leviathan. 15c	400 Morning Star. 21
500 Morning Star. 21	210 Mexican. 41 @ 41c
740 Mexican. 51 @ 51c	200 New Coso. 30c
345 Ophir. 91 @ 91c	235 Overman. 71 @ 71c
220 Overman. 71 @ 71c	515 Ophir. 71 @ 71c
615 Prospect. 25 @ 30c	450 Phil Sheridan. 31
50 Phil Sheridan. 41	900 Prospect. 40c
50 Silver Hill. 40	100 Raymond & Ely. 21 @ 21c
135 Savage. 2 @ 2.30	215 Savage. 2 @ 2.30
955 Sierra Nevada. 1 @ 1.10	770 Sierra Nevada. 1 @ 1.10
520 Utah. 41 @ 41c	20 Utah. 61
380 Union Con. 2.65 @ 2.65	575 Union Con. 2.30 @ 2.40
100 Ward. 10c	120 Yellow Jacket. 4 @ 4.05
280 Yellow Jacket. 4 @ 4.05	
AFTERNOON SESSION.	
420 Belcher. 3 @ 3.10	90 Alpha. 81
265 Bullion. 3 @ 3.20	1375 Best & Belcher. 11 @ 11c
45 Belmont. 30c	265 Bullion. 3 @ 3.20
210 Best & Belcher. 31 @ 31c	12180 Con Imperial. 50 @ 50c
300 Chollar. 17 @ 16c	150 Chollar. 20 @ 21c
65 Con Virginia. 27 @ 27c	120 California. 26 @ 26c
290 California. 271	120 Con Virginia. 24 @ 24c
500 Comanche. 21	215 Crown Point. 4 @ 4.20
120 Crown Point. 4.15 @ 4.20	310 Caledonia. 1.55 @ 1.61
150 DeFrees. 1 @ 1.15	50 Empire Id. 25c
130 Eschschuer. 11	450 Eschschuer. 1 @ 1.60
95 Eureka Con. 11	400 General Chariot. 1 @ 1.30
930 Gould & Curry. 4 @ 4.20	100 General Thomas. 20c
10 Golden Chariot. 21	1260 Grand Prize. 4.15 @ 9.80
250 Gila. 15c	285 Gould & Curry. 5 @ 5.80
1420 Grand Prize. 2 @ 2.00	365 Hale & Nor. 1 @ 1.65
150 Leopard. 3 @ 3.00	375 Justice. 4 @ 4.35
200 Jackson. 21	150 Jefferson. 55c
150 Kentuck. 21	360 Leopard. 1.40 @ 1.40
135 Leopard. 1 @ 1.05	200 Leviathan. 15c
415 Mexican. 5 @ 5c	50 Manhattan. 71
1180 Modoc. 2 @ 2.60	320 Mexican. 41
150 Manhattan. 21	280 Northern Belle. 12 @ 12c
370 New Coso. 31 @ 31c	505 Overman. 81 @ 81c
310 Northern Belle. 13 @ 13c	100 Panther. 10c
10 Ophir. 81	30 Raymond & Ely. 4 @ 4.20
200 Overman. 71 @ 71c	500 Rye Patch. 11 @ 11c
100 Rye Patch. 11 @ 11c	100 Savage. 10c
1590 Sierra Nevada. 95 @ 95c	185 Union Con. 2 @ 2.20
20 Utah. 41	190 Utah. 71
265 Yellow Jacket. 31 @ 3.90	145 Yellow Jacket. 51 @ 51c

New Safety Appliance for Mine Cages.

At the Brussels exhibition were exhibited several safety appliances for mine cages, which the *Colliery Guardian* describes:

The system of parachute, or safety appliance, designed by M. Charles Cousin, of Conde, permits of bodies launched into mid air, being stopped progressively without shock or damage, by means of a graduated series of weights which come into action successively, until a complete stoppage is secured.

This safety cage was entered in Class VI. (France), and received honorable mention from the judges; its principle was demonstrated to those interested in the matter, in the following simple manner: A cotton thread, passed over a pulley at a considerable height from the floor, carried at one end, and distant 80 centimeters (31 inches) from the floor, a weight of 100 grammes (3½ oz.), represented by a small glass quite full of water. The other end was provided with a graduated series of weights resting on the floor, but not fastened to it in any way. By pulling this end of the thread, the glass of water was raised to about 30 meters (98½ feet), and then left to itself. The glass fell, of course, like a bullet, with the normal velocity due to gravity, until within 80 centimeters of the floor, when it began to raise the weights at the other end of the thread, each one of them in succession being heavier than the last; so that the weight of the glass added to the velocity due to the height of fall, was gradually counterbalanced. As the thread could only sustain 100 grammes at each end, and the addition of the weight of a gramme on one side or the other, would cause it to break, it is evident that it did not experience a shake equivalent to one gramme, nor the least shock, since it did not allow a single drop of water to be spilled, and also resisted.

The application of this system to a mine cage is made as follows: Independently of the winding rope, a rope called by its inventor "the safety rope," passes over two pulleys above the pit mouth. Both ends reach down to the bottom of the shaft, and both are provided with a graduated series of weights, calculated so as to counterbalance the weight of the cage and tubs added to the impetus of the accelerated motion due to gravity. It is, therefore, evident that this series of weights would be a match for any fall that could occur. The safety rope is maintained at a certain tension by a supplementary weight placed over each series. The cages are provided with a simple wedge arrangement, which ensures the gripping of the safety rope, if the winding rope should break. It consists of a transverse lever, carrying the wedge at its end, and on the other side a spring which brings back this lever to a horizontal position when the tension of the winding rope is removed owing to its breaking. A kind of rectangular box is arranged over the wedge, and serves as a guide sliding over the safety rope in the normal state of working. In the event of the winding rope breaking, the wedge tightens itself in the box, it there closes more and more tightly on the safety rope on which it pulls with all the weight of the cages; but, as this rope, instead of being fixed, carries at its other end a graduated series of weights, it raises the latter in succession until it comes insensibly to rest. It is asserted that never, at any speed, has a small glass full of water, placed on the tubs, lost a drop of its contents.

To this safety cage is added a spring in the form of a horse-shoe, called by the inventor "a regulator of the winding rope." The object of this spring is to keep the winding rope constantly taut, when, on account of the settling of the measures, or any other cause, the cages are arrested in their ascent by too great friction against the guides. In such a case the spring opens and keeps the rope restricted, so as to prevent the spring of the safety cage from coming into action unnecessarily.

Lastly, a disengaging hook is added, which consists of an arrangement of five vertical wrought-iron rods, the middle one being connected to the winding rope so as to be released at the critical moment, but then only. The two outside rods represent a lever of the first kind, which carries a bolt, jointed at each end, and passing through the three middle olive rods; at the other end, which is curved in the shape of an olive, this lever is provided with a spring which keeps the bolt in its place. One of the bolts is placed higher and the other lower, their action being alternate and independent of each other. The result is that the middle rod cannot escape except on pressure being applied at both sides simultaneously. It is impossible to open it by pressing on one side only; nor will the fall of a piece of wood, a stone, or other object, effect the disengagement. Pressure on both the olive-shaped ends of the levers, at the same time is necessary to release it; and this can only take place in a kind of funnel, attached to the pit-head, through which the arrangement is drawn when overwound.

Arrangement for Ascent and Descent in Mines.

Herr W. Scharrath, engineer, Berlin, exhibited in the German department a drawing of an ingenious, though perhaps not very practicable method for the convenient ascent and descent of shafts by miners. It consists of an endless chain passing over two large drums with horizontal axis, one fixed at the top of the shaft and the other at the bottom. Between the two chains, and about six feet apart, are fixed platforms capable of holding two men each. These platforms are kept in position, both above and below, by short chains attached to the main

endless chain, and are so arranged as to be always outside the drums when passing over them. This arrangement is quite independent of the cages. The shaft is, therefore, divided into three compartments, throughout its depth, by two partitions. The principal compartment—that in the middle—serves for the cages, while the endless chain passes through the smaller compartments at each side.

Mining Outlook in Montana.

As mining is yet the chief industry of Montana, it is a subject that possesses more interest to the average citizen than any other; still but few, outside of their respective localities, have any very clearly defined idea of what developments are actually being made throughout the Territory. As there are no new discoveries in placer mines, the usual amount of gold only will be taken out, and if any increase is perceptible over the yield of last year, it may be attributed to the fact that the mining season opened 20 or 30 days earlier than usual.

In the Stemple district, Lewis and Clarke county, about 20 men are said to be taking out gold ore and running arrastras, while a number are engaged in erecting a 10-stamp mill, which will soon be in readiness. Those who are thoroughly posted predict that between this time and the first of December, when winter will cause a suspension of crushing machinery, \$50,000 will be taken out. The quartz is of such uniform quality that a certain number of tons will yield a certain amount of bullion. For quality of ore and ease of extraction these mines are the best that are opened in the Territory, and will continue to increase in production as more machinery is attainable, for there appears to be no indications that the supply of ore will not increase more rapidly than increased machinery is erected. It presents one of the best fields for capitalists to erect machinery that can be found in Montana.

The mines in Jefferson county, within a radius of 10 miles of Jefferson City, are being worked with a great deal of energy, and the developments show the lodes to be better and richer than has heretofore been believed. Several hundred men are constantly employed about the reduction works, teaming and extracting ore from the mines. It promises to be, if not the first, at least the second silver district in the Territory within the next two years.

Pony district, Madison county, is taking a leading position for the extent and value of its gold ores. Some 40 stamps are pounding away on rock that averages \$25 per ton. Several hundred men are employed in mining and milling these ores, and the number will be considerably increased as more machinery is erected. All the developments give encouragement of permanency, and the lodes are not less rich as greater depth is attained.

In the Vipond district, Beaverhead county, there is considerable activity manifested in the development of lodes, and there is a large quantity of high grade silver ores extracted. A mill on the Big Hole river, a few miles distant, is the only machinery employed to reduce the ores of that district, but it is understood other works will be in operation before the close of the season, when those mines will rank among the most productive in the Territory.

Butte district, Deer Lodge county, is assuming an importance rarely witnessed of late years. The mines seem to be permanent and they are unquestionably very rich. Three mills, a concentrator and several arrastras are the present reduction facilities, but it is asserted that several other reduction works will be in operation before the close of the year. A large number of men find remunerative employment at the mills and mines, and there is a great deal being done in the direction of the development of lodes that have as yet cut no figure as bullion producers.

At Bannack, Beaverhead county, a number of mills are running constantly with the most satisfactory results, and considerable ore is being taken out of the mines in that vicinity for reduction at home or for shipment to Salt Lake. At Glendale, in the same county, there are reduction works of considerable capacity, which turn out a large quantity of silver bullion. A furnace will also be run at Argenta this summer, on ores from the surrounding mines.

The above are the principal camps that are now turning out bullion, though it is possible that Phillipsburg will shortly be adding considerably to the bullion product of the Territory, while Cable, Radersburg, and the Brandon districts, will help to swell the amount. From this showing it will be seen that quartz mining in Montana is rapidly assuming very important features, and that in the near future the flow of bullion from the Territory will be equal to those of any other of the gold and silver regions, save California and Nevada.

A FRENCH authority according to the *Polytechnic Review*, recommends the use of sawdust instead of hair in mortar to prevent its peeling off. His own house, exposed to prolonged storms on the sea coast, had patches of mortar to be renewed every spring, and after trying without effect a number of substitutes, he found sawdust perfectly satisfactory. It was thoroughly dried and sifted through an ordinary grain sieve to remove the larger particles. The mortar was made by mixing one part cement, two lime, two sawdust, and five sharp sand, the sawdust being first well mixed dry with the cement and sand.

Quartz Mining.

A correspondent of the *Eureka Sentinel* writes the following practical suggestions:

The quartz silver mining question of this camp, and all other camps in the State of Nevada, is a subject of paramount importance to the mining interest. Failures in quartz silver mining are so frequent that many intelligent men who have traveled through the different mining camps of eastern Nevada have left us with an impression that no prudent man should engage in it. Occasional success, no matter how brilliant, is not enough to make an occupation a proper one for men generally. Those who command large capital, and can afford to lose the expense of opening a mine, building a mill or furnace are comparatively rare, and if the quartz mining of the future should be no better than that of the past, and if all should manage the business hereafter as the majority have managed heretofore, then none, save very wealthy men, should engage in it. We presume that there would be no exaggeration in saying that one-half the quartz mills in the State have been unprofitable, and caused serious losses to their owners. The Lemon mill, for instance, in this camp, rotting away because it is not used and of no value to its owners.

But after admitting all that can be said against quartz mining, we still claim that it is one of the best occupations in the world, and that it is capable of immense development, and the great civilizer, for without mining, men would only exist as barbarians. It needs, however, to be conducted on proper principles, otherwise it is extremely dangerous. More than any other business, it needs a well-educated and practical intelligence in the Superintendent, who understands everything about a lode. It is not enough to have a diploma as mining engineer; in addition to the training of the school he needs, above all, experience in the neighborhood, and, if possible, in the very mine where he is at work. General knowledge of geology is of very little use, and proficiency in Latin and Greek are of none at all. If the mines come to a fault, and the ore to a sudden end, the Superintendent should know in which direction the lode has been thrown and how to find it. Such a Superintendent, who should himself be interested in the mine, is the first requirement for safe lode mining. Many mines have succeeded without it, but twice as many might have succeeded with it. The capable Superintendent having been found, he will be very careful about spending the money intrusted to him. He will not presume that every quartz reef contains gold and silver, nor that a claim containing good ore in another lode is rich in his, nor that the occurrence of a rich specimen is a proof of a large deposit of pay ore. He will satisfy himself that he has found a prospect that will pay before incurring much expense, and if he finds neither silver or gold at the surface he will be skeptical about finding it further down. The safe method of procedure is not to build a mill or furnace until there is enough good ore in sight to leave a net profit sufficient to pay for it. There are many mines in Eureka district that will pay on these principles but they have not been properly worked. The many failures have discouraged their owners through the empirics who have been sent here to superintend them. It is almost as dangerous to engage in silver quartz mining as in the higher branches of chemical manufacture without proper knowledge, but with this, the prizes offered are splendid in both occupations.

Rocky District, Utah.

A correspondent of the *Salt Lake Tribune* says: For a long time it has been supposed that in Rocky district, 12 miles north of this place, there would be found a big copper mine of great value. The same has now been found, and the lucky finders are M. Sarault, Dan Severan and M. Atherton. These parties have kept steady at work and at last have been rewarded by the finding of a large body of copper ore that will assay over 50 per cent. copper, eight ounces silver, and about 20 per cent. iron. A new shaft is now being sunk to facilitate the extraction of the ores.

Leonard and Lyon are also developing some copper claims that are looking well, at Beaver Lake district, adjoining Rocky.

There is a rumor that parties in Salt Lake intend to erect a copper smelter in close proximity to these mines. Those who have visited the camp speak encouragingly of it.

In consequence of stormy weather (for it has stormed here for the last seven days) making the roads bad, two of the smelters have been obliged to shut down for the want of charcoal; but this trouble will be of short duration, there being plenty of ore in sight to smelt.

There is now a big stock of bullion lying on the dump of the Shumar smelter awaiting shipment north.

The Wasco and the Hoosier Boy mines are looking well, and improving every day.

PETRIFIED OAK.—Ashburne & Baker, whose hydraulic claims are at Scott's Flat, run across a great curiosity a short time since. After washing down to the depth of about 100 feet from the surface, they uncovered a petrified oak tree, which, by actual measurement, was 43 feet long and six feet through. It is said to be the largest and prettiest piece of petrification ever uncovered in that part of the country. The finest we have ever seen, of all shades shapes and colors, came from diggings in that part of the county.—*Nevada Transcript*.

Field for Prospecting.

We feel that too much attention cannot be called to this county as an excellent field for prospectors. Almost all mining experts who have come here of late, declare we have the richest mining county in the State, and most of our people are convinced of it. Since the pleasant weather began a large amount of prospecting is carried on, and, in fact, an unusual amount has been done on new as well as old ledges during the past year. This is the most favorable season of the year for prospecting either for quartz or gravel, and all who are idle would do well to go out on the hills and try to strike something that will pay. There is an immense amount of ground in the various districts of the county yet unprospected, and one man has as good a chance of making a "ten strike" as another. In the older mining districts of the county there are undoubtedly rich spots and unopened claims which need enterprise and industry, backed with capital to open them, and our merchants and men of means should lend a helping hand in having them thoroughly prospected. Every dollar and every hour's work spent in the development of the mineral resources of the county will result in the ultimate benefit of the county and the parties engaged in it. Some claim there is no certainty of making a strike, but in this respect other vocations are not much better than mining. Every business enterprise, and not a single exception can be named, is but an experiment, in which men venture money, in the hope, without a certainty, of getting it back. The farmer who sows his grain, and the merchant who buys a stock of goods, makes ventures which may result in success or failure. Crops fail and stocks of goods become invaluable, and in almost all kinds of business there is uncertainty. The prospector who finds his gravel pans out well, or who strikes a ledge, giving evidence of richness, takes no more chances in making it than men often do in other kinds of business. Every kind of industry requires earnest labor, constant attention and a knowledge of work to carry it on. With these requisites in view, give the miner a pick and shovel and turn him loose in this county and he will certainly make a living, and be more likely to get a fortune than in any other business.—*Nevada Transcript*.

Quenching Thirst.

Nearly 100 years ago, says *Hall's Journal*, Dr. Lind suggested to Captain Kennedy, that thirst might be quenched at sea, by dipping the clothing in salt water, and putting it on without wringing. Subsequently the Captain, on being cast away, had an opportunity of making the experiment. With great difficulty, he succeeded in persuading a part of the men to follow his example, and they all survived; while the four who refused and drank salt water, became delirious, and died. In addition to putting on the clothes while wet, night and morning, they may be wetted while on, two or three times during the day. Captain Kennedy goes on to say, "after these operations, we uniformly found that the violent drought went off, and the parched tongue was cured in a few minutes after bathing and washing our clothes, while we found ourselves as much refreshed, as if we had received some actual nourishment."

The bare possibility of the truth of the statement, makes it a humanity for any paper to give it a wide publicity, since there are few readers in any hundred, who may not go to sea and be shipwrecked.

We personally know that wading in water quenches thirst, and very few readers can remember being thirsty while bathing at the sea shore, or while swimming in our rivers. When the fearful horrors of dying with thirst are remembered, and the more fearful madness which is the certain result of drinking sea water to allay thirst, it is certainly well to encourage individual experiment in this direction, and solicit an authenticated report of the same.

CONCENTRATIONS AT DRY VALLEY.—Through the courtesy of J. R. Duff, Superintendent of the Meadow Valley mine and mill, we were enabled to pay a visit, on Thursday last, to Dry Valley, for the purpose of observing the process of concentrating the tailings belonging to that mill, which is now being done by Osborne and other concentrators. The advantage derived from concentrating is that the value of seven or eight tons of tailings may be reduced so that one ton will contain the entire valuation of the seven or eight tons, thereby saving enormous freights, if they have to be shipped for reduction, and also the saving of so much cost per ton in working. The process consists in having streams of water running through a portion of the tailings, a constant agitation being kept up, so that the heavy metallic portion falls to the bottom, whilst the refuse matter floats off. This agitation is kept up until, as we stated before, the seven or eight tons are reduced to one. At the Dry Valley mill about ten men are engaged at this process, shoveling, washing, etc. These concentrations have been shipped to Sacramento, Milford, York, Utah, and Salt Lake City, to see at which place they can be worked to the best advantage. Shipments are at present slow, owing to so few Mormon teams now coming to Pioche, the consequence of which is that about 130 tons of the concentrations are now at the mill awaiting shipment. These concentrations work \$120 per ton in silver, in addition to which there is 45 per cent of lead.—*Pioche Record*.

An Important Enterprise.

We have before alluded, says the *Eureka Sentinel*, to the Prospect Mountain tunnel as one of the most important enterprises ever inaugurated in eastern Nevada, if not on the Pacific coast. The tunnel is designed to pierce the very heart of Prospect mountain, at a depth of about 1,600 feet. The tunnel starts at the west base of the mountain and runs nearly due east. Its length, to reach a point immediately under the apex of the mountain, is estimated at 3,000 feet. A number of veins, however, will be cut long before this point is reached. Along the western declivity of the mountain, a great many lodes are known to exist, and it is not unlikely that others, which do not show an outcrop, will be cut. Work in the tunnel has been steadily prosecuted for some months, and the present contractors are said to be making excellent progress. The rock has been unfavorable, but a change for the better, we have no doubt, will soon take place. Within 100 feet from the present face, the Tyndall lode will be tapped, and thenceforward other ledges will be encountered at short intervals, straight ahead to the summit. One authority estimates 15 well-defined veins in direct line of the tunnel. Some of these are owned by other parties, but the tunnel location covers a vast area of mineral-bearing territory, the right to which is undisputed. There is some talk, on the part of those directly interested, of a grand consolidation of all the interests and claims pertaining to that particular portion of the mountain, and there is hardly a doubt that such an arrangement will sooner or later be consummated. This once accomplished, and the Prospect Mountain tunnel would become one of the most valuable properties of which we have any knowledge, in this section of the State. The old mountain has never been more than scratched on the surface, and still it has yielded, in a small way, it is true, a constant stream of the highest grade ore found anywhere in Eureka district. There is hardly a spot 100 yards square, on the whole mountain, where ore of good quality does not blossom to the surface. We all know that ore is not rained down from above—it must put out from below. Hence, the conclusion is irresistible that Prospect mountain, at a proper depth, is one vast storehouse of precious metals. It is to demonstrate this fact that the tunnel under notice is being run. The company is a local organization, composed of sixteen gentlemen, residents of Eureka. It is among the possibilities that Congressman Wren and Mr. Ricord, Superintendent of the Richmond, both members of the tunnel company directory, will, when matters are further along, make an effort to place the control of the property in the hands of English capitalists, visiting London for that purpose. The stockholders in the tunnel have the most unbounded faith in the great value of their enterprise, and whether or not extraneous aid is interested in the work, they are firmly resolved to prosecute operations until the very heart of the grand old mountain shall have been penetrated.

BLASTING BY ELECTRICITY.—The North Consolidated Virginia mining company have of late been using electricity to discharge the blasts put into the bottom of the shaft. This has been attended with the very best results. By this process all the blasts have been discharged at once and several times as much rock torn up as was loosened when the blasts were discharged in the usual way. The process is simple. The battery is placed in the drift above and wires descend to the bottom of the shaft. These wires are connected with the explosives by smaller wires and the circuit thus completed. A few turns of the battery sends the electric spark through the wires, exploding the detonators, which in turn set off the blasts and all at once. Superintendent Jackson reports the effects more than twice as great as when the blasts are discharged by the usual method. The company have sent below for a heavier battery which will be up in a few days.—*Virginia Enterprise*.

WARD DISTRICT.—The *Reflex* says: During the past week the affairs of the Martin White company have engrossed the attention of every one hereabouts to the exclusion of every other topic. The excitement incident thereto has about died out and a feeling of confidence has taken the place of doubt. That company's financial troubles are now at an end, and there is no room for a well founded belief that like embarrassments will soon confront the company again. Advice last evening set even the most shaky at rest. On the whole, Ward district has not suffered from what has occurred, but has been benefited thereby. The worst is over, the panicky rumors of the past week and a half only serving to bring this mining section prominently before the public.

CUPEL FURNACE FOR WARD.—The *Ward Reflex* says: We learn from undoubted authority that it is the purpose of the new management of the Martin White company to erect a cupel furnace immediately, and that it will be ready within thirty days. After its erection only fine bullion will be shipped, which will go through Wells, Fargo & Co. from that time on. Everything that is presented below in the shape of checks is being paid. Nothing more could be reasonably desired. The entire new Board of Directors are reported to be men of unlimited means, and we have every reason to believe measures will be taken looking to the energetic working of this company's mines.

USEFUL INFORMATION.

Hints for House Cleaners.

A lady drawing from a long experience in house cleaning arts has prepared an article for the *Prairie Farmer*. We select therefrom a number of hints which we believe will be useful to many readers:

Soot falling on the carpet from open chimneys, or carelessly handled stove pipes, if covered thickly with salt, can be brushed up without damage to the carpet.

A little spirits of turpentine added to the water with which floors are washed will prevent the ravages of moths.

When carpets are well-cleaned, sprinkle with salt and fold; when laid, strew with slightly moistened bran, before sweeping; this with the salt will freshen them wonderfully.

Fuller's earth mixed to a stiff paste, with cold water, spread on the carpet, covered with brown paper, will, in a day or two remove grease spots; a second application may be necessary.

Spirits of ammonia, diluted with water, if applied with a sponge or flannel cloth to discolored spots in carpets or garments will often restore the color.

A paste made of whiting and benzine will clean marble, and one made of whiting and chloride of soda, spread and left to dry (in the sun if possible) on the marble will remove spots. Paint splashed upon window glass can be easily removed by the application of a hot solution of soda.

Use kerosene and bath brick, or powdered lime to scour zinc, tin, or copper; wash in hot suds, and polish with dry whiting.

To give glass great brilliancy wash with a damp sponge, dipped in spirits, then dust with powdered blue or whiting (tied in a thin muslin bag) and polish with chamois skin.

A flannel cloth dipped into warm soapsuds, then into whiting, and applied to paint, will instantly remove all grease and dirt. Wash with clean water and dry; the most delicate paint will not be injured, and will look like new.

One pound of copperas dissolved in one quart of boiling water will destroy foul smells. Powdered borax scattered in their haunts will disperse cockroaches.

Plaster of paris mixed with gum arabic water makes an excellent white cement, but must be used immediately as it hardens quickly. A mixture of five parts gelatine to one of acid chromate of lime, applied to broken edges, which should be pressed together and exposed to the sunlight, makes an insoluble cement.

To whiten walls, scrape off all old whitewash, and wash the walls with a solution of two ounces white vitrol to four gallons of water. Soak one-fourth pound off-white glue in water for 12 hours; drain and place in a tin pail, cover with fresh water, and set the pail in a kettle of boiling water. When melted, stir into the glue eight pounds of whiting, and water enough to make as thick as common whitewash. Apply evenly with a good brush; if the walls are very yellow, blue the water slightly by squeezing in it a flannel bag in which is some powdered blue.

To clean matting, wash with a solution of one pint of salt to four gallons of water and wipe dry immediately.

To clean oil-cloths, wash always with warm milk. Once in six months scrub with hot soapsuds, dry thoroughly, and apply a coat of varnish. They will last as long again.

A little kerosene added to stove polish improves the luster. Apply while the iron is warm.

To remove spots from furniture take four ounces vinegar, two ounces sweet oil, one ounce turpentine; mix and apply with a flannel cloth.

Gum camphor wrapped in paper and laid around sugar barrels will disperse ants.

Practical Hints about Gas Burners.

Most people who have experimented upon their gas burners at all, says the *Polytechnic Review*, have tried the plan of fitting over the burner a small additional tip. This tip soon grows hot, and a larger flame with more light is obtained. It has been argued, however, that the additional light thus obtained was chiefly due to the more rapid flow of the heated gas, and thus there was no economy attained. The experiments of Dr. Carl Huemann, detailed in *Liebig's Annalen*, will start anew a discussion on this subject. He upholds the old idea that the light of the flame is usually contributed by solid, not gaseous particles of carbon. This is in opposition to the views recently enunciated by Dr. Frankland. If the combustible matter be diluted with inferior gases, Dr. Huemann says, it will require greater heat to make it luminous. A practical feature in his researches is the declaration that light is notably diminished by the use of metallic burners. The substitution of non-conducting material, such as stearite, for the ordinary iron burner, is advised. By raising the temperature of the issuing gas, and of the burner, a marked increase of light was obtained, and this, it is positively stated, was done without a greater flow of the gas. The highest results were attained when the burner was heated close to the orifice. But Dr. Huemann insists that extra heat for the burner must not be contributed by the luminous flame

itself. He declines to enter into the economical question as to whether heating the gas and thus obtaining brighter light, is or is not a profitable operation.

CLOTHES PINS.—The *Newark Advertiser* says: Insignificant as the common wooden clothes pin is itself, its manufacture forms no mean part in American industries, and the numerous factories in New England and other States furnish employment to thousands of people. There are several large clothes pin manufactories in Pennsylvania and Ohio, and one in the vicinity of Saratoga, N. Y., each of which is capable of turning out 1,000 boxes, or 72,000 pins, per week. There are several small factories scattered throughout Massachusetts, New Hampshire and Vermont, and all are run by water power. As a rule, those engaged in the manufacture of clothes pins are Quakers. Beech, white birch and poplar are the woods used in making the article, the birch and poplar being considered the best. The machinery employed is very simple. The wood is first sawed into logs four feet in length, and then cut into small square sticks by means of a cutting machine. Each stick, after being rounded in a lathe, is passed into another machine which throws out a number of perfectly formed pins at one cut and with great rapidity. The pins are then thrown into a large revolving cylinder and smoothed by friction with each other.

STOPPING ADVERTISEMENTS.—We have frequently received letters from readers asking whether such and such a "firm, which recently advertised in the *Press* has suspended," and we know that advertisers do not always consult their best interests by removing their names from before the people. We believe that the following from the *Engineer* is very true: "Certain firms try to economize by taking out their advertisements occasionally; they might as well take down the sign over their doors. Advertisements should be continuous. Any idea of discontinuing them for a period, however brief, with a view of saving, is a mistake which leads only to disappointment and loss. It involves not only the loss of time during which the advertisement ceases to appear, but the additional loss of time required to bring the public interest up to the point at which it left off. The proverb 'out of sight out of mind' is nowhere more applicable than in the case of an advertisement."

GOOD HEALTH.

The School-Room Evil.

[Written for the *Press* by C. L. ANDERSON, M. D.]

The dangers that lurk in the school-room to the breathing organs, and through them to the health of the body generally, I fear, are not sufficiently appreciated. School architects, teachers and the public are, in most cases, almost entirely ignorant of what takes place in nearly all school-rooms where many children are crowded together for hours at a time.

When we consider that not less than one-half the deaths in San Francisco during the past two years were caused by diseases of the respiratory organs, and that this, notwithstanding the epidemic of diphtheria, is not a higher per cent. than occurs in other large cities, we must see the importance of pure air in regard to health.

My attention has been more particularly called to the subject by having charge of the ventilating arrangements of a 12-room school-house.

Take 50 children and place them in a school-room, with doors and windows almost or quite closed, however large it may be and with the ordinary means of ventilation, and but a few minutes would elapse before the air would be impure and unhealthy to breathe.

By ordinary means of ventilation, I mean an opening in the ceiling, windows down at the top, a transom over a door opening into a hall, and perhaps a stove. All these are well enough for certain purposes, but with the exception of the stove, they do but little in the way of removing the most objectionable results of respiration—the carbonic acid gas. This being so much heavier than the air, falls to the floor, and with 50 pairs of lungs manufacturing all the time, it becomes uncomfortably abundant in a little while. Opening the doors or windows at the bottom gives it a chance to escape, but then the pupils are endangered by cold drafts, and they suffer with cold feet, caused by the cold air at the bottom of the room. How shall these things be remedied?

After a year's trial of our school-rooms, we find them to work with much satisfaction. The most usual evil, bad, cold air at the floor and lower part of the rooms, by this system of ventilation, is easily remedied. The plan adopted is as follows: We have two chimneys, consisting each of six smoke flues and six air flues. They are built so that each room has a separate flue for carrying off the smoke and one for ventilation. The ventilating flue is connected with a large air-tight, tin tube under the floor, passing across to the side opposite the place where the stove stands, and opening into the room through

the base-board, with a register, which can be opened or closed at pleasure. Each chimney-stack, containing the flues, is carried straight up from the basement to the top of the building, and high enough to give a good, strong draft. The flues all unite as soon as possible after passing the upper set of rooms. Hence, it will be seen, that a draft, started by heat in either flue, will move the column of air in all the flues; provided they are open. When it is cool enough to have fire in one or all the rooms, the ventilation takes place in this way: The air at the bottom of each room is gently moving towards the register and the opening of the stove and passing into the flues. The room is being swept, as it were, of the cold and the vitiated air, while fresh air comes in through windows or other openings, which may be provided with screens, to prevent a draft. The register being situated at the opposite part of the room from the stove, tends to diffuse the air across the floor, which is being warmed by the stove, thus warming the feet of the pupils.

In warm weather, when there is no fire in either stove and it is desirable to keep the air pure in the rooms, a lamp, placed in one of the flues, would be sufficient to produce a motion of the air. But usually, in warm weather, the doors and windows are kept open, so that there is but little danger of bad air.

The plan above indicated can be applied to any school-house with one or many rooms. The principle is easily understood and the application non-expensive. The chimney is used as a ventilator, and carries that air, which falls by its gravity, out of the room by the force of the heated current set in motion by the air flue. The tube under the floor, opening into the room opposite the place where heat introduced serves two purposes—removing the carbonic acid gas and aiding to diffuse the heat in that part of the room where it is most needed, along the surface of the floor.

In most school-rooms, as well as other public places of meeting, there is no way to ventilate the lower part of the room. The heated air rises and goes out at the ventilators, and if there are openings at the surface of the floor and registers there, as I have seen, instead of carrying out the air that has been breathed, they introduce a current of cold air, because they are not connected with a flue, which may, by heating, give an upward current, and thus pump out the foul air.

There is a great deal of confusion in the popular mind in regard to ventilation and a great deal of nonsense written on the subject. "Patent ventilators" abound, but I believe with Leeds, who has written a very sensible book on this subject, "that perhaps the very best patent that could be obtained for anything connected with this subject would be the application of a little common sense to the use of our ordinary contrivances."

This subject is not so difficult to understand or put in practice. The air of the school-room should be studied and understood by the teacher. If it cannot be kept pure and healthy inside, it would be better to march out and teach in some neighboring grove, after the manner of Plato or Aristotle.

A large per cent. of the diseases that either prove fatal in early years or follow us through life, especially those of the respiratory organs, are contracted in the school-room. This assertion is verified by recent investigations, and is, unfortunately, too true to be contradicted. A reform is needed in the manner of treating our children in schools. It is bad enough for grown people to endure for an hour or two, once or twice a week, the bad air of our halls and churches, without killing off our young children by confinement, four to six hours every day, in badly ventilated school-rooms.

Dyspepsia and Long Life.

The late Dr. W. W. Hall, formerly editor of the *Journal of Health*, has written very sensibly of dyspepsia in a little book just published in New York City by R. Worthington. According to this writer, nine out of every 10 cases of dyspepsia are caused not by any defect of the digestive organs, but by improper dieting and insufficient exercise, mental or physical. People, whom a disordered digestion requires to pay attention to these matters, frequently outlive by many years their more robust neighbors. The author cites the case of one poor dyspeptic patient in whose case no less than 63 ailments were manifested; among them fretfulness, nightmare, and, most dismal of all, a sense of gloom. This was undoubtedly a very bad case, for, in spite of all that wealth could supply, or careful treatment do to remove the disorder, it remained unabated, until finally the offending article of diet was discovered, and then recovery was rapid. In about a month's time the only trouble this restored dyspeptic had to complain of was that she could never get enough to eat. With this instance before his eyes, the most desperate dyspeptic may hope to live cheerfully to a ripe old age by searching out the cause of his troubles and resolutely applying himself to the removal of it.

Dr. Hall recommends the sufferer to begin by eating a little of one or two articles of food at regular meals. If that agrees with him let him increase the quantity; if not he should try something else. In this way the dyspeptic will soon find out what agrees with him, and what kinds of food he should avoid. After he has made these discoveries, it will be his own fault if he continues a dyspeptic.



W. B. EWER..... SENIOR EDITOR.

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, May 19, 1877.

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A RICH FIND.—The Placer *Argus* says, for a long time past A. O. Bell, who lives near Rock creek, about three miles from Auburn, has been prospecting on various quartz ledges, but with very meagre success. About four weeks ago he began sinking a shaft on a ledge known as the "Life Preserver," which paid well from the commencement, and has increased all the way down. The shaft is now about 30 feet deep. From Monday morning till Wednesday noon he took out, it is estimated, between \$30,000 and \$40,000, \$7,000 of which was taken out in an hour. This statement is corroborated by parties who have seen it. The ledge is about one foot in thickness, and is mostly decomposed rock. The mine is now shut down and well guarded. One small specimen, worth about \$400, is on exhibition at the bank. Mr. Bell on Wednesday sold his mine for \$20,000 to some parties from Inyo county. There is considerable excitement and all the vicinity is being taken up.

WAR MAP.—We have received a very handsome large map of the seat of war in Europe; and also on the same sheet a general map of Europe, with statistics of the military, naval strength, population and financial condition of the contending powers. The map is in colors and very plainly printed in good style. Copies can be had for 50 cents, post-paid, by sending to E. M. Slater, agent for the Pacific coast, 5294 Shotwell street, San Francisco. The map is published by Gaylord Watson.

THE Sulphur Bank quicksilver mine, of Lake county, turned out 1,056 flasks of quicksilver during April.

THE shipbuilders' lock-out, Glasgow, will affect from 25,000 to 30,000 men.

Remedy the Abuses.

There is no doubt in the least that in order to revive the confidence of the public in mining ventures there must be a severe series of reforms instituted, which will clear the business of its worst features and leave it in such a shape that people can enter into it with at least as much chance of making something as in any other undertaking. Just now our largest mines are under a cloud, and in fact all enterprises, the stock of which is sold at the Boards, are in a depressed state. Confidence has been lost in the business, and even the brokers themselves have concluded that reform is necessary.

The committee appointed by the members of the Board to investigate the cause of the depression in the workings of mine management, or whatever in that direction they mean to investigate, need not look very far. They can begin with some of the most flagrant abuses, and afterwards take the lesser ones and weed them all out. Until this is done we hardly need to look for better times in the stock market. Reform is needed more than new bonanzas to create any interest.

The business of milling ore is one of the first things demanding investigation. The prices charged the company, and those actually paid by the managers, might be compared occasionally to the benefit of stockholders. The propriety of Trustees of a company ordering worthless ore sent to the mills, which they own personally, might be considered. Also the question of ownership of tailings. These few subjects will do to start with before taking up the abuses in connection with other points of mine management, or with transactions among brokers which savor of injustice, or worse.

The system by which certain men get control of a mine at the annual election, with the sole purpose of getting a chance to have the ore milled during the year where they want it, is common and well known. They are the Trustees of the stockholders, managing the property in trust for them. Yet, in the face of this, they order ore milled which will not pay the expenses, and levy assessments on the stock to pay the balance. The profits of the milling go to their individual pockets. There is nothing new in this. It is well known and understood, but no one with the power has taken active steps to stop it. Here is a flagrant abuse of trust, and a good place to begin reform.

The question may properly be asked, in what respect do the paid officers of a mining company differ from the servant or agent of any commercial business? Has a President, Superintendent, or Trustee any right to derive profit from a company of which he is a servant? Have the officers any right to profit from the supplies furnished to mine or mill? Have they a right to send the ore to a mill in which they are interested, when they know that in justice to stockholders of the company this should not be done? These questions should be asked in a court of law, and asked of those who have committed these very acts. The people who act as agents and betray their trusts, should be made to answer for their misdeeds before a criminal court, and be punished to the limit of the law. Let this be done once only, and a precedent established, and this great abuse is at an end.

Then the tailings subject comes up. Have the people who are paid to crush the ore, any right to the tailings? If they have, this right(?) should cease, as it is only a premium offered for carelessness, waste and neglect, instead of for economy.

If those mill men who claim such right think they have it, we suggest that they consult some of the most able lawyers of this or any other state, when it is probable their minds will be disabused. If we refer to the annual reports of some of the Washoe mines prior to 1870, say Gould & Curry, Savage, Ophir, etc., it may be seen that the management exercised control over their tailings and slimes, the account being credited with the amount derived from their sale. Lots of these tailings are worth \$50 per ton, and there they lie, near the mills, becoming the property of the mill owners, simply because they put the rock through at so much per ton for other parties. This is all wrong and is the root of a great deal of wrong doing. It should be stopped summarily, and now is a good time to do it. We hope that the Crown Point company who are sufferers in this direction, as the proceedings of the meeting given in another column show, will be the first to direct special attention to it through the courts. Mill work should be let by contract and no Superintendent should have the power to send a lot of worthless rock to be milled because he does not like to see the mills belonging to his friends idle. There are plenty of other abuses to remedy, but these referred to, if stopped, would help stop others as well.

CON. VIRGINIA disbursed, on Monday, \$1,080,000, being her thirty-third dividend, and making a total of \$28,080,000 paid out by the company to the stockholders. In addition to this amount, the mine has earned millions of dollars for working expenses.

ON Wednesday night an extensive conflagration occurred at New Almaden. Eleven houses were burned down; none belonging to the company. Loss about \$5,000.

Mining Stocks.

The depression which has for so long existed in the mining share market has been attended with rather disastrous results to the mining community, and to those who made a living by the fluctuations in prices from day to day. The latter class is numerous, and no doubt much suffering has been felt, but in such a precarious business people must take it as it comes, good or bad, and those who have been imprudent enough to invest everything they had, without putting anything aside for a rainy day, have no one to blame but themselves. Dealing in stocks is hazardous at all times, and poor men have no business at all to meddle with it; for a break such as has occurred, and such as is liable to happen at any time, may impoverish them, while the man with money may hold on and tide over the depression so as to regain his losses. But even men of means are frequently embarrassed and overwhelmed financially by an unlucky turn in the market. This more often happens, however, when they try to take more than they can carry. Rich people can, of course, afford to try their fortunes in the share market with a few odd thousands, but poor ones should let it severely alone. Half of the people who invest in mining shares know nothing whatever about the mines which the shares represent, and care nothing about them either, as long as they can make a turn on their investment in the market. This system is all wrong, and the longer it is kept up the worse it will be for the legitimate mining interests of the coast.

The principle of incorporating mining companies and having shares is an excellent one in itself, and had it not been for this plan the developments made on many of our big mines would never have occurred, for the simple reason that it takes combined capital to do such work on a large scale; and capital which can afford to wait until considerable money and time have been expended. It is the abuses of the system that want remedying, these abuses having continued so long that the public are disgusted and have almost concluded to let the mining business alone for evermore.

Originally, the idea of incorporating mining companies and selling stock, was with the intention of combining capital and for developing mines. This idea has, in many cases, and with many persons, been entirely lost sight of and the whole thing has been perverted into a kind of gambling business, injurious alike to the mining and general prosperity of the coast. Dealing in mining shares is by no means mining, although so considered by some. The majority of those having anything to do with stocks deal in them with the idea of making money from the fluctuations, and care nothing about the mines whatever, except so far as the condition of any particular mine affects the price of the stock. As we have previously stated this is an entire perversion of the whole system of incorporations and shares, but so thoroughly has the practice become rooted among us that it is difficult to make the public understand there was ever any other intention. The mines are considered more as a medium with which to make stock than anything else and they are a second consideration, the shares being the first.

The present depression may be considered a result of a feeling that has for a long time been dormant, that is, that the present system is good for the rich, but bad for the poor. Moreover, that many of the mines are worked for no other purpose than to give certain persons an opportunity to manipulate the stock, and that such mines—and there are many of them—have absorbed more money than their merits warrant. The abuses of the system are more numerous than we have space to detail here, and the sooner they are remedied the better for the public and the mining interests. Our people should learn to recognize the fact that if they have money to invest in mining they should put it into legitimate enterprises and leave the delusions and dangers of the stock market to those who are, like the gambler, willing to risk everything for a chance to make a fortune in a minute. This is not often done in legitimate work, any more than in any other business, although the profits are more likely to be large. If the present panic in the stock market has the effect of putting out of sight forever such stocks as represent mines which are selling for five times their value, it will be a good thing for the country, even if temporary embarrassment to a few is the result. Inflation in anything is bad, and when, because half a dozen mines in one locality turn out rich, the hundred others double or treble their market value, with nothing else to make them do it, the result in the end will be always disastrous. Some of the mines called on our stock boards are notoriously stock jobbing ventures, and no pretensions are made to do much legitimate work upon them; still they are held at prices higher than many legitimate mines upon which real mining is being done. The state of the market just now is very depressing on all classes of business, but if it has the effect of clearing out stock jobbing ventures from legitimate mines, as it appears to be doing, it will be better for the mining business in the end.

WARD district has had a pay-day, the first in some time, and now the people of the new camp are happy.

The California Mill.

The lumber and planing mill interests of this city are quite extensive, as all the lumber that comes here comes in a rough state and has to be planed, sawed or otherwise finished to suit requirements. There are several of these mills in town, all of which have, as a general thing, as much work as they can attend to. The largest and most complete of these mills is the California, on the corner of Spear and Howard streets, the premises of the mill covering upwards of a quarter of the large block. This mill is one of the oldest established, and although running for over nine years, has had the good fortune to escape any damages by fire—that great bug-bear of institutions of this kind. A change has just been made in the proprietorship of the mills by the admission into the firm of Mr. A. I. Sanborn, of Sanborn & Byrnes, stair builders, the whole now being one concern. The firm now consists of C. J. Prescott, A. I. Sanborn and D. W. Ross.

These mills are extensively and substantially fitted out with the best machinery for all classes of work, such as sawing, planing, scroll sawing and turning, stair building, mouldings, sash, blinds, doors, frames and shutters, and wood finish of every description. A walk through the mill shows a hive of industry and gives one a good idea of the perfection attained in the department of wood-working machinery. There are machines for doing every imaginable thing with wood and doing it quickly and perfectly, only requiring the attendance of a man to feed it and keep it supplied.

They have two Gray & Woods and two Woodbury moulding machines, as well as a small molder on the lower floor, there being 10 molding machines altogether in the mill. Some of these machines are capable of making unusually large moldings. There are four band-saws and 10 circular saws in the mill, and also a large and a small sash saw. There is one large upright saw for ship-timber, capable of doing very heavy work. This is the only large saw of this kind on the coast, large band saws for this purpose are found not to answer so well. The Gray & Woods planer on the lower floor is the largest in San Francisco. It is 100 feet long and will take a stick of timber 24 by 32 inches. Among other machinery are half a dozen cut-off saws and as many more scroll saws; a buzz planer for smoothing off small work; variety molding machines or shapers, mortising and tenoning machines; blind and sash stickers; a sand-papery machine for smoothing off fine work, etc.

There are over 200 men connected with this mill at present. The large and heavy work is done on the lower floor in the main building, and the material is then taken up stairs for lighter work. The mill is noted for its ship work particularly, doing about three-quarters of the ship work done here, as a specialty is made of this department. They have recently finished the work of the steamer *Newark*, lately launched. The machinery in the mill is all of the latest patterns and is kept in first-class order. Ship work has to be done in the best manner, and is, as a usual thing very heavy. Everything has to be kept in the best order to turn out this work rapidly, quickly, and of the best material.

The various departments of the mill are under the charge of foremen who have charge of their particular work. P. R. Cunningham is general superintendent; B. L. McDonald is foreman of the machinery department; Mr. Payson of stair-building; John Dickson is foreman of the building department; the carvers are Warren and McKinnon; C. L. Thomas is engineer.

The engine driving the machinery has a 19-inch cylinder, three-foot stroke, with a Myer's variable cut-off. The fly wheel is 18 feet and the driving pulley 16, with an eight and a half inch shaft. Prescott, Scott & Co. built the engine originally, and overhauled it again last year, enlarging the cylinder and putting in new valve gear. The boiler is fed by an Adams steam pump, a California invention which has been running for years, and gives good satisfaction. The engine is about 125-horse power. There are two boilers, 16 feet by 32 inches. In connection with the engine room is a forge at which Geo. S. Fitzgerald, the mill-wright, assisted by the engineer, makes all the molding irons and blacksmith jobbing for the whole mill. This work has to be done with great care, and this little forge saves a good many dollars to the mill owners.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Tybo Con., May 8th, \$11,434.20—total to date, \$22,519.20; Grand Prize, 7th, \$7,060.35; Modoc, 23d bars, value \$6,296.50—total to date, \$25,341.10; Northern Belle, 8th, \$8,133.57; Northern Belle, 11th, \$10,001.52; California, 12th, \$161,378.98—total to date, \$391,544.68; Con. Virginia, 11th, \$190,229.04—total to date for April account, \$1,142,043.66; Grand Prize, 10th, \$6,500; 13th, \$6,700; Leopard, 11th, \$6,000; Indian Queen, 8th, \$1,246.65; Tybo Con., 12th, \$11,414.85—total to date, \$33,934.03; Comanche, 12th, \$10,806.05; Modoc, 13th, \$12,810.73—total to date, \$44,578.33; Grand Prize, 12th, \$6,679.35; Leopard, 11th, \$6,130.

BULLION amounting to \$9,301.61 arrived in Pioche from Leeds during the last week.

Our Resurrected Mines.

Restoration of the Old Murchie Estate.

We have had occasion frequently of late to refer to the greater, and steadily increasing attraction, that is being paid to the various branches of mining in California. There have been seasons of greater excitement, times when speculation ran higher, and when more activity has been manifested in regard to particular kinds of metallic or mineral deposits, but never a time in this State when well-proven gold mines, or such as promised to fairly reward the investment of capital, were so much sought after as at present. In the early history of the State we had our mining excitements, accompanied by a rush of population to the particular point of attraction, wherever that might happen to be; those furies then having occurred with something like periodical regularity. Then came the several excitements about coal, silver, petroleum, borax, and quicksilver, in the pursuit of which the same hurrying to and fro ensued, and the same mistakes were committed as had characterized these earlier movements; our home mines having in the meantime been neglected. After the disappointment that so generally attended these scampering away after these "Jack-o-lanterns," our miners, prospectors, ore millers and moneyed men are coming back to the quartz and placer mines of California, under the impression that they afford better field for the permanent investment of capital and the employment of labor than any offered elsewhere on the coast.

These classes are not now looking so much after a big, as a sure and lasting thing. Bonanzas are of course good in their way, but it has been found a difficult thing to make two or three of these go round, and a considerable number of small mines are wanted for the outsiders. And this is what our mining men are looking for now, as men seek for a farm, or a stock range, or a suitable place for embarking in any other staid pursuit or small industry requiring care and economy; so, with some such idea are they now looking after mines in this State.

One great advantage attending the ownership of mines in California is the fact that parties interested can, as a general thing, easily reach and inspect such properties themselves, and thus be able to better appreciate their exact situation and value, and also judge whether they are being managed properly or not.

With this greater attention now being directed to the gold mines of California, many old properties of this class upon which work had been suspended, or which, through a lack of a thoroughly energetic management, had fallen into a state of decadence, have lately changed hands in whole or in part, and are now again under full headway, or about ready to resume operations. Conspicuous among this number of regenerated enterprises is

The Murchie Property.

Lying a mile or so east of Nevada City, California, a map of which we herewith publish, this being among the earliest mines opened in that well known locality. This estate is remarkable as presenting a good example of the several kinds of gold mining now being prosecuted in California; hydraulic, drift and quartz operations being all actively and profitably carried on within its limits.

The Quartz Mines.

As will be seen by reference to the map, six quartz lodes have been developed on this claim, all being, according to the report of J. S. Phillips not long since made upon this property, strong and well defined, varying from one to eight feet in width, every one of them highly charged with gold, and occurring in a geological formation the most favorable in nature for persistent and affluent veins. Mr. Phillips' endorsement is good authority for the value of this feature of the property. The Big Blue lode has an average width of about four feet and stands nearly vertical; the Independent is twenty inches wide and dips west at an angle of about forty degrees; the Alice Bell ranges from six feet to two feet in thickness with a northerly dip of sixty degrees; the Indian Hill has the same dip and averages three feet; the Red White and Blue is from one to two feet wide, and like the Lone Star, three feet wide, lies much flatter than the others.

In the Way of Exploratory Work

Five shafts have been sunk and three tunnels driven on this series of veins. On the Independent vein, two incline shafts, one 300 and the other 380 feet in depth, have been put down. From Deer creek a drain tunnel, in good part completed, is being driven to intersect these shafts near the bottom. A tunnel, 480 feet long, designed for gravel washing, has been run on the Alice Bell ledge, which in its course has cut the Lone Star, developing there a large shute of high grade ore. The positions of the other excavations made, also of the mill already erected, and the various other improvements, including roads, reservoirs, etc., are indicated on the map, together with the course of the ancient gravel channel that traverses this ground, the working pits opened thereon, etc.

Expenditures, Income and Improvements.

Upon this estate there has, to date, been expended fully \$100,000 in the construction of improvements; all, with the exception of the hoisting works destroyed by fire several years ago, now in good condition and available for working purposes. Among these improvements, apart from the exploratory work already alluded

to, is an eight-stamp mill with all the necessary appurtenances. This mill is driven by water from the company's ditches while the water season lasts, and by steam power the balance of the time; a steam engine of sufficient capacity having been provided for the purpose. The machinery for an additional ten-stamp mill of the most improved pattern has been placed on the ground, and will be ready for operation inside of a month. The hydraulic claim has been thoroughly opened and provided with suitable outfit; iron pipe, derricks, giants, flumes, etc., having been supplied, and a long, bed-rock tunnel constructed for receiving and carrying off the tailings. The company owns two ditches which deliver upon their ground about 500 inches of water from four to five months in the year, the site of this water being secured by perpetual franchise.

Their ground, which comprises 439 acres, held under a United States patent, is heavily timbered with forests suitable for making first-class lumber. The gravel deposit here occupies the bed of one of the old buried rivers, which never fail to prove rich in gold, the small amount of gravel already run off having yielded largely. On the ground are comfortable residences for workmen, outhouses and shops, with tools, cars and implements of every kind needed.

Touching the Former Product of this Ground Scarcely an approximate estimate can be made, the various ravines that traverse it, as well as the bed of Deer creek, having been noted for their prolific outcrop of gold. The Murchie family, who were once exclusive and are still part

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

A slight and unimportant cave occurred in the ore chamber of the 400-ft level of the Justice. Not a pound of ore is lost and no unusual expense incurred in placing the ore-producing stopes in a better working condition.

Advices from the Eureka Consolidated state that the mine is looking much better this week, with very encouraging prospects of soon being able to start a furnace on ore from ground not in dispute. The 5th level drift and upraise from same are now in ore of good grade and carrying a good percentage of lead.

The various ore stopes on the 1500, 1550 and 1600-foot levels of the California are looking very favorable. Those of the 1550 and 1600 are of great width, and the ore is continuous from the northern to the southern boundary.

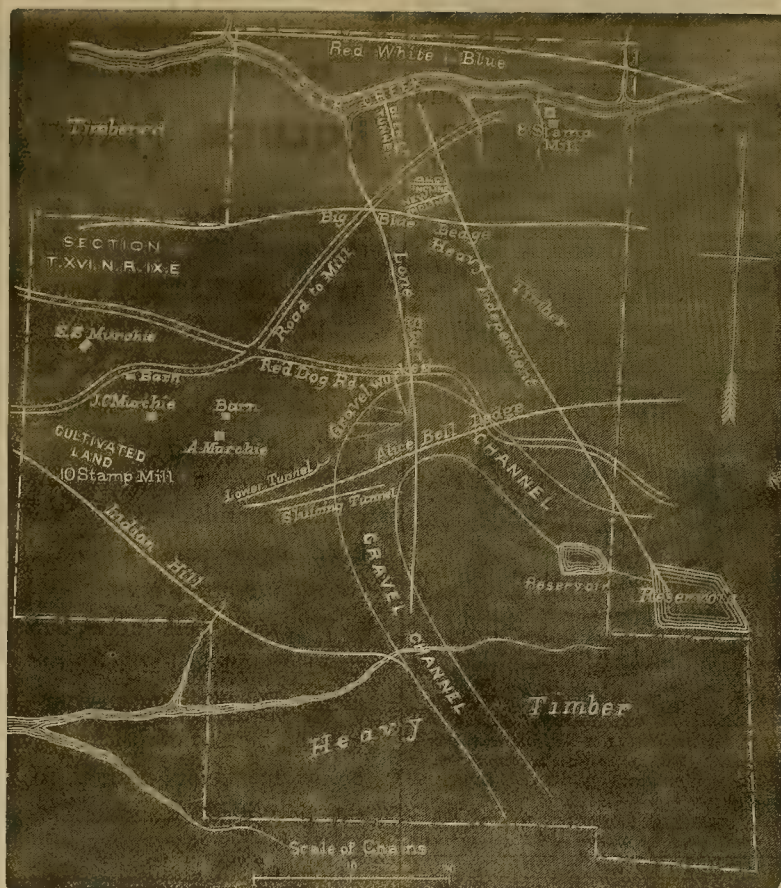
The Alps is turning out 15 tons of ore per week, that works about \$80 per ton.

Savage is still struggling with a heavy flow of water.

The stopes in the Grand Prize continue to yield the usual amount of high-grade ore.

They have commenced sinking the south winze from the 2135-foot level of the Consolidated Imperial.

Chollar ore samples assay \$24.50 per ton.



MAP OF THE MURCHIE MINING PROPERTY, NEVADA COUNTY, CAL.

owners of it, have alone taken from the quartz lodes and surface diggings enough to have made them independently rich, had they not adventured their means in a too great variety of undertakings. From the Independent mine, they had extracted, up to the time of the burning of the hoisting works, upwards of \$77,000, with considerable sums from their hydraulic claim and other of their quartz lodes. With the burning of these works, which occurred just when they had got their mines in good shape for large and profitable production, active operations were suspended, and so remained until a small company of capitalists and business men, taking an interest in the estate, advanced enough money to put it into good shape; a work that has now been so nearly accomplished that we may expect that this long-neglected property will soon come to the front and liberally reward the old owners for their pluck in holding on, and the new for their enterprise in placing it once more on its feet.

The other day the miners employed by the Boulder Valley coal company, Colorado, struck. The company refused to accede to the demand of the miners and employed new men, who were about to go to work. This so enraged the old hands that they broke into the powder house, stole 20 kegs of powder, blew up the shaft and stoping, and burned the buildings, doing damage to the extent of \$10,000.

The California mill, which has been running on Con. Virginia ore for the past 30 days, cleaned up on Tuesday of last week. Tons worked, 8,600; net yield, \$861,878; about one-half gold. Average per ton, \$101.

The Winfield mill is crushing 40 tons of Ophir ore per day.

Some of the richest ore ever found in the mine was struck in the Comanche last week. It is only in bunches so far.

CREDITABLE ENTERPRISE.—We are pleased to notice the opening of a new restaurant in this city, which, from the knowledge we have of the owner and his qualifications for good and generous providing, we doubt not will quickly take the lead among the city institutions of its kind. The location is 218 Sansome street, between California and Pine, and is central and accessible. The proprietor is Mr. J. V. Webster, one of the leading farmers of Alameda county; a man who knows how to produce good things and will place them without stint upon his tables. We had the pleasure of looking through the establishment before the opening, and we never saw anything more conveniently arranged and perfect in all its points than Mr. Webster's enterprise has produced. Everything is new from floor to ceiling. The kitchen is so light and so planned that it must always be fresh and cleanly. We are glad to pronounce the restaurant first-class in every particular, and recommend it to all whom business or pleasure bring to the city. The opening spread was made on Wednesday night of this week. About one hundred gentlemen sat at the tables. Hon. Frank M. Pixley presided. An elegant and artistic supper was served, and the guests were all pleased with the institution and its proprietor. Comments were abundant upon the fine large space which is occupied, and the charming way in which it is furnished with tasteful and useful articles and supplies.

How Whips are Made.

We doubt not that some of our readers have, in their youth, plaited whip-lashes from wood-chuck hides of their own dressing. That was on the "old farm." Now they find it easier to buy than to make their whips, if they have use for them.

Wishing to obtain some facts relating to the making of whips in this city, we visited the factory of the Keystone Whip Company, No. 2,629 Mission street. Here we found the business carried on in all its details by something more than a dozen operatives. The son of the senior member of the firm, himself an accomplished whip-maker, politely showed us about the factory and explained the work going on. The main items of expense in material are rattan and whalebone. The rattan is imported from Batavia and China. The qualities which are too soft, or otherwise unfit for use in whips, are sorted out and sold to the basket-makers. The fine strips which make up the stock of a whip are split out first by hand, and afterwards worked down by drawing them through a shave, which can be gauged. The whalebone is already split when imported from the East. The price of this article has advanced from an average price of about \$2 per pound to about \$7, in consequence of the loss of the whaling fleet last season.

The main part of most whips is composed of nine pieces. The whalebone is in the center, surrounded by the thin strips of rattan, and secured in place by glue. This compound stock is dipped in glue so that every part is permeated by it, and then run through a machine, which winds it with a strong thread from end to end. It is again wound with rope, so that it cannot warp out of shape, and left to dry. A peculiar turning lathe gives a smooth finish and even taper from butt to tip. This valuable machine was made to order, on a new plan, in this city; the owners of the patented machine used in the East refusing to sell a machine to come here, or permit the use of their patterns.

The thread covers are plaited on to the stocks by machines, which are wonders of ingenuity; some carrying as many as 24 spools. Some of the better grades of whips have this cover made of fine gut, prepared from sheep entrails. Sometimes a portion is worked on by hand, and fancy designs in colors, or the owner's name introduced. A great variety of sticks is used for the stiff portion of the stock, many of them being very handsome. The finest come from England, and include the holly and other ornamental woods. The Malacca cane, which grows in the Dutch East Indies, and is imported by way of Germany, is also used largely. The "mounts," or metallic ornaments are also imported.

Fine lashes for stage drivers, teamsters, or tandem whips are plaited out of the best California deer skin, tanned by Messrs. Keaton at their own yard. They contain from four to 24 strands, and are from four to 16 feet long. Horsehide answers for the cheaper grades used by cartmen and others.

Plaiting lashes well can be done only by careful and experienced hands, and is all piece work. Much of it is given out to be done at the homes of the operatives. Some of the best plaiters are women and girls, who earn good wages by working during hours that are not taken up by other duties, and without being exposed to the publicity of a factory. We wish there were more industries of this sort in our midst. The well-known "black-snakes" of the mountain teamsters are also made here from Santa Clara leather. Their quality depends mainly upon the quality of the leather and number of covers sewed on. These last vary from one to five.

Samples of the goods turned out by this company would form a beautiful exhibit, of interest to any one capable of admiring good workmanship. They comprise every style from the regulation whip of the trotting course, four feet eight inches long, up to the longest stage-driver's "persuader," and they vary in price from \$3 per dozen to \$75 each. A gentleman lately had one made here for Foss, the celebrated Calistoga "whip," which cost \$30, and we saw one made for the owner of a tandem at San Jose, which was an elegant piece of work. The company also makes braided rawhide work of many kinds, such as riattas, bridles, hackamores, etc.

In this business California has to compete with the lower wages and water-power of New England. The Keystone company do not attempt to make the lowest class of goods, but intend that what they do send out shall give satisfaction. On the average they employ about 20 hands of both sexes and almost all ages. Several of "our boys" here find a field for usefulness, but it is not found best to have many in the same room.

About 70 dozen whips are turned out per week in these dull times, but as many as 200 dozen per week have been sold in better seasons. The Messrs. S. & J. W. Keaton are English by birth, have followed this business from boyhood up, and are familiar with all its details. They have had their factory running here for about six years.

THE miners in Ward district have come to the conclusion that tunnels are not the best things for the economical working of the mines, and are going in for shaft sinking.

THE Ward Reflex reports a big strike in the Ready Cash mine of that district. The Ready Cash is included in the valuable property of the Steptoe Consolidated.

Growth of the English Navy.

The following complete list of ships, of all classes, launched during the financial year just closed, will on comparison with the statement of vessels removed from the navy list in the same period, prove how far the additions have been in excess of the waste, and will to some extent enable readers to understand why it has been possible to reduce the estimates for 1877-78. The year was opened by the launch of the 12-gun composite corvette, *Turquoise*, from Earle's yard at Hull. She is a vessel of 1,864 tons, with engines of 2,100 horse-power, and cost about £90,000. Then followed the monster iron armor-plated turret-ship *Inflexible*, which was launched at Portsmouth on the 27th of April. She will carry four 80-ton guns in her two turrets, is of 11,406 tons displacement, with engines of 8,000 horse-power, and cost for hull and engines alone £522,000. The weight of the armor she carries is over 3,000 tons. In May, another powerful vessel, the *Temeraire*, was launched at Chatham; she is an iron, armor-plated broadside ship, and will carry four 25-ton and four 18-ton guns; her tonnage is 8,412 tons, horse-power 7,000, and cost of hull and engines £380,000. The weight of armor she carries is nearly 2,100 tons. In August four vessels were added to the fleet, viz., the composite corvettes *Ruby* and *Emerald*, 12 guns, 1,864 tons, and 2,100 horse-power, costing about £90,000 each; the composite sloop, *Osprey*, six guns, 1,124 tons, and 900 horse-power, costing about £60,000; and the iron gunboat *Medina*, 3 guns, 363 tons, and 310 horse-power, costing £10,250. In October six ships were launched, viz., the screw corvette *Bacchante*, 16 guns, 3,932 tons, and 5,250 horse-power, costing £211,000; and the iron gunboats *Sabrina*, *Medway*, *Spey*, *Tees* and *Tay*, of 363 tons, three guns and 310 horse-power, costing £10,250 each. Then followed the iron armor-plated ships *Nelson* and *Northampton*, carrying 12 guns each, of 7,323 tons, and engines of 6,000 horse-power, and costing about £350,000 each. The weight of their armor is 1,500 tons. In December, three 3-gun composite vessels of 774 tons and 750 horse-power were launched, viz., the *Condor*, *Flamingo* and *Griffin*, costing about £93,000 each; since which time there have been launched the *Buryalus*, corvette, of 16 guns, 3,932 tons, and 5,250 horse-power, costing £211,000; the *Iris*, armed steel dispatch vessel, of 10 guns, 3,735 tons, and 7,000 horse-power, costing about £185,000; the composite gun-vessel *Falcon*, of 3 guns, 774 tons, and 750 horse-power, costing some £35,000; the composite gunboats *Firm*, *Forester*, *Foxhound* and *Forward*, of 4 guns, 455 tons, and 360 horse-power, costing about £20,000 each; the torpedo launch *Lightning*, costing about £6,000; and three torpedo mooring steamers and one torpedo lighter, costing altogether about £18,000. There are also due at this date from the hands of the contractors two composite gunboats and three river service gunboats; but, leaving them out of the calculation, the actual additions to the fleet consist of no fewer than 29 vessels of various classes, representing a tonnage of 58,000 tons, and an expenditure of £2,839,000. During the same period, the removals from the strength of the navy have been, the *Octavia*, frigate, of 3,832 tons; *Racer*, sailing-sloop, of 708 tons; *Black Eagle*, paddle yacht, 540 tons; *Lynx*, sloop, 675 tons; *Severn*, frigate, of 3,485 tons; *Virago*, paddle frigate, of 1,590 tons; *Speedwell*, gun-vessel, 570 tons; *Reindeer*, screw sloop, of 1,365 tons; *Pigeon*, gunboat, of 330 tons; *Barrosa* and *Scout*, corvettes, of 2,431 and 2,187 tons respectively; *Star*, gun-vessel, 877 tons; *Adventure*, iron troop-ship of 2,510 tons; and the sloops *Shearwater* and *Gannet*, of 913 and 861 tons respectively. The removal of ineffective vessels has thus amounted to some 22,000 tons, against the 58,000 tons of new ships which have been sent afloat during 1876-77, thus giving a gain on the side of efficiency to the amount of 36,000 tons, of which 34,464 tons are armor-plated ships.—*Iron*.

The Santa Rita Furnace.

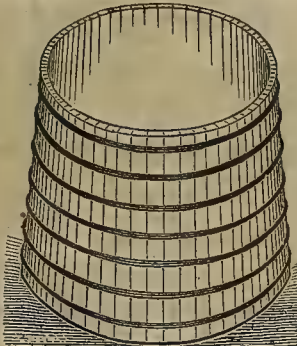
The *Coso Mining News* has the following about the new Santa Rita furnace: "We have been watching with considerable eagerness the progress of the work at the Santa Rita furnace, and hoping that when it started it would prove a success. Last Thursday morning the steam whistle called the men to their posts and the furnace was fired up. Every part of the machinery worked to perfection, the only thing in or about the whole works to give any annoyance being a leakage of one of the water tanks. On Thursday morning last we were invited by Mr. Fortune to come down and see them start up. Arriving at the furnace we had the pleasure of meeting with three of the principal men of this company, Messrs. Jose Carrascosa, Caldonio Ortiz and Edouard Gaxiola, who had come up from San Francisco to examine their property and see the furnace start. These are all solid business men and wealthy capitalists, and in a moneyed sense are carrying quite as heavy a load as Flood & O'Brien. Quite a large number of our leading citizens were also present at the inaugural ceremonies of starting this furnace, and after a thorough examination of the works, and being satisfied the slag was running all right, we were all invited up to the office of Mr. Fortune, the Superintendent, where we all drank bumpers to the health of the members of the company and the success of the Santa Rita furnace. At half-past 2 o'clock on Thursday afternoon the first molding of the bars was

commenced, and up to the same hour on Friday (yesterday) an average of 50 bars of bullion for each shift were turned out. Considering that the furnace was started without any lead bullion but entirely upon the ores, we think this may be put down as an extraordinary run. This amount will be very materially increased after the furnace has become thoroughly heated up. The furnace is of only 20 tons capacity, but is all that is desired for testing the ores and prospecting the mine. It is undoubtedly the entering wedge to more extensive operations on the part of this company, as the gentlemen who came up to examine the property and see for themselves expressed themselves as not only entirely satisfied with it, but are highly pleased with the successful management of Mr. Fortune and his active and efficient assistant and book-keeper, J. A. Green. Another gentleman of this company, Mr. J. M. Tinoco, business manager, in San Francisco, had made preparations to accompany this party to Darwin, but unfortunately for him he met with a severe fall, last Sunday evening, while descending his stairway, by which his right arm was broken just above the wrist, consequently he could not come. Mr. Fortune seems to have exercised the best of foresight and good judgment in selecting his employees at the furnace. His chief smelter is considered one of the best on the coast. Following are the names of the principals at the furnace: Chief Smelter, J. Jameson; Night Foreman, T. Shaw; Day Engineer, Jeremiah O'Connor; Night Engineer, James Rawlings. The names of the other workmen we have not obtained, but they are all well posted in their several specialties. Mr. Fortune will, in a day or two, make his first shipment of several tons of rich bullion. We predict a success for the Santa Rita.

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 THAT IS MADE. Applied without extra charge to En-
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Chemical Apparatus and Chemicals, Drug-
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 ists, Mining Companies, Milling Companies, Prospectors,
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Having been engaged in furnishing these supplies since
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 ounce Troy at different degrees of fineness, and valuable
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Deposits of bullion received, melted into bars, and re-
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Bullion can be forwarded to this Office from any part of
 the interior by Express, and returns made in the same
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LEOPOLD KUH,

(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical Chemist,

No. 611 COMMERCIAL STREET,

(Between Montgomery and Kearny,)

SAN FRANCISCO, CAL.

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Will receive a few pupils at his new laboratory, No. 617
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SEND FOR CIRCULAR. Address

MENZO SPRING,

9 Geary Street, San Francisco.

Choose a good companion
 only—one of Dewey & Jordan's
 "New York watches."

Continued from page 309.

depth of 200 feet having, we believe, in no case been attained.

THE WARD BECHER.—Supt. Fulton showed us this week some nice specimens of milling ore from the Ward Beecher on Treasure hill. He is now working a small force of men on the mine, which he will increase as soon as necessary surveys are made. The Superintendent informs us that it is the intention of this company to do vigorous work upon their mines this summer, and we expect soon to hear of important developments in this once famous property.

Arizona.

PROSPECTING.—*Arizona Enterprise*, May 9: The prospecting fever is raging more violently than ever since the work on the Peck was confined to the development of the north tunnel, pending the negotiations for sale. The miners who were thus left unemployed went off prospecting, and new strikes are being made every day. Prospectors have come in from Nevada and California and have infected the mountains and we hear every day of new and in some cases, valuable discoveries. In the Black Hills, about five miles from Spaulding's ranch, on the Agua Fria, some valuable discoveries have been made. Upon the Bonanza lode the different characters of ore are chloride and gray copper, and assays have been made as high as \$1,100. A new district is to be formed and work will soon be commenced in good earnest.

In Turkey Creek district, Cole & Barry have the shaft on the Continental down 50 feet, and have at the bottom of the shaft two feet of rich ore, of which one strata of four or five inches is high-grade chloride and carbonate ore, and occasionally shows native silver. The ground upon the Goodwin, belonging to Messrs. Collier, Master-son & Hatz, has recently been incorporated in San Francisco, under the name of the Goodwin mining company. Kethro Bros., upon the Silver Joe, have some remarkably rich ore, which they are taking out.

In Hassayampa district, Dave Humes and John Whitman are at work upon a rich galena mine, at the mouth of Groom creek, and are taking out good ore.

In Peck district, the Jack on the Green is a new discovery, four miles east of the Peck mine, and the owners are at work sinking upon it and taking out some high-grade ore, of which they have a 10-inch strata.

In the Peck, the work of developing the north tunnel is being vigorously pushed, and the face of the tunnel shows an immense body of high-grade ore.

In Bradshaw district, A. J. Davis has recently made some discoveries, which he has named respectively the Comstock, Ophir and Katie Haywood. They carry some good ore—carbonates and black sulphurates.

W. B. Hopkins arrived in Prescott last Monday from the Humboldt district, bringing ore from his Little Tommie mine, which is down 30 feet, and goes \$100 to the ton in silver and gold.

In the Tip-Top a new strike has been made, and some samples of the body of ore, which has recently been struck, shown to us yesterday, show a marvelous richness.

RICH DISCOVERY.—*Arizona Miner*, May 4: A short time since, Messrs. Jay G. Kelley, Dr. W. E. Day and A. O. Noyes discovered on Lynx creek, six miles from Prescott, a lead, and named it the Zalida. Since that time they have prospected their discovery and have satisfied themselves thoroughly that they have a genuine lead. Assays made by Mr. Kelley, who is a practical assayer, show their ore to be worth all the way from \$2,000 to \$3,000 per ton. They have sunk a shaft several feet on the ledge, which shows a solid body of horn and sulphide silver ore, two feet thick. The ore is permeated with crystallized sulphate of lead, similar to the ore of the famous Peck mine.

RIO VERDE DISTRICT.—I omitted to say that the miners here held a meeting last Saturday, and established the boundaries of the Verde district, as follows: On the east, the Verde river, from Frank Jordan's house to the mouth of Oak creek; thence west to the summit of the mountain, thence along the summit to the crossing of the Chino trail, and thence to starting point. The facilities for working mines are equal to those of any country. There is an abundance of wood and water, and it is close to a farming settlement. These mines are distant from Prescott about 25 miles, and are approached by rail by way of Coyote Holes. Several locations have been made, but there has been no prospecting below the surface, where the rock assays from 60¢ to 10¢, copper, and from \$40 to \$100 in silver per ton, and the indications are that there are immense deposits of this ore.

Montana.

MINING AND MILLING.—*Helena Independent*, May 4: The owners of the Blue Jay lode, in Stemple district, are very busy in taking out ore from their mine. The lode is large and easily worked, and all developments so far made warrant the belief that they have one of the best lodes in the country. We learn that they have just contracted for crushing 100 tons of the ore at \$3 per ton. As there are only 100 tons of the ore at \$3 per ton, they are expected to pay at least \$25 per ton, judging from that heretofore reduced, the boys have the promise of a little pocket money are long. The ten stamp mill now being erected by Vestal & Company, on Upper Silver creek, will be set in motion early next week, but regular crushing will not begin until one week from next Monday.

New Mexico.

MORE SILVER.—New Mexico *Herald*, March 3: Mr. A. V. Adams, of Pueblo Viejo, in the United States, and an extensive strike has been made near Safford, by a Mr. Riggs. The district is named Montezuma. Several locations have been made. To announce a find of silver ore in this country is nothing wonderful. It would, however, be regarded as something remarkable to announce a section of country of any considerable extent in southwestern New Mexico or southeastern Arizona where either copper or lead did not crop out.

Oregon.

ANOTHER STRIKE.—*Oregon Sentinel*, May 9: Capt. Caton informs us that the miners now engaged in working the Beaver creek cinnabar mines have lately made another strike of a ledge about two feet in width and bearing as rich as any yet taken from the mine. They are meeting with splendid success and all parties are jubilant. The word was brought in Monday by Capt. John S. Miller, who came over on that day after grub and some additional tools and mining apparatus. This mine will doubtless prove a "big thing."

THE GRAVE CREEK DITCH.—From Mr. Sam. Bowden, who assisted in the preliminary survey finished last week, we learn that the ditch will be about 17 miles long and will carry 3,000 inches of water. It will supply water to work several thousand acres of ground which has been heretofore unavailable. The gravel beds are from 20 to 100 feet deep and prospect well throughout, three acres in Brimstone gulch, which has been worked several years, yielding about \$100,000. The company is composed wholly of our citizens, is incorporated with a capital stock of \$250,000, in shares of \$1 each, 50,000 of which they propose to throw upon the market at once in an unassessable form, to enable them to complete the enterprise this season. Work on the ditch will be commenced in a few days and it will be opened up as fast as possible. Once completed and it will open up up to the rich spots known to exist in this and Josephine counties, but which are suffered to lie idle merely for want of capital and enterprise.

Utah.

SAN FRANCISCO DISTRICT.—Cor. Salt Lake *Tribune*, May 11: Situated about 50 miles west from Beaver, and 12 miles from Star district, lies this unexplored little town with the biggest mine in Utah, without any exception. The Big Bonanza lies about one mile from the village. The shaft is sunk 150 feet—all the way in good ore. Not a pound of waste rock or dirt has been taken out of the shaft. The ledge is known to be 200 feet wide. Nearly 7,000 tons of ore have been taken out, and one can hardly see where it came from. Nine lineal feet of this ore will

weigh a ton. About 1,500 tons were taken out to make a level for the whim, which rests on a solid foundation of good ore. A mine with 150,000 tons of good ore in sight, and not a sign of waste on the dump, is a curiosity. It will average over \$40 per ton, and is steadily increasing in value. The four gentlemen who own this Big Bonanza—Messrs. Ryan, Calton, Campbell and Byram—have a certain thing of a fortune, and their slow but sure way of developing their prize shows that they are fully aware of the fact. Twelve miners can take out ore faster than two furnaces can reduce it. There is as yet but one smelter running, but another is to be built immediately by Mr. Godbe, of Salt Lake, who has contracted with the owners of the mine for 5,000 tons of ore as a starter. There will, beyond a doubt, be at least six furnaces running on this ore within a year, when of course there will be a good many men employed, but at present there are enough men here to do all that is to be done. The camp has passed through a year of expectations, and only now have the people found out exactly how to reduce the ore. The smelter has shut down for a few days to repair the engine, having just finished a run of 25 days, producing 130 tons of bullion during that time.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING MAY 2TH, 1877.

190,408. CUT-OFF VALVE.—F. A. Bishop, Placerville, Cal.
190,434. TYPE DISTRIBUTING MACHINE.—J. M. Howe, S. F.
190,473. TRACE FASTENERS.—C. S. Crittenden, S. F.
190,475. SEWING MACHINES.—W. A. Dawson, S. F.
190,530. SPECTACLES.—G. Yocco, San Jose.
190,552. WASHING MACHINE.—R. Chatterly, S. F.
190,556. SOFA BEDSTEAD.—H. Combes, S. F.
190,560. CAN-OPENER.—L. Cutting, S. F.
190,588. ENVELOPES.—W. S. Hoeding, S. F.

RE-ISSUES.

7,661. LUBRICATOR.—J. Gates, Portland, Oregon.
662,663. LUBRICATOR.—J. Gates, Portland, Oregon.
7,664. WINDOW SCREEN.—R. Hochkofler, (guardian of G. Reed, insane), W. C. Hoagland and J. J. Newsome, Brooklyn, Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

EAST CALIFORNIA M. Co.—May 14th. Location: Nevada. Capital stock, \$10,000. Directors—Daniel Hanlon, F. H. Farley, J. A. Thompson, R. K. Farley, Thos. Knapton, Henry Wolfson and John F. O'Toole.
CUBE SUGAR MACHINE MANUFACTURING CO.—May 15th. Object: To buy letters patent for cube sugar machines and to manufacture and sell cube sugar machines. Directors—L. Hopken, John W. Murch, W. F. R. Schindler, B. Castleman and J. F. Sarander. Capital stock, \$45,000.
ATZTEC G. & S. M. Co.—May 15th. Location: Aztec district, Pima county, Arizona. Capital stock, \$100,000, in 100,000 shares. Directors—Gov. A. K. P. Safford, Rev. T. M. Cunningham, John Haynes, Calvin A. Poage and C. S. Benedict.

Something about Newspapers.

The statistics about newspapers shown in S. M. Pettengill & Co.'s "Newspaper Directory" for 1877, show the Americans to be emphatically a reading people. It conveys a large amount of information about the newspapers of America, interesting to the readers thereof. There are reported in the Directory the names, character (political, agricultural, religious, medical, etc.), and names of publishers of no less than 795 dailies, 79 tri-weeklies, 125 semi-weeklies, 6,606 weeklies, 122 semi-monthlies, 771 monthlies, 16 bi-monthlies and 60 quarterlies, published in the United States and the British American provinces. The Directory shows the number of each of these editions which are published in each State, Territory or province. The book contains 376 pages, and embraces an immense amount of valuable information, showing great labor in its collection and preparation. It gives all necessary facts for an advertiser to know about 8,574 separate publications, while it is also interesting and valuable for the general reader. Pettengill & Co. are the oldest among the leading first-class newspaper advertising agents in the country.

UTILIZING SQUIRREL SKINS.—We have stated before our belief that the great squirrel nuisance may be greatly abated if we can discover some profitable use to which their skins and carcasses can be turned. We propose to keep the subject up until full and complete trial is made of the materials which can be furnished. If some of our readers will send us a dozen or two of squirrel skins, properly stretched and dried, we will put them on exhibition at the Mechanics' fair in this city, then send them to the Paris exhibition of 1878 and try to call the attention of foreign manufacturers to the cheap price at which they can be obtained in endless quantity. Parties who will aid us in making an exhibition of this kind will please send the skins by mail, prepaying the postage at the rate of one cent per ounce, and not cause us to pay express rates, which are much higher. We should like farmers to state at what price they can furnish them by the 100 if wanted. We trust our readers will help us in this matter, that the subject may be fully tested.

SIXTY thousand shares of Knickerbocker stock were purchased for account of the company at the delinquent sale.

THE California mine paid a dividend of \$1,080,000 on Tuesday.

General News Items.

THE flour mill at Salinas City was burned on Saturday last.

THE Russian fleet is in this port, but will soon leave with sealed orders.

THE City of Brussels, supposed to be lost, is all right, she having only broken her shaft.

THE coopers' strike at Cleveland, Ohio, is over, the men having gone to work at the old prices.

It is stated that all persons indicted for complicity in the recently developed insurance frauds in New York will have speedy trial.

WHITNEY, a prominent speculator in mining stocks, reported to have failed in New York, was formerly an operator in San Francisco.

THE Governor has appointed Prof. George Davidson, of San Francisco, a Regent of the State University, vice Felton, deceased.

Two thousand colliers in the Dartmouth district, Prussia, have struck. The strike threatens to assume serious proportions.

VOLUNTEERS from the English militia regiments have been asked for, for hospital and transport service. The Duke of Edinburgh is on his way to the Suez canal.

THE Turkish gunboat which passed Kalafat under cover of the Turkish fire from Widin, was captured by a Roumanian battery lower down the river.

THE time for receiving bids for service on miscellaneous mail routes in Arizona has been extended by order of the Postmaster General, to June 20th, 1877.

THE Tribune says the Stevens battery will soon leave American waters under command of Capt. Samuels, and will be sold to Russia either on the high seas or after arriving at England or France.

THE Tribune's Washington special discredits the newspaper stories of filibusters on Mexico being reinforced by the United States, giving Assistant Secretary of State Seward as authority therefor.

THE Department of State, Saturday, received information from our Minister at Peking that the Chinese Government had given notice that it would, on the 1st of April, open to foreign trade the additional ports of Ichang, Wuhun, Wenchoo and Pakyoo.

PROF. RILEY, Chief of the National Entomological Commission, has just closed a three weeks' examination in Texas and Kansas of grasshoppers, and submitted his report to the Governor. He says that throughout the largest part of Kansas the battle is already fought and won.

It is stated that the reason of William H. Vanderbilt's trip to Europe is the establishment of a line of steamers between New York and Europe. The steamers are to be modeled after the White Star ships, and at first will carry only freight and steerage passengers.

THE Managers of the Chicago, Burlington and Quincy, Missouri, Kansas and Texas, and Texas Central railroads, have effected a fast freight combination of their roads, which will go into operation June 1st, and they will regularly run 200 cars and seven sleepers through from Chicago to Houston and Galveston, Texas, from that date.

THE Standard Oil Company's coopers, Cleveland, Ohio, 1,500 in all, who struck three weeks ago, will return to work on Tuesday at the company's terms, but with the promise as business revives wages will be increased. The company also agrees not to employ boys in their shops, but to give all their work to men.

THE reply of the State Department to the formal notification by Turkey of the existence of a state of war between that power and Russia, is to the effect that the United States will continue to occupy a strictly neutral position towards the belligerents. A similar reply will be furnished to Russia. Boker, Minister to Russia, will return to St. Petersburg the latter part of this month.

THREE new ferry slips are being built directly south from the present landing of the Oakland boats, and will be completed about the 1st of August. The most southerly one will be used by the boats of the Dumbarton route. The other two have not been assigned yet. It is probable that the Oakland boats will change their slips, and arrangements made to avoid the crossing of the different boats in their trips.

THE Porte is uneasy about the supplies of arms and ammunition still to come from New York, and is very angry with America for allowing the Russian squadron to remain in American waters. Bad feelings are increasing. Turkish journals have already advocated the massacre of Christians. The English representative has demanded explanations. Many Turks resent the idea of a friendly occupation of Constantinople by the English, and say if England wants to help Turkey, she should do so on the Danube and in Asia. There is great uneasiness among European residents. Many have left and others are leaving. The Khedive's actions are watched very distrustfully. It is known that he has been previously tempted by the Russians, and it is thought if the Turks suffer any important reverses the temptation will prove too strong for him.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

METALS.

WHOLESALE.]

THURSDAY, M., May 17, 1877.

IRON.
American Pig, ton..... 32 00 @ 34 00
Scotch Pig, ton..... 32 50 @ 34 00
White Pig, ton..... 31 00 @ —
Oregon Pig, ton..... — @ —
Refined Bar..... 34 @ 54
Horse Shoes, keg..... 5 00 @ —
Nail Rod..... — @ 7
Norway, Oval..... — @ —
Rolled..... — @ —

COPPER.
Copper Tinned..... 37 @ 40
Sheathing, lb..... 37 @ 40
Sheathing, Yellow..... 21 @ 22 1/2
Sheathing, Old Yellow..... 10 @ 11
Composition Nails..... 21 @ —
Composition Bolts..... 24 @ —

STEEL.
English Cast, lb..... 14 @ 25
Anderson & Woods, ordinary sizes..... 15 @ —
Drill..... 15 @ —
Flat Bar..... 15 @ 20
Pilot Steel..... 24 @ 12 1/2

TIN PLATES.
10x14 C Charcoal..... 9 00 @ 9 50
Banca Tin..... 20 @ 20
Australian..... 19 @ 20

ZINC.
By the Case..... 11 @ —
Zinc Sheet 7x3 ft, 7 to 10..... 11 @ —
7x3 ft, 11 to 14..... 11 @ —
14 to 18 Kil..... 12 @ —
8x4 ft, 8 to 10..... 12 @ —
8x4 ft, 11 to 10..... 12 @ —

NAILS.
Assorted sizes..... 3 25 @ 3 37 1/2
QUICKSILVER.
By the lb..... 1 @ 42

LEATHER.

[WHOLESALE.]

WEDNESDAY M., May 16, 1877.

Sole Leather, heavy, lb..... 26 @ 33 1/2
Light..... 22 @ 24
Jodot, 8 Kil, doz..... 49 00 @ 50 00
11 to 13 Kil..... 58 00 @ 59 00
14 to 18 Kil..... 57 00 @ 58 00
Second Choice, 11 to 16 Kil..... 57 00 @ 58 00
Cornellian, 12 to 16 Kil..... 57 00 @ 58 00
Females, 12 to 13 Kil..... 57 00 @ 58 00
14 to 16 Kil..... 57 00 @ 58 00
Simon Ulmo, Females, 12 to 13 Kil..... 57 00 @ 58 00
14 to 15 Kil..... 56 00 @ 57 00
16 to 17 Kil..... 72 00 @ 74 00
Simon, 18 Kil..... 81 00 @ 83 00
20 Kil..... 72 00 @ 74 00
24 Kil..... 72 00 @ 74 00
Robert Calf, 7 and 9 Kil..... 35 00 @ 40 00
Kips, French, lb..... 1 00 @ 1 35
Kil, doz..... 4 00 @ 4 50
French Sheep all colors..... 8 00 @ 10 00
Eastern Calf for Backs, lb..... 1 00 @ 1 25
Sheep Roams for Topping, all colors, doz..... 9 00 @ 13 00
For Linings..... 5 50 @ 10 50
Cal. Rummel Sheep Linings..... 3 75 @ 4 50
Boot Legs, French Calf, pair..... 4 00 @ 4 75
Good French Calf..... 4 00 @ 4 75
Best Jodot Calf..... 5 00 @ 5 25
Leather, Harness, lb..... 38 @ 38
Fat Bridle, doz..... 45 00 @ 47 00
Skiing, lb..... 30 @ 37
Welt, doz..... 30 00 @ 30 00
Buff, ft..... 18 @ 20
Wax Side..... 17 @ 18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, May 16, 3 P. M.
LEGAL TENDERS in S. F., 11 A. M., 94 1/2 @ 94 1/2 SILVER.
50¢ gold in New York 107.
GOLD BARS, 800 @ 90. SILVER BARS, 10 @ 15 1/2 cent. discount.
EXCHANGE on New York, 50 @ 55-100 cent. premium for gold on bankers 49; Commercial, 49; Paris, five francs \$1 dollar; Mexican dollars, 94 @ 95.
LONDON Consols, 93 1/2; Bonds, 106 1/2.
QUICKSILVER in S. F., by the flask, 1 lb, 41 @ 42.

Questions of the Times.

Which are the most reliable watches?
American watches, they are driving those of foreign make out of the market.

Which is the best American watch?
The New York watch, made at Springfield, Mass.

Why is it the best watch?
Because it is substantial in all its parts, constructed on the best principles and embodies those improvements which experience has shown to be the most desirable.

Why is the New York Watch so popular?
Because in buying one you are sure of getting a good time-keeper. While purchasing a watch of most other makes is like investing in a lottery—a great many blanks to one prize.

Which is the cheapest watch?
The most economical is the New York watch. For you can get one of these excellent time-keepers for less than it costs in a short time to repair a poor watch, which benefits no one but the repairer.

Where can I get a New York Watch?
By addressing the long established, practical Watch-makers and Jewelers, DEWEY & JORDAN, 433 Montgomery St., San Francisco, who will send you a descriptive price list, including the following styles of movements: "John Hancock," "Geo. Sam. Rice," "Chas. E. Hayward," "Aaron Bagg," "Theo. E. Studley," "Chester Woolworth," "Frederick Billings," "Railway," "John L. King," "E. W. Bond."

THE GRAND PACIFIC.—This hotel, well known to all persons from the Pacific Coast who have visited Chicago of late, under the new management is a perfect success. It is well for travelers to remember that at this house, in order to meet the expectation of the public in these times of financial depression, a sliding scale of prices has been arranged, from \$3 to \$5 per day, with board, according to location, the service, table and all other accommodations being the same to all guests. The entire hotel has been re-furnished and decorated, so that it is handsome both externally and internally. All the conveniences and modern improvements for the convenience of the guests are at hand.

PACIFIC RURAL PRESS.

A first-class 16-page Illustrated Agricultural Weekly, filled with fresh, valuable and interesting reading. Every farmer and ruralist should take it. It is immensely popular. Send for a sample copy.

DEWEY & CO., Publishers, S. F.

ORDERS for the GOLDEN PIANO will be received at this office, where further information can be had concerning their excellent qualities and favorable prices.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Booth Gold Mining Company.—Location of works, Auburn, Placer county, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the thirtieth day of April, 1877, an assessment, No. 2, of five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, No. 320 California Street, Room No. 5, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the fourth day of June, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the twenty-fifth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors,

GEO. R. SPINNEY, Secy.

Office, 320 California St., Room 5, San Francisco, Cal.

California and Arizona Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Cedar valley, Mohave county, Arizona.

Notice.—There are delinquent upon the following described stock, on account of assessment No. 2, levied on the third (3d) day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Edmund Burch.....	13	50	\$1 00
Edmund Burch.....	15	500	10 00
Edmund Burch.....	17	500	1 00
Edmund Burch.....	18	200	4 00
Edmund Burch.....	19	200	4 00
Edmund Burch.....	21	200	4 00
Edmund Burch.....	24	100	2 00
Benjamin Flint.....	39	4,000	80 00
W H Hall.....	41	2,500	50 00
James W Thrift.....	43	2,500	50 00
E E Rice.....	44	2,500	50 00
E E Jewell, Trustee.....	49	1 49	
Martin Corcoran.....	50	1,250	25 00

And, in accordance with law, and an order of the Board of Directors, made on the third (3d) day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at Room B, No. 507 Montgomery street, on Monday the fourth (4th) day of June, 1877, at the hour of two (2) o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

T. E. JEWELL, Secretary.

Office, 507 Montgomery Street, San Francisco.

California Fruit Growing Association.—Location of principal place of business, San Francisco, California. Location of property, El Dorado county, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the 14th day of April, 1877, an assessment, No. 4, of \$2.00 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, 331 Sansome Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 21st day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold on Saturday the 9th day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors,

HORACE JONES, Secretary.

Office, 331 Sansome Street, San Francisco, Cal.

Consolidated Bonanza Silver Mining Co.—Principal place of business San Francisco, California. Location of works in Eagle and Washoe Valley Mining District, Ormsby county, State of Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 19th day of April, A. D. 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Tuesday the 29th day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 19th day of June, 1877, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Directors,

WM. MARTIN, Secretary.

Office No. 19 First Street, San Francisco, Cal.

Dolores Consolidated Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Blasdel, H G, Trustee.....	16	10,000	\$2,000 00
Blasdel, H G, Trustee.....	17	5,000	500 00
Blasdel, H G, Trustee.....	18	5,000	500 00
Blasdel, H G, Trustee.....	19	5,000	500 00
Drexler, L P & Co., Trustee.....	8	25,000	2,500 00
Fry, J D, Trustee.....	7	10,000	1,000 00
Keene, J R, Trustee.....	9	10,000	1,000 00
Talbot, W C.....	3	100	10 00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.

J. W. CLARK, Secretary.

Office, 418 California street, San Francisco, California.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of April, 1877, to the 16th day of May, 1877, and will then take place at the same hour and place as above named. By order of the Board of Directors,

J. W. CLARK, Secy.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of May, 1877, to the 16th day of June, 1877, and will then be held at the same hour and place named above. By order of the Board of Directors,

J. W. CLARK, Secy.

Empire Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, War Eagle Mountain, Owyhee County, Idaho Territory.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-sixth day of April, 1877, an assessment, No. 13, of \$1 (one dollar) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 330 Pine Street, Room No. 5, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the thirtieth day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold on Tuesday, the twenty-sixth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors,

WM. H. MCCLINTOCK, Secy.

Office, 330 Pine Street, Room No. 5, San Francisco, Cal.

Excelsior Silver Mining Company.—Principal place of business, San Francisco, Cal. Location of works, Potosi District, Lincoln County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-fourth day of April, 1877, an assessment of ten cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold and silver coin, to the Secretary, at the office of the company, 308 Post Street.

Any stock upon which this assessment shall remain unpaid on the twenty-fifth day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the eighteenth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

W. A. KOLLMYER, Secretary.

Office, 306 Post Street, San Francisco, Cal.

Mariposa Land and Mining Company of California.—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, California.

Notice.—There is delinquent upon the following described stock, on account of assessment, No. 10, levied on the twenty-eighth day of March, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

COMMON STOCK.

Names.	No. Certificate.	No. Shares.	Amount.
Adams, Thomas.....	1105	100	100 00
Ambleman, Edgar M.....	1492	100	100 00
Ambleman, Edgar M.....	1493	100	100 00
Ambleman, Edgar M.....	1494	100	100 00
Ambleman, Edgar M.....	1496	100	100 00
Ambleman, Edgar M.....	1528	100	100 00
Ambleman, Edgar M.....	1530	100	100 00
Brumagin, J H.....	1112	100	100 00
Brumagin, J H.....	1113	100	100 00
Brumagin, J H.....	1115	100	100 00
Brumagin, J H.....	1342	100	100 00
Brumagin, J H.....	1347	100	100 00
Brumagin, J H.....	1349	100	100 00
Brumagin, J H.....	1350	100	100 00
Brumagin, J H.....	1360	100	100 00
Brumagin, J H.....	1361	100	100 00
Brumagin, J H.....	1362	100	100 00
Brumagin, J H.....	1381	100	100 00
Brumagin, J H.....	1384	100	100 00
Brumagin, Fred P.....	1270	100	100 00
Brumagin, Fred P.....	1271	100	100 00
Brumagin, Fred P.....	1283	100	100 00
Brumagin, Fred P.....	1306	100	100 00
Brumagin, Fred P.....	1334	100	100 00
Brumagin, Fred P.....	1639	100	100 00
Brumagin, Fred P.....	1643	100	100 00
Brumagin, Fred P.....	1644	100	100 00
Brumagin, Fred P.....	1645	100	100 00
Brumagin, Fred P.....	1646	100	100 00
Brumagin, Fred P.....	1647	100	100 00
Brumagin, Fred P.....	1648	100	100 00
Brumagin, Fred P.....	1649	100	100 00
Brumagin, Fred P.....	1650	100	100 00
Brumagin, Fred P.....	1651	100	100 00
Brumagin, Fred P.....	1652	100	100 00
Brumagin, Fred P.....	1653	100	100 00
Brumagin, Fred P.....	1654	100	100 00
Birmingham, D Walton.....	1473	100	100 00
Boody & Co, D A.....	A25	50	50 00
Collins, C A.....	1200	100	100 00
Collins, C A.....	1203	100	100 00
Collins, C A.....	1206	100	100 00
Collins, C A.....	1237	100	100 00
Curles, W B.....	272	100	100 00
Connor, W P.....	1298	100	100 00
Cowles, Jos.....	A22	25	25 00
Cowles, Jos N.....	A23	25	25 00
Glendenning, Davis & Amory.....	291	100	100 00
Homans, E C.....	1242	100	100 00
Homans, E C.....	1415	100	100 00
Harriott & Noyes.....	1102	100	100 00
Harriott & Noyes.....	1103	100	100 00
Harriott & Noyes.....	1104	100	100 00
Harriott & Noyes.....	1250	100	100 00
Harriott & Noyes.....	1253	100	100 00
Hedges, Allen.....	1160	100	100 00
Hewdon, Kilbreth & Co.....	1210	100	100 00
Hoyt, E P.....	1223	100	100 00
Hoyt, E P.....	1224	100	100 00
Hoyt, E P.....	1225	100	100 00
Hyman, Henry.....	1613	100	100 00
Hyman, Henry.....	1614	100	100 00
Kennedy, Hutchinson & Co.....	476	100	100 00
Kennedy, Hutchinson & Co.....	1640	100	100 00
Kennedy, Hutchinson & Co.....	1641	100	100 00
Kennedy, Hutchinson & Co.....	1207	100	100 00
Kennedy, Hutchinson & Co.....	1208	100	100 00
Kennedy, Geo H.....	1158	100	100 00
Kennedy, Geo H.....	1159	100	100 00
Moore, Silas H.....	1215	100	100 00
Maas, Frederick M.....	1626	100	100 00
Maas, Frederick M.....	1627	100	100 00
Maas, Frederick M.....	1628	100	100 00
Otis & Co, F A.....	1318	100	100 00
Otis & Co, F A.....	1319	100	100 00
Otis & Co, F A.....	1320	100	100 00
Oppenheimer, Ed L.....	1330	100	100 00
Pond, Anson P.....	74	100	100 00
Pond, Anson P.....	75	100	100 00
Pond, Anson P.....	76	100	100 00
Pond, Anson P.....	77	100	100 00
Pond, Anson P.....	78	100	100 00
Pond, Anson P.....	79	100	100 00
Pond, Anson P.....	80	100	100 00
Pond, Anson P.....	81	100	100 00
Pond, Anson P.....	82	100	100 00
Pond, Anson P.....	409	50	50 00
Pond, Anson P.....	410	50	50 00
Rodwell, C M.....	1167	100	100 00
Rodwell, C M.....	1168	100	100 00
Rodwell, C M.....	1169	100	100 00
Rodwell, C M.....	1170	100	100 00
Rodwell, C M.....	1171	100	100 00
Rodwell, C M.....	1172	100	100 00
Rodwell, C M.....	1173	100	100 00
Rodwell, C M.....	1174	100	100 00
Rodwell, C M.....	1175	100	100 00
Rodwell, C M.....	1176	100	100 00
Rodwell, C M.....	1177	100	100 00
Rodwell, C M.....	1178	100	100 00
Rodwell, C M.....	1179	100	100 00
Rodwell, C M.....	1180	100	100 00
Rodwell, C M.....	1181	100	100 00
Rodwell, C M.....	1182	100	100 00
Rodwell, C M.....	1183	100	100 00
Rodwell, C M.....	1184	100	100 00
Rodwell, C M.....	1185	100	100 00
Rodwell, C M.....	1186	100	100 00
Rodwell, C M.....	1187	100	100 00
Rodwell, C M.....	1188	100	100 00
Rodwell, C M.....	1189	100	100 00
Rodwell, C M.....	1190	100	100 00
Rodwell, C M.....	1191	100	100 00
Rodwell, C M.....	1192	100	100 00
Rodwell, C M.....	1193	100	100 00
Rodwell, C M.....	1194	100	100 00
Rodwell, C M.....	1195	100	100 00
Rodwell, C M.....	1196	100	100 00
Rodwell, C M.....	1197	100	100 00
Rodwell, C M.....	1198	100	100 00
Rodwell, C M.....	1199	100	100 00
Rodwell, C M.....	1200	100	100 00
Rathborne, R Wm.....	121	100	100 00
Rathborne, R Wm.....	163	100	100 00
Rathborne, R Wm.....	177	100	100 00
Rathborne, R Wm.....	240	100	100 00
Rathborne, R Wm.....	287	100	100 00
Rathborne, R Wm.....	307	100	100 00
Rathborne, R Wm.....	314	100	100 00

Name.	No. Certificate.	No. Shares.	Amount.
Rathborne, R Wm.....	315	100	100 00
Rathborne, R Wm.....	310	100	100 00
Rathborne, R Wm.....	156	100	100 00
Rathborne, R Wm.....	320	100	100 00
Rathborne, R Wm.....	324	100	100 00
Stern, Joseph.....	1506	100	100 00
Stern, Joseph.....	1507	100	100 00
Stern, Joseph.....	1508	100	100 00
Smith, Geo W.....	235	100	100 00
Smith, Geo W.....	236	100	100 00
Smith, Geo W.....	237	100	100 00
Thorpe, Louis E.....	A 7	1	1 00
Thorpe, Louis E.....	A 8	1	1 00
Thorpe, Louis E.....	A 12	1	1 00
Van Schaick & Co.....	69	100	100 00
Van Schaick & Co.....	70	100	100 00
Van Schaick & Co.....	71	100	100 00
Van Schaick & Co.....	1333	100	100 00
Vanderhoof H B.....	1509	100	100 00
Vanderhoof H B.....	1510	100	100 00
Brumagin, J H.....	unissued	450	450 00
Bound & Co.....	unissued	300	300 00
Dunnell, T L.....	unissued	25	25 00
Hallgarten & Co.....	unissued	50	50 00
Stone, Geo F.....	unissued	100	100 00
Stern, Chas.....	unissued	300	300 00
Smith, Morris H.....	unissued	300	300 00
Towar & Learned.....	unissued	100	100 00
Willbren & Co.....	unissued	100	100 00
Weeks, W A.....	unissued	200	200 00
Van Schaick & Co.....	unissued	1000	1000 00

PREFERRED STOCK.

Adams, Thomas.....	1188	100	100 00
Adams, Thomas.....	1189	100	100 00
Adams, Thomas.....	1190	100	100 00
Adams, Thomas.....	1191	100	100 00
Adams, Thomas.....	1192	100	100 00
Adams, Thomas.....	1193	100	100 00
Amblen, Edgar M.....	1194	100	100 00
Amblen, Edgar M.....	A 93	51	51 00
Brumagin, J. H.....	1190	100	100 00
Block, Henry.....	A 31	67	67 00
Block, Henry.....	A 32	63	63 00
Block, Henry.....	A 33	5	5 00
Block, Henry.....	A 34	1	1 00
Block, Henry.....	1243	100	100 00
Block, Henry.....	1244	100	100 00
Block, Henry.....	1245	100	100 00
Block, Henry.....	1246	100	100 00
Block, Henry.....	1247	100	100 00
Block, Henry.....	1248	100	100 00
Block, Henry.....	1249	100	100 00
Block, Henry.....	1250	100	100 00
Block, Henry.....	1251	100	100 00
Block, Henry.....	1252	100	100 00

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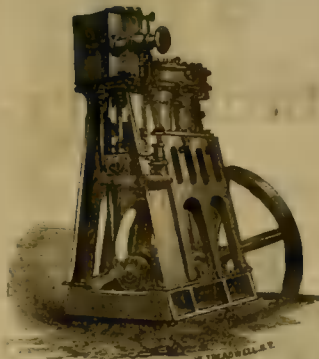
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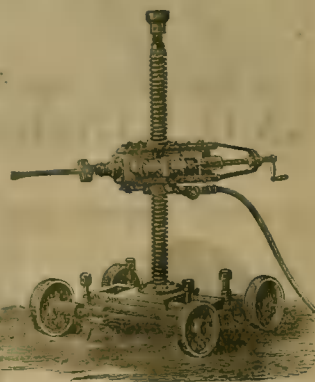
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For Steam Boilers, Pipes, etc. Best non-conductor of heat in use. It effects a LARGE SAVING OF FUEL, LASTS AS LONG AS THE IRON to which it is applied, and is reasonable in cost.

REFERENCES: United States Government Buildings and the principal manufacturing establishments in the East and on the Pacific Coast; the principal mines and mills in Nevada, etc., etc.

United States and Foreign
SALAMANDER FELTING COMPANY.

PACIFIC BRANCH,

(Patents issued September 4, 1869; October 5, 1869; October 4, 1870; May 9, 1871.)

SEWARD COLE, Manager,

Office: 317 California Street, S. F.
Factory: Berry Street, bet. 4th and 5th, S. F.
Nevada Agency: 38 North C Street, Virginia.

DEALERS IN

H. W. JOHNS' ASBESTOS ROOFING AND PAINTS—Fire and Weather Proof.

ASBESTOS STEAM PACKING, made from pure long fiber Asbestos. Indestructible and Self-Lubricating. Circulars and Descriptive Pamphlets Sent Free.

PATENTED CAST STEEL SHOES AND DIES.

Guaranteed Cheaper than the Best Iron.
IMPORTANT NOTICE.
Reduction in Price from 16 Cents
to 12 Cents Per Pound.

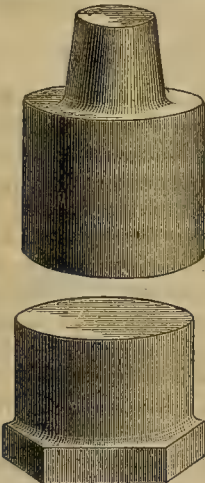
Owing to our largely increased business, the present low price of iron from which our Steel is manufactured, and the improved facilities for casting and forging, we take great pleasure in announcing that from and after this date we will supply our IMPROVED CAST AND FORGED STEEL SHOES AND DIES FOR QUARTZ MILLS at twelve cents per pound, delivered at San Francisco or Sacramento, instead of sixteen cents, as heretofore.

We also furnish Steel Plates for Blake and other Ore Crushers, Steel Gut Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

Address all orders, with dimensions or drawings, to

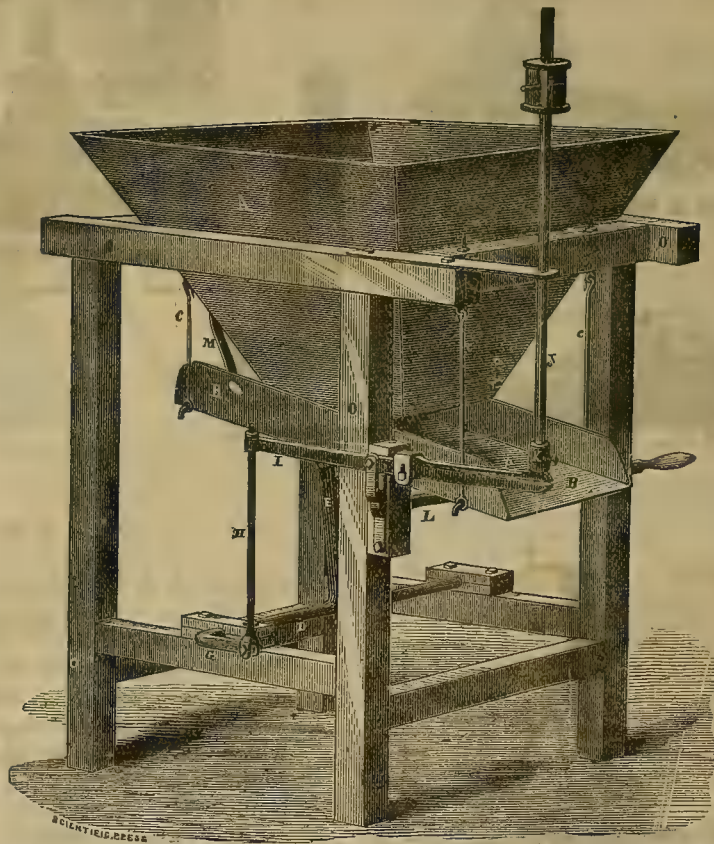
CAST STEEL SHOE & DIE CO.,

59 Nevada Block, S. F.



TULLOCH'S AUTOMATIC ORE FEEDER,

Awarded the Centennial Medal.



The TULLOCH AUTOMATIC ORE FEEDERS have been practically tested during the last year and a half in 40 mills, of from five to 80 stamps each, and have, in every case, given perfect satisfaction. The Tulloch machine is so constructed that the drop of the stamp feeds the ore in just such quantities as the stamps require. Each drop regulates the supply required for the next drop, whether it be more or less, and this is the true principle of an automatic feeder. The tray moves longitudinally, and a stationary scraper forces the material forward at each backward movement of the tray, thus insuring the perfect feeding of all classes of ore, whether it be dry or wet.

We append a few extracts from the many testimonials which we have received from mill men and practical mining men, of the effectiveness and positive action of the Tulloch Feeder. We do not depend solely upon these testimonials, as we are aware that testimonials are easily secured for almost any machine, but the high character of the parties certifying to those herewith given, will establish their value and genuineness:

Mr. Jas. G. Fair has 28 in use; says: I regard them superior to any Feeder with which I am acquainted; I consider no mill perfect without them. Mr. E. R. Burke, Summer mine, Kern county, has 16: They never get tired; no man living can feed a battery as well; they save us in labor alone \$48 a day. Mr. Green, of the Phoenix mill (13), Amador, writes: The first machine we had is working away; is as good as ever; have not spent a dime on it; in use 14 months; you need fear no competition on wet ores. Mr. W. H. Armstrong, of Consolidated Virginia mill: We are running 60 stamps with your Feeders; they give unbounded satisfaction; they have not cost the company one dollar since starting up. Mr. H. C. Bidwell, Supt. Green Mountain and Gold Stripe companies, Plumas county, writes: From the start they have done splendidly; no trouble whatever; requiring but little attention; a boy can manage them; the saving in both labor and castings is fully one-half over the old style of feeding by hand. Mr. Preston writes: I have four of your Automatic Self Feeders, and my mill men each and all say they are the best they have ever used. They are an improvement on all I have ever seen, being simple in construction, and good for either wet or dry crushing; refer to over 40 mills using them; they are guaranteed to give perfect satisfaction. Send for circulars.

F. OGDEN, 413 California Street, S. F.

PICKERING ENGINE GOVERNOR.

VALLEJO FOUNDRY, October 17th, 1876.

Messrs. NEYLAN & YOUNG, San Francisco,

Agents for "PICKERING GOVERNORS."

Gents:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this year for my patent Straw Burning Engines give splendid satisfaction. They far surpass for regularity of speed any Governor that I have ever seen, and I have seen all the best kinds; I have seen the main belt fly off the pulley several times this season while threshing, and the engineer did not discover it, so perfectly was the speed maintained, until he was told of it; this I consider something wonderful; I consider the Governor absolutely perfect, so far as speed is concerned. I bought and put on to one of my engines a Shive Governor, to see which was the best, and after one season's trial I have no hesitation in saying they are far superior to any other Governor that I have seen or used. I wish you would send me the lowest price that you can furnish 25 Governors for, next season's engines. Yours respectfully, J. L. HEALD.

The only Governor that has received awards at each of the International Exhibitions. American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Baltimore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals; International Exposition, Paris, 1867, One Bronze and Two Special Medals; International Exposition, Vienna, 1873, Medal of Progress and Decoration; International Exhibition, Philadelphia, 1876, Medal and Diploma.

CAMERON'S CELEBRATED STEAM PUMPS

For Feeding Boilers and Draining Mines. MACHINISTS' TOOLS AND WOOD WORKING MACHINERY.

NEYLAN & YOUNG, SOLE AGENTS FOR THE PACIFIC COAST, 18 and 20 Spear Street, S. F.

Dewey & Co. { 224 Sansome St. } Patent Ag'ts. | Engraving done at this office.



Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING AND TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 320 Sansome street, Room 10.

San Francisco Pioneer Screen Works,

J. W. QUICK, MANUFACTURER,



Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

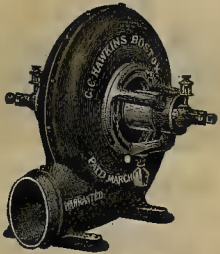
32 Fremont Street, San Francisco.

A. L. FISH & CO.,

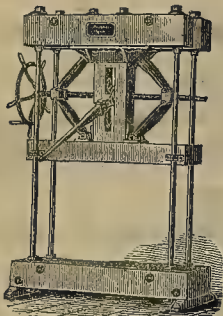
Nos. 9 and 11 First Street, San Francisco,

DEALERS IN

All kinds of New and Second-Hand Machinery.



Hawkins' Blowers and Exhaust Fans.



Boomer Press,
For Wine, Cider, Lard, etc.

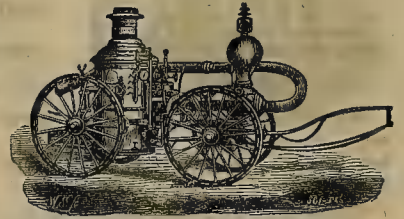


MINING PUMPS
FOR HEAVY LIFTS AND BAD WATER
A SPECIALITY.

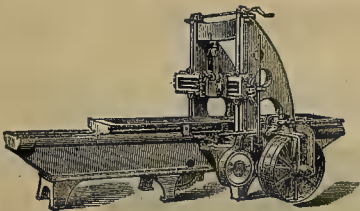
DOUBLE ACTING PLUNGER,
1,000 Feet Single Lift Guaranteed.



Waters' Patent Governor.



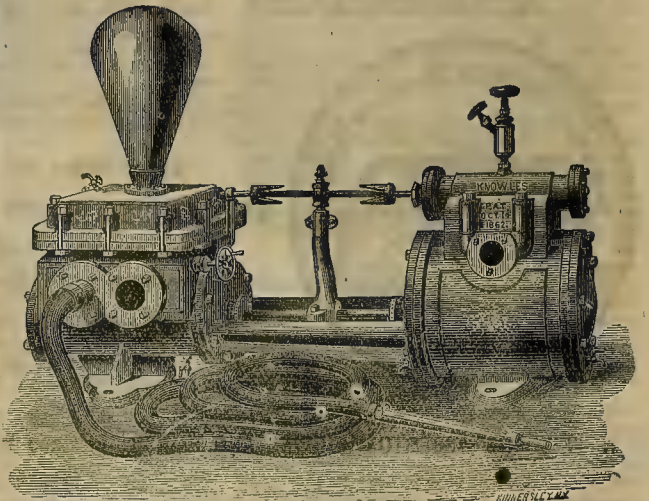
Clapp & Jones' Steam Fire Engine.



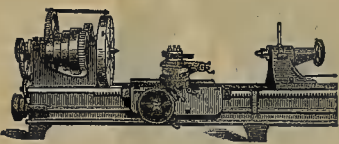
Ferris & Miles' Lathes, Planes and Machinists' Tools.



Ferris & Miles'
Steam Hammers.



Knowles' Steam Pump; for all purposes where Pumping is required.

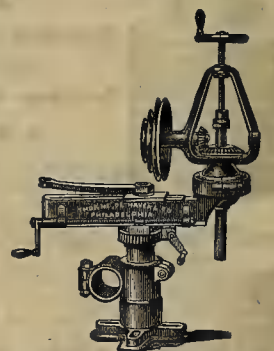


Union Rock Drill.

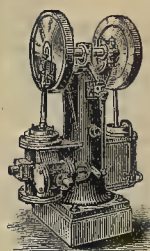
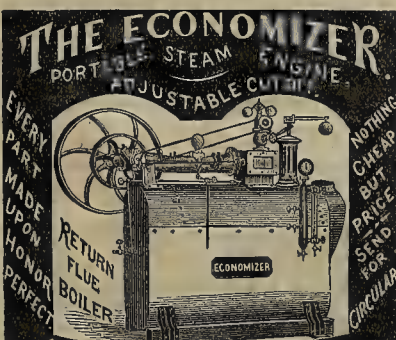
We offer this as the least complicated and most durable Rock Drill yet introduced.

Office of Amazon and Glasgow Mining Co.,
San Francisco, Nov. 25, 1876.

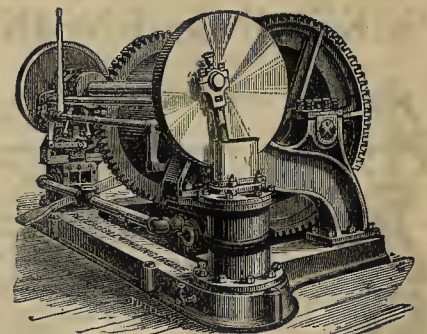
A. L. Fish & Co., Agents for Knowles' Patent Steam Pump,
Gents: After using many devices for pumping mines I must say the DOUBLE ACTING PLUNGER MINING PUMP (Knowles' Patent), bought some time since for the Amazon and Glasgow mines, is seemingly as near perfection as it is possible to be. We carry steam 500 feet to the pump, raising water 400 feet, which it does easily with 40 pounds of steam, without the slightest jar on the pipes, and is perfectly noiseless. Gravel cannot wear the cylinder, and it is by far the simplest, cheapest and most economical way I know of for draining mines. I would cheerfully recommend them. Yours truly,
A. Caldwell, Superintendent.



Thorne & DeHaven Drill.



Delamater Iron Works Air Com-
pressors for Running Rock Drills, Etc.



Bacon's Hoisting Engine.

Especially adapted to use in Mines, Hotels, Factories, Quarries, and Steamships, with Bacon's Safety Stop.

Engines, Boilers, Quartz Mills, Saw Mills, Etc., Etc.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MAY 26, 1877.

VOLUME XXXIV.
Number 21.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening last, President Davidson in the chair. L. C. McAfee, J. C. Sibirian and J. T. Murphy were elected resident members. The contributions to the cabinet were valuable. They included 59 specimens of birds, representing 57 species, collected around San Francisco and Sacramento, by G. L. Lansing, to whom a vote of thanks was passed for his gift. A silicified piece of wood, from Forest Hill, was presented by J. P. Dameron; Prof. Davidson presented a piece of carbonate of magnesia from Fort Point, and another member contributed a fine specimen of the pipe fish.

Prof. Davidson made a communication on earthquake waves, noticed at Fort Point at the Golden Gate, phenomena caused by the earthquake at Iquique. We give elsewhere in this issue the Professor's remarks on this subject, and also a diagram showing the results recorded by the gauge at Fort Point. Prof. Davidson also read a paper on an improvement in the break-circuit chronometer.

W. N. Lockington read a paper on a peculiar description of goby fish, specimens of which were recently found in the sand of Richardson's bay by Mr. Throckmorton. It can remain out of water a long time by means of a special organization adapted to the storage of water.

Mr. Dameron read a paper on the blue gravel auriferous formation of the Sierra in connection with a mortar that he described as prehistoric, found in the deposit. He said that the finding of such prehistoric implements in the gravel is reported to be common, and from this he concluded that the aboriginal flourished while the blue gravel deposit was in process of formation. Prof. Davidson said he did not think the Academy should give its sanction to the statement that the mortar was actually deposited with gravel. It might have got into the gravel in some way, but that might have been during the last 10 years. In a similar way toads have been found in stones and trees at enormous depths.

Dr. Harkness exhibited a specimen of the black knot fungus, *Sphaeria morbosus*, found in the Yosemite valley. This fungus is peculiar to North America, and has heretofore been described as only occurring east of the Rocky mountains. It attacks the cherry tree, and in some districts of the East has almost rendered the cultivation of the cherry impossible.

Dr. A. W. Saxe, of Santa Clara, called attention to a newly discovered parasite that has appeared in his section of country, and has developed into a most alarming pest, attacking fruit trees and ornamental shrubbery. The insect was first observed in September, October and November, 1876, and at that time it was only observed on the acacia rubra, then on the pendula and latifolia, and afterwards on all the acacia; also on rose bushes, and on most of the tender shrubs of the garden, except those that have pungent juices. The doctor exhibited a twig of *Ficus Australis* and a twig of rose tree covered with the pest—a large white insect by some unknown means of locomotion had taken possession of nearly every acacia in town, and all the rose bushes, locust, mesquit and other shrubs. The ova are mostly deposited on the young succulent twigs and the under side of leaves. After depositing its ova, and when full grown, being about half an inch in length, the insect falls to the ground. It is very destructive. In two years it destroys an acacia tree, no matter how large. It also fastens on orange trees, and appears very destructive to them. He had not observed, at any stage, whether the insect be comes winged; but it spreads over a quarter or a half mile in a month, and it has not been ascertained how it travels. The ordinary birds that feed on insects do not feed on this, and avoid the trees on which it has effected a lodgment. It resembles the coccus.

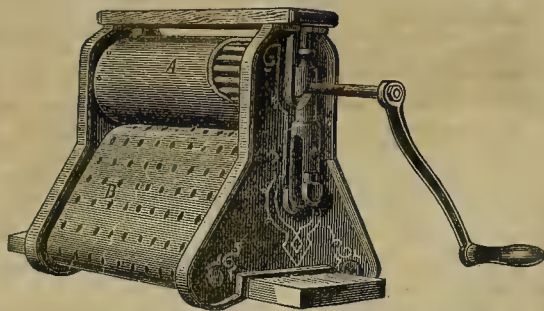
Dr. Harkness stated that similar reports came from San Mateo eight weeks ago. There were millions of them, and the farmers were cutting off the branches and throwing them on the ground.

Dr. Saxe said that there are localities all along the Santa Clara valley where the orange grows luxuriantly, and the insect is quite as destructive to the orange as to the acacia. He had applied

carbolic acid, soap and water, and had kept the insect off the orange tree so far, but it is going to be a very troublesome pest. It is worse than any other form of infesting insect that he has seen.

Improved Washing Appliance.

We herewith illustrate a washing machine which is novel in principle of construction, mode of operation, and in the peculiar adaptability of the material employed to do the work, viz: that of vulcanized india rubber, which the practical working of this machine has shown to be as well suited to the purpose of washing wearing apparel as it is well suited to the purpose of wringing the articles after they have been washed. The rollers in the machine are corrugated, but are differently spaced to create an abrading action when they are revolving. The top roll is covered with a sleeve of vulcanized rubber, prepared expressly for this pur-



DENNEY'S IMPROVED WASHING APPLIANCE.

pose, with cloth inserted to prevent stretching to get loose upon the roll. An endless band of same material revolves with the under roll. It has an inclination outward, and crosses under the machine. The band is perforated to allow a circulation of the suds and air from the channels in the under roll. The elastic force of the confined air drives the suds through the goods, thus cleansing them. The inclination of the band prevents the clothing dropping off when run through past the rolls, and allows the articles to be washed out to the ends. To enter the goods they are pressed against the band, to which they adhere, and are carried in without danger of pinching the fingers.

The advantages possessed by this machine over that of naked wooden rollers will be apparent to every intelligent person. The soft, elastic character of the rubber adapts it to washing all grades of wearing apparel and other domestic goods, from the coarsest to the finest, without possibility of injuring the texture of the finest articles used. Double the spring pressure is applied to the rolls that is applied to wooden rolls, thereby increasing its efficiency. The rubber is specially prepared for the machines. It is almost indestructible, white and attractive in appearance. For any further information concerning the machines, address the inventor, S. I. Denney, Gap, Lancaster county, Pa.

ANOTHER PLACER COUNTY STRIKE.—The Placer *Argus* says that two old miners who have been prospecting in the vicinity of Auburn many years, have at last stumbled upon something that promises to make them independent. About ten days ago they commenced work at a point near the Chinese cemetery, a mile and a half from town, finding good indications from the first. They are now down only fifteen feet, but have taken out rock, three tons of which, not selected, were crushed at the Union Star mill, and yielded \$410, or at the rate of \$136.66 per ton. There is a well defined ledge about two feet in thickness, which it is believed will hold out rich. The rock is not decomposed, like that found by O. A. Bell last week.

THE Virginia *Enterprise* says that during the past three months no less than thirty-five mines have shut down altogether. Of those still working some are not employing more than four or five men.

An Improved Water Filter.

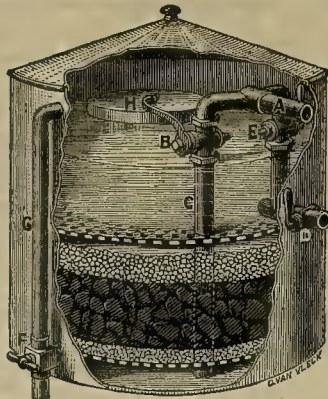
We illustrate on this page an improved filter, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by G. & W. Snook, which is intended as an attachment to water pipes through which water is conducted under pressure, so that the water can be purified and cleansed for drinking and other purposes. By the means employed the inventor is able to use an open-topped tank as a filtering vessel.

The water is admitted in the pipe, A, passing through the stop-cock, B, and pipe, C, discharging into the lower chamber of the filter. It is then forced up through the filtering material, and may be drawn off at pleasure through the stop-cock, D, connecting with pipes to any part of the house. The supply is regulated by the float, H, attached to the stop-cock, B. To clean the filter, close the stop-cocks, B and D; then open the valve, F, at the bottom of the



overflow pipe, G, when the water will flow down through the filtering materials and out of the valve, F, into the overflow pipe, G, carrying all the impurities with it. If it is desirable to give a more thorough cleaning, open the stop-cock, E, and let the water flow into the upper part of the filter until thoroughly cleansed; then close the stop-cock, E, and valve, F, when it will be ready for use again.

This filter is simple, durable and easily



Snook's Patent Water Filter.

cleaned. It is self-regulating, and, we are assured, will last many years without renewing the filtering material. It is of a capacity to filter all the water required for an ordinary dwelling house, and is a preventive against worms, bugs and all other mechanical impurities in water. They may be connected to any tank, and through the usual pipes supply the whole house, or the water may be used direct from the filter, where no tank is required for other purposes. Several sizes of these appliances are made to suit varied requirements. They are inexpensive, and will be kept in repair free of expense by the patentee. The manufacturers are G. & W. Snook, 427 Pine street, in this city.

THE President has dismissed the charges against Governor Potts of Montana.

An Antiseptic Burial Casket—New Method of Embalming.

Dr. Samuel Rogers, of this city, after having experimented for several years, has made a discovery which is of great interest to science, and to the medical profession in particular; and which is destined to effect an entire change in the present systems of embalming, or preserving the bodies of the dead. All the methods hitherto in vogue, although varying slightly in detail, depended on the injection of preservative chemicals into the veins or arteries. Although this in a measure answered the purpose, it was not entirely successful, as the features were liable to change and discoloration, the method expensive and its success greatly dependent on the skill of the operator.

Dr. Rogers employs for the purpose desired a casket of peculiar construction, and a newly discovered compound with which the body is washed. The casket is made with double walls, or with a recess in the bottom in which the chemicals are placed. After the subject is placed in the casket and the lid is sealed, by drawing out a small valve the chemicals begin slowly to evaporate and their action preserves the body. Before being placed in the casket, the body is washed all over with the solution, and the process has the effect of preserving the body for an indefinite time without its showing any signs at all of decomposition.

During the experiments in this direction by Dr. Rogers, extending over a period of years, the bodies of sheep, dogs, etc., were used, and it is only of late that any attempts with a human body were made; but the result of the experiments with the former leaves no doubt of the success of the process. If there had been any doubts they are removed now by the method having been applied to a subject obtained in a legal way from the city and county hospital, for anatomical purposes.

We examined this subject last week, some 50 days after death; there was no sign of decomposition apparent. There was no odor whatever, and the limbs and joints are as pliable as when in life. The solution applied to the surface of the body passes in by the law of endosmosis, and seems to act upon every part of the body. The flesh appeared moist and natural in color. The viscera had not been removed, as has to be done in ordinary embalming. This subject was preserved under unusual difficulties, as it had been exposed to the action of the air during the entire time since death, as it was necessary to examine it frequently as a matter of experiment.

As will be seen, this discovery is quite simple in the means employed, rapid in the time required, and requires no expert to apply it. The natural appearance is not dried out of the body, nor is it at all mutilated. This subject has been critically examined by several members of the medical faculty of this city, who concur in the expression of their satisfaction at the result of their examination, which was conducted in a thorough manner. Among the physicians alluded to were Dr. Wythe, Professor of Anatomy in the Medical College of the Pacific, Dr. Titus, ex-resident physician of the City and County Hospital, Dr. Albertson, Vice President of the State Homeopathic Society, Dr. Henry Gibbons, Sr., editor of the *Pacific Medical Journal*, and Dr. Parry. Several incisions were made, and it was found that the blood was still as fluid as if the man had only been dead an hour or two, whereas fifty days had elapsed since his decease.

The process is entirely accomplished by the external application of chemicals without injecting the circulatory system, as in ordinary embalming. And still the body is kept in a perfect state of preservation. The process has proven for a period of seven weeks to be perfectly antiseptic in its action, and also a perfect disinfectant in its effects, as there is no odor emanating from the body. For the purpose designed by Dr. Rogers, of preserving bodies for transportation to the East or Europe, this discovery merits the attention of the public and especially of the medical profession. For preparing bodies for anatomical purposes, when not needed for immediate use, the present condition of the body referred to, warrants the assumption that the process keeps them in a better state and is superior to any method practiced in the different medical colleges, as published or now known to anatomists.

The Guadalupe Mine.

"I have traveled many lands, and have seen much of the world's most wonderful and beautiful scenery; but nowhere have I ever beheld so rare a gem as this." Such was the remark of Mr. Hastings, a shrewd Yankee, and a wealthy shipping-merchant of Boston, whom we met at the residence of Col. B. B. Thayer, at the Guadalupe quicksilver mine, in this county, a day or two since. And such, we doubt not, was his honest conviction.

But few of our citizens are probably aware of the remarkable improvements and valuable developments which have been made upon this fine mining property within the last two and a half years—since it passed under the management of the present Superintendent; and but few are doubtless prepared to believe that the sum of \$1,000,000 has been expended upon the property during that period—in the construction of new hoisting and reduction works, store-houses, offices and miner's cabins; in improving and beautifying the grounds, and in the development of the mine.

Brief History of the Mine.

The Guadalupe was among the first of the early cinnabar discoveries of this State. The mine is located in a wild mountain gorge, on the Guadalupe creek, in the Santa Cruz range, near where the creek emerges into the valley, and distant from San Jose about 12 miles. It is about three miles in a straight line from the famous New Almaden quicksilver mine, and is a part of the same great cinnabar formation, which may be traced for hundreds of miles along our Coast range. The mine was discovered as early as 1846, and has been worked with varying results, subject to intervals of litigious suspensions, ever since. It was never, until recently, regarded as a profitable mine—owing, doubtless, to the crude methods of working it, and the lack of experience and capital to develop it properly.

Sixteen years ago the present month, when the editor of this journal visited the mine for the first and (until now) the last time, he found the facilities for working the mine very imperfect. The old incline was located on the right bank of the creek, and terminated near the first level of the present shaft. The furnaces and condensers were of the old styles wasting nearly as much quicksilver as they saved, and requiring vastly more fuel than the present furnaces, which are continuous feeders, and waste positively no metal. The property at that time presented a generally unthrifty appearance.

The title to the property—which is a United States patent—having been settled, and the ownership having undergone some important changes, the work of developing the property was undertaken in earnest. Capt. Mayo, who superintended the mine for a number of years, was succeeded by Capt. Brown, and he, after two years of management, by the present Superintendent, a man well known throughout the State as a chemist, mining expert, and what was of the most consequence, as a thorough-going business man.

The First Step.

Colonel Thayer entered upon his duties in the fall of '74. He saw at once the necessity of confining the creek in a water-tight channel to prevent the flooding of the mine. This was accomplished in a few weeks time with the labor of 500 hands; and thus was one of the most serious obstacles to the successful working of the mine removed. A new shaft was sunk on the opposite side of the creek from the old incline, and hoisting works were erected which can hardly be excelled by anything of the kind on the Comstock. These works alone cost \$150,000. The balance wheel of the mighty engine weighs 22,000 pounds, and other portions of the machinery are of like ponderous character. The structure rests upon the solid rock, and the engine runs with the smoothness and precision of clock work. The main shaft is divided into three compartments, one of which is used for the great pump which drains the mine, and the others for hoisting the ore and lowering timbers, etc., to the mine.

To the Lower Regions.

Stepping upon the cage, in company with Colonel Thayer and his mining Superintendent, Captain Williams, at the top of the bell we were dropped the little matter of 600 feet, or about an eighth of a mile into the bowels of the earth; thence traversing a tunnel for a distance of several hundred feet to the very heart of the mountain, we came to a solid body of ore, which has been uncovered by a cross-cut for a distance of 220 feet. Here we found a perfect wall for the entire length of the ore matter, as distinct and well defined as any which encases a vein of silver-bearing ore. Of the thickness of the ore body no man knoweth; but that it is a veritable Quicksilver Bonanza.

Is beyond question, as the developments already made in the lode have amply demonstrated. It will be some months yet before this body of ore can be worked to advantage, as the main shaft has first to be sunk to a greater depth, and the necessary drifts, winzes, stopes, etc., to be constructed. Then we may confidently expect that the product of this mine, which is now 1,000 flasks of quicksilver per month, will be speedily increased to 2,000 or more flasks. Upon the upper levels are large quantities of ore easy of access, from which

The Furnaces

Are now supplied. Other furnaces are soon to be erected to meet the increasing product of the

mine. Of those recently constructed by Colonel Thayer, they are the result of many years of experience in the reduction of quicksilver ores, and combine the largest reducing capacity with the minimum of expense.

About the furnaces and works generally perfect order everywhere reigns. The men, of whom there are about 250 employed, are provided with comfortable homes. They are of the best class of miners, the good-for-nothings having been sent adrift. All the mining is done by contract, and thus skill and muscle become at once chief factors in swelling the pay roll.—*San Jose Mercury.*

The Bear River Mines.

On Friday last, in accordance with an invitation received and accepted, we paid a visit to the various mines located on Bear river. In the morning we repaired to the *Forum* office and found that our escort, J. W. Ritchie, had engaged places for us in the Foot & Walker line, and started out. After leaving Dutch Flat we struck the Miner's ditch, and followed it. The scenery on this route is grand and picturesque in the extreme, and coupled with the delightful task of walking long flumes, on a six-inch board, renders it the most popular route by which to reach the mines. About dinner time we arrived at the upper ditch camp. The first claim to which we came, and situated below all the others, was the

Ritchie Mine.

This claim is situated about nine miles from Dutch Flat, on Bear river, lying partly in Nevada and Placer counties, and is a drift mine. The claim was located in 1870, by J. W. Ritchie, the present owner, and W. Riddle, who commenced operations at once, and it has been worked ever since. It is 4,000 feet in length, 1,000 in width, and contains 170 acres of ground. The first operations were begun at a point about 140 feet below the west line of the Whipple claim, by running a straight tunnel for 182 feet. On reaching this depth the bed-rock began to dip, when an incline, 126 feet long, was run to the bottom of the channel. From this point a drift was run west, at right angles with the main tunnel, which was in 372 feet. The gravel for the entire length of the drift has paid well, and in some places was very rich. In one of these rich spots \$1,288 were taken out in a short time, and in another, \$500. In 1873 a tunnel was run at the lower end of the claim for 400 feet. This also followed the bed of the channel, which has an average width of 80 feet, and the gravel yielded gold in handsome quantities. In May, 1876, Mr. Ritchie leased a portion of the claim to D. Crissman and Wm. Ballew, who employed two others, and commenced work in both tunnels, running drifts east and west to connect, and thereby procure good air. Mr. Ballew sold out his interest to Wm. Duren. At present there is some little delay in the work, as the air in the lower tunnel is becoming very bad, and they are running straight ahead, so as to connect as soon as possible. The yield of the claim at present averages \$10 per day to the man, with good indications of increasing. Both tunnels are supplied with an overshot wheel, pump and machinery for hoisting and forcing air into them. This claim has paid wages ever since the gravel was struck, and, as stated above, sometimes enormously. The channel on which they are now at work is about 80 feet wide, but there is a large body of gravel, from 50 to 200 feet in depth, and a thousand feet in width, that would yield handsome returns if hydraulized. It has been prospected thoroughly and carries gold from the top to the bedrock. Taking everything into consideration the future prospects of this mine are very bright, only needing energy and perseverance to make it one of the richest mines in Placer county.

The Whipple Mine

Commences at the eastern line of the Ritchie claim, and runs east 800 feet. The claim was located in 1870, by the Whipple Bros. and John Deardoff, but Mr. Deardoff sold out shortly after. They commenced work on the upper part of the claim first, but not meeting with the success they had expected, in 1875 they removed their works to the lower boundary line. They commenced on the channel, running an incline 110 feet in length to the bottom of the channel. They then commenced drifting and have run an easterly drift over 200 feet from the bottom of the incline. The yield from the claim has varied considerably, but at the present time it is yielding very flatteringly. The gold is getting coarser, some nice little pieces having been picked up lately. The works on this mine consist of an overshot wheel, pump and hoisting machinery, all of which are run by water-power. Four men are employed in the mine, and work is being pushed steadily ahead. The body of gravel lying within the boundaries of their ground is not so extensive as the Ritchie deposit, but prospects well from top to bottom, and as a hydraulic mine would pay equally as well as any ground on the river. Next in order we come to the

Dry Creek Company Mine,

Owned by H. Bartlett and others, which was located about the same time as the other mines. The claim extends 2,000 feet along the channel, the belt of surface gravel not having an extensive depth and area. An incline of 101 feet was run to the channel, and a drift was run from this point 500 feet, in which they struck coarse gold. No stoping was done, the drift being run for prospecting purposes only. As

they did not take out much gravel, only prospecting the dirt as they went along, the mine did not pay wages. At present the mine is shut down, but we understand that the proprietors intend to commence work in it shortly. It is their belief that they have the best claim on the river, and they do not intend that it shall lay idle long. They have the best rigging for working the mine on the river, and when they are in full operation we expect to hear of large returns.

The Bonanza Mine

Is the last in the chain of mines that we visited, and is owned by eight citizens of Dutch Flat. The claim contains 160 acres of ground, for which a patent will shortly issue. A tunnel has been run 80 feet, and as far as prospected will pay well for hydraulizing. The proprietors are energetic men, and when the time comes for them to begin operations they will go to work with a will, and if the indications are to be relied on, will have a veritable "bonanza" in their mine.—*Dutch Flat Forum.*

Important Ditch Enterprise.

The Nevada Transcript says: John Cashin, J. S. Thompson, J. D. Sweeny, M. M. Richardson and J. H. Thomson, have filed a document in the County Recorder's office, setting forth that they have located and appropriated fifty thousand inches of water, running in Truckee river, measured under a four-inch pressure. They take it from the river at a point called Camp 20, in this county, at the dam of the "People's Ice Company." The purpose for which this water location is made is to convey the water of the Truckee river in a flume and ditches into Sierra county, in this State, and into Washoe county, in the State of Nevada, for floating wood, timber and lumber, and more particularly for irrigating land. The flume and ditches will extend to Spanish Spring valley, in Washoe county. The flume at the initial point will be constructed twelve feet wide on the bottom and four feet high on the sides, with two and one-half inches grade to the rod, and will be continued on a grade that will be necessary to convey the water to the agricultural lands lying north and south of the line of the flumes and ditches. The ditches and flumes will be of sufficient capacity to carry fifty thousand inches of water to the above named point. They claim the right of way for their flumes and ditches over all lands lying along the line to the points above mentioned. The distance is about thirty miles. We understand the main idea in contemplation of this enterprise is to furnish water for irrigating the lands in that vicinity. There are thousands of acres there that are of no use to anybody in their present state, it being utterly impossible to utilize it without water, and the movement is projected to give it a good and permanent value. The land can now be bought of the Government for \$1.25 per acre, and when the enterprise is carried through it is claimed it will be worth \$5 or \$6, and perhaps more. An illustration of that fact is shown in the case of the inauguration of the same kind of an enterprise between Reno and Steamboat Springs, where, previous to water being carried there in flumes, the land was worthless; but now it commands a high value, from the fact that at that point any kind of feed for animals can be raised upon it. As soon as the company get the matter properly arranged they will commence the building of the flume and ditches. They expect to get at it this season.

River Mining.

What is this new class of mining you call river mining? So query many, and the *Foot-hill Tidings* replies in brief:

Twenty years ago river mining meant turning out a river—such as the Yuba or Feather—from its natural channel, either to a remote bank from the place to be mined or through flumes by the aid of wing dams or otherwise, pumping out the water, and then stripping a few rods square down to the bedrock and washing out the gold from the gravel found therein. Sometimes a company of men would spend an entire summer in getting a spot opened and never get a color before the early rains would drive them out; then again, a delay in the rainy season would enable them to work the spot for some weeks, and many's the pile made in this way. Down on the Yuba, for instance, the Cape Horn, the Grizzly, and many other mining companies, were known to take out from 50 to 100 pounds of gold per day some seasons—and as high as \$800 was washed from single wheelbarrow loads of the gravel taken out. It was only a few years that this kind of work could be done, for the tailings from the mines above came down to such an extent as to preclude the possibility of stripping any more.

Now, after 18 or 20 years of the accumulation of this debris—filling some of the rivers to the depth of 30 to 60 feet with a hard, packed and puddled clay and cement substance, it is proposed to sink down in the bedrock on these river banks, drift under this accumulation of debris and in the usual way of mining out ancient river channels secure the immense deposits of gold known to exist along these river beds.

River mining is soon to be the favorite field of venture for capitalists—this we already feel perfectly assured of—and so soon as the Yuba River company, the pioneer in the work gets in, those who secured interests in river mining while in prospective will be considered lucky *hombres*. Mark our prediction.

Trinity Mining Interests.

The almost total failure of placer mining, says the Trinity Journal, compared with what it would have been had the past season been different, leads us to look around us and see the opportunities which may offer for entering into other kinds of mining than that wholly dependent upon the seasons. The last winter was a peculiarly unfortunate one for the country in more respects than one. It not only produced less gold than the customary amount, but it checked the prosecution of important enterprises, which, had they been carried out as originally projected, would have opened a large field for the employment of labor, and thus paved the way for another era of prosperity. But it may be that the failure of placer mining will be the means of turning the attention of working men to other channels of employment, and be, in the long run, more of a blessing than present appearances would warrant.

The cinnabar mining interests, which commanded great attention two or three years ago, is not, at the present time, prosecuted with that vigor which the importance of the interest would seem to demand. This does not follow as a result of the failure of the lodes heretofore worked, but rather that there is not the demand for quicksilver, nor does that necessary article of commerce command the price in the market at which it was held two years ago. The high price then asked for quicksilver was not in consequence of any scarcity of the article, nor for the reason that, by a probable failure of the mines from which the chief supplies of quicksilver had been drawn, there would be a scarcity in the near future. Quicksilver, like any other article of necessity, was subject to the manipulation of speculators, and in this way, the supply of the market was monopolized and controlled by a ring which placed such a price upon the article that it could not be used with profit in many places where it had heretofore been employed. The fictitious value thus given to quicksilver stimulated prospecting, and thus caused the discovery of many new mines, some of them of value. Foremost among these were the cinnabar mines of this county. While the demand for quicksilver continued, and the price was held at the high figures of two and three years ago, the work of prospecting was prosecuted with energy and resulted in finding indications of the metal in a number of localities near the site of the main discovery. These mines possess a value which the future only can determine. When the present lull in mining in Nevada and elsewhere gives place to renewed activity, it will be followed by an increased demand, and consequent higher price for quicksilver which will justify the holders of claims in developing them to a greater extent.

But it is not to placer, nor yet to cinnabar mining that we are to look for the great source of employment in the future. Each is good in its way, but there is another mining interest which has not, as yet, been fairly started, but which will at some time in the near future, be a prolific source of wealth. We refer to quartz mining. Where there have been such rich and extensive deposits of placer gold as those which built up Weaverville, Junction City, Douglas City, Lewiston, and in fact all our chief mining camps, it stands to reason that there must be veins of paying quartz, from which all this wealth has come. Other counties, such as Amador, Calaveras, Nevada and Tuolumne years ago became noted for the quartz mining which grew up near the site of rich placers. Such, we think, will also be the case in Trinity. Already we hear of developments which were in a great measure unexpected. The existence of a quartz ledge which would hold out such good promise as the Bullychoop, was a thing hardly to be dreamed of three or four years ago. Shares in this ledge now command a fair price which a year ago were, to say the least, of doubtful value. The success of the holders of Bullychoop should inspire others to a search for the veins from which the placers of other places have been enriched.

In one respect the quartz hunter in this county will have a greater difficulty to contend with than has been the case in the placers of the Sierra Nevada range. The bedrock lies at a greater depth from the surface than in the low mountains in which the gold deposits of southern counties were formed. We presume the fact that there have been in past years greater rainfall and consequently a greater growth of vegetation in a measure accounts for this fact. Quartz in granite bedrock is easier traced or found for the reason that the bedrock is nearer the surface than slate is usually found.

Recent discoveries in Deadwood creek show the existence of paying quartz in that locality; the indications of which were noticed in some prospecting done years ago. Deadwood heads up in the mountains opposite French gulch, where rich quartz was worked in former years. There is no good reason why the search for quartz should not be successfully prosecuted in other localities as indeed, is being done to some extent. The existence of quartz veins has been noted in almost every mining camp, but thus far little has been done toward testing and developing them. There are a few of our old resident miners but can recall where the noticed quartz ledges in former days, but thought little or nothing of the matter at the time. It can do no harm and may be of service, if they would give them a little attention now.

MECHANICAL PROGRESS.

Uses for the New Form of Steel.

We made a note recently of the progress in steel manufacture by which cast-steel is being produced cheaply directly from pig-iron, and consequently may be used in heavy castings. This new form of metal is called "solid cast-steel." An English exchange gives a number of instances in which this cast-steel may be used advantageously for forged work in machine parts. It says: "There will be no need to state that the uses to which the metal may be put are exceedingly numerous, when it has been demonstrated that its properties are equal to those of the best forged steel. We make a few remarks on those applications of the metal to machine construction which appear to us to be most important. For heavy shafts, straight and bent, for steam engines of large size appears to us to be the most important application of solid steel to general industry. The forging of ingots of such large dimensions has, up to the present, been a matter of great difficulty. The ingots nearly always contained large cavities arising from agglomeration of the metal on cooling. On the other hand, the operation of hammering ingots of such dimensions is accompanied by serious difficulties, and experience has amply shown the inconvenience of this system. The same rules apply in casting pieces of this kind as have already been detailed; molds will naturally vary according to circumstances. Annealing must always be carried out with the utmost care, and the metal maintained at a red heat during such time as may be requisite for the softening action to have full effect. All these pieces of machinery, like cranks, pinions, shafting, may be constructed with considerable advantage of cast-steel; the quality should be of the very softest, so as to offer a maximum of resistance to shock. They should be cast in ingot molds whenever practicable, as this greatly conduces to the solidity and soundness of the casting."

PORTABLE ELECTRIC LIGHT.—An ingenious little electric light apparatus has been invented by Mr. Facio, of Paris, and is applicable to watches, walking sticks and such like. The watch, for instance, to which it is applied is united by a chain to a link bar, which may be placed in a button hole, another chain communicates with a pile which may be carried in the waistcoat pocket; to the link bar another chain is attached in communication with a receptacle or box containing wick, and a "Geissler" tube, which will transmit the spark produced by the electricity. Thus the time can be easily seen in the dark. The apparatus is composed of other conducting chains coming from the pile, and of a receiver which may be perfectly independent, the receiver being provided with a wick or bobbin, and the receiver may be made like a locket or other article if desired; communication between pile and locket or other article may be produced by means of a button or other suitable appliance placed in any convenient position. The chains may be formed or composed of two wires and surrounded by insulating material, which latter may be covered with some precious metal or other material as fancy or taste may dictate. The lighting material may be carried by the watch itself, or the light generating apparatus may be provided with a case to hold the watch or other object to be lighted up in such a manner that the glass which covers the aforesaid case will receive the action of the lighting tube containing the "Geissler" tube, and the case itself will be independent of the object to be lighted.

GOOD FORGERS.—The question has often been asked us, says the *Carriage Monthly*, "How is it that some smiths are able to make better forgings than others?" or "How is it that— is always so successful with his welds?" The secret of all this is in first knowing how, and after knowing how, in doing, or trying to perform, what we know. The knowing smith so lays out his work at the close of the day that his first work in the morning will be the heaviest and such as requires but little welding. By doing this he not only leaves the lighter portion of his labors for the waning of the day and also the tiring of his arm, but he removes the chill from the anvil and other tools to such an extent as to prevent the iron becoming chilled before the weld is properly made. His fire is always clean. His tool rack is always in order, thus enabling him to grasp the required tool at the proper time. He never places his iron in the fire a second time until, with a file, he has removed all the scales. The ice-cold anvil will chill the thin part of the "scaf," and prevent the welding of that portion. It is impossible to take a clean heat with a fire full of slag. If you have to hunt five minutes for a tool, your iron has become cold, and unless you remove the scales and other matter, your forgings will not be perfect.

SERVICE OF STEEL WHEELS.—The Boston *Advertiser* of April 2d says: "The locomotive *David Tyler*, of the Boston & Providence railroad, has under its tender a set of German cast-steel wheels, made by Bochum. Each wheel has run 102,002 miles, and shows little or no signs of wear. These wheels were imported in 1872 as an experiment."

TESTING RAILROAD MATERIAL.—The *Aurora*, Ill., *Beacon* says that the Chicago, Burlington and Quincy Company require all material of whatever kind, to stand a thorough practical and scientific test before being delivered to the locomotive, car or track depots. All boiler material is tested by bending while cold, which it must do without showing a flaw, and by getting the tensile strength of every sheet. Every sheet of iron for fire-box use must stand a tensile strain of 60,000 pounds per square inch. Every sheet of boiler material not for fire-box use, must stand a strain of 55,000 pounds per square inch. Every sheet of steel for fire-box use must stand a tensile strain of 70,000 pounds per square inch, and no sheets of iron can be issued from the store without being marked "Tested, O. K." All stay-bolt iron must stand 60,000 pounds per square inch, and bend double cold without showing any flaw, and a bolt, three-quarters of an inch in diameter, must bend double cold, with a thread cut on it, without showing cracks more than one-third of an inch in depth. All common bar-iron, whether round or flat, must bend double cold without showing a flaw deeper than one-eighth of an inch, and bend double red-hot without showing any tendency to "red shortness." All flues or boiler tubes must be of maker's weight, not less than No. 13 (wire gauge) in thickness, nor greater than No. 11; must caulk into a flue-sheet without cracking or showing any seams in iron; must flat down and bend double cold without showing any flaw or crack either across or lengthwise of flue, and must show a homogeneous material when subjected to an acid bath.

AN ATMOSPHERIC ENGINE.—A reader of the *Press*, in Indianapolis, Indiana, sends us an account of a new atmospheric gas engine, constructed by Sinker, Davis & Co., of that city, from which we give the following descriptive item: "The engine is vertical, perhaps eight feet to top of fly-wheel, and can be operated in a floor space of four by five feet. Its mechanism appears to be not intricate, compared with the ordinary stationary steam engine. No smokestack is needed. The principle upon which this engine works is as follows: Gas and air, mixed in such proportions as to give a mild explosive compound, are admitted under a piston, which slides air-tight in a vertical cylinder, open at the top. The compound is ignited, explodes, and the explosion drives the piston upward. The ignited gases, having increased in volume, lose their heat; their pressure becomes less as the piston rises, and when it has reached the top of the cylinder, a partial vacuum is formed, and the pressure of the atmosphere makes the piston descend. The work thus done steadily by the atmosphere during the return stroke of the piston, yields the driving power, which is transferred to the shaft by suitable mechanism. The utilization of the instantaneous power of the explosion, by allowing the piston to fly up freely from it without doing other work than emptying the cylinder of air, is the basis of the great economy and success of these engines."

BOX PILING FOR SMALL SCRAP.—A writer in the *American Manufacturer* makes the following practical suggestions: Box piling very small scrap iron has long been practiced in the old country, and is a very economical way of working it up, and, if properly handled, makes a finished bar, without a seam, with once heating. Two sections of bars are required to form the box, or case; one for the top and bottom, and the other for the sides; and when filled, make a good pile, which requires no tying, and can be changed without much risk of falling down. The bars are rolled out of puddled iron at the forge rolls. Piles, up to several hundred pounds, can be made. When reading Mr. Wheeler's method of utilizing scrap steel, as described in last week's *Manufacturer*, I thought that this way would be suitable for his purpose and less expensive. There may be an objection to this form of pile, as it is open at the ends, and as the steel is reduced to a semi-fluid state, it might run out. This may be so in regard to steel; but it does not apply to iron scrap, which, in this way, can be worked up without reheating. Bars can be made in sections, so that old rails can be rolled into finished bars at one heat, where such quality is suitable. Baling scrap, in a scrapping furnace, is very wasteful, and increases the cost considerably, without improving the quality in proportion.

PACKING POLISHED SHEETS.—We read in an Eastern exchange that a manufacturing firm has introduced a new and improved method of packing their fine planished sheet iron, which must be very desirable for shipment to great distances, as well as when large lots require to be stored for any length of time. It consists of a large sheet of common iron turned up around the edges like a large bake-pan, which is done in a heavy iron press made for the purpose, in sizes to fit the sheets to be packed. Into this the required number of sheets are placed, and on this is fitted a substantial inch board covering; the package is then placed under a press which forces the whole down into the pan until the edges are brought up over the board, when it is strongly nailed to the wood, making a firm, neat and tight package that can be easily handled, and cannot fail to preserve the finished sheets in good condition for a long time, even under exposure that would ruin the iron in the old style of packing.

SCIENTIFIC PROGRESS.

Social Statistics.

A paper entitled "Births, Deaths and Marriages, and the Comparative Progress of Population in some of the Principal Countries of Europe," by Mr. Frederick Martin, author of the "Statesman's Year Book," was read recently before the English Statistical Society. Mr. Martin, says *Iron*, taking as the basis of his paper the vital statistics published in the last annual report of the Registrar General, gives the birth, death and marriage rates of nine countries, divided into three groups, the first comprising England, France and Prussia; the second, Austria, Italy and Spain; and the third, Denmark, the Netherlands and Sweden. For all these States except two, Italy and Spain, the calculation of averages per 1,000 of population, spreads over 22 years; while for Italy they comprise 12 and for Spain ten years. Mr. Martin showed in his tables, illustrated by diagrams, the striking differences that exist between the nine countries in the average rates of births, deaths and marriages. While in England and Wales the average annual birth-rate, per 1,000 of the population, was as high as 39.9 in the 22 years from 1853 to 1874, in France it was during the same period as low as 26.1, France standing, as regards births, far below any other country. The death-rate again varies enormously in the different States. While it was as low as 20.2 per 1,000 of the population in Denmark, it was as high as 32.2 in Austria; England filling a place only less favorable than Denmark and Sweden, the average rate having been 22.2 per 1,000 during the period. The marriage-rate, as may be expected, is subject to great fluctuations, springing from trade prosperity or stagnation, and good or bad harvests. The average annual marriage-rate during the 22 years was highest in Prussia, namely 17.3 per 1,000 of the population, and lowest in Sweden, 14.1 per 1,000. Among the tables given by Mr. Martin, perhaps the most suggestive was one giving the surplus of the average annual birth-rate over the death-rate, denoting the increase of population. It was 12.7 per 1,000 of the population in England and Wales; 11.6 in Sweden; 11.4 in Denmark; 10.7 in Prussia; 9.0 in the Netherlands; 7.7 in Austria; 7.5 in Spain; 6.9 in Italy; and 1.9 per 1,000 in France. It will be seen that England was the most progressive and France the least of all the nine countries, the population being almost stagnant. Mr. Martin thinks "France is the riddle of Europe."

INFLUENCE OF AGE ON LEAF AND FLOWER.—Decandolle, the celebrated Swiss botanist, has started a question which promises to be a very interesting one. Does a tree produce flowers or fruit earlier as its age increases, temperature and other circumstances remaining the same? He gives a number of observations to show that in some cases they do, and in other cases they do not, and botanists are in a quandary. It is generally found in these contradictory cases that there is a near reason, not discerned, that will explain the whole. It has been noted by American botanists (see Salem volume of "Proceedings of American Association") that trees of the strongest constitutions leaf the earliest. Thus there are varying times of leafing in Norway spruces, though both be of one age. In a severe winter, if one or two such die, it will be the one which leafs the latest. The early one is the hardest. Now a young tree is always more tender than one approaching a flowering condition. Young trees are often destroyed when older ones escape. This being the case, there would be a difference in the time of leafing between such young ones and their elders. On the other hand, where young trees had as strong a constitution as older ones, and there may be many such cases, there would be little difference.

A TRANSIT OF VENUS MEDAL.—The French Academy of Sciences have commemorated the observations of the transit of Venus by striking a medal. M. Alphee Dubois was intrusted with the execution of this object, and he has had recourse to the ancient mythology. On one side of the medal, Venus, "in the simple costume of goddesses," passes before the car of Apollo, the god of the sun. Science is represented on the earth—a female figure sitting and observing the phenomenon. The legend round the border is, "Quo distent spatio sidera juncta docent;" "the stars by their conjunction teach us by what space they are separated." On the reverse is "Institut de France Academie de Sciences. Passage de Venus sur le Soleil, 8-9 Decembre, 1874." The medal has been distributed to the members of the Academy, and to all the observers of the transit.

"POPULAR SCIENCE MONTHLY."—As a mark of the progress of popularized science in this country, nothing could be more positive than the fact that D. Appleton & Co., of New York city, find themselves forced to issue a monthly supplement to their excellent journal, the *Popular Science Monthly*. The limits of the regular magazine do not give space to the multitude of topics which are pressing for publication, and we know that eager readers will be glad to have the doubled amount of choice selected and original scientific literature which Prof. Youmans provides. We regard the new publication as a loud voice proclaiming American scientific progress.

OZOKERIT FOR PRESERVING METALS.—For preserving metal and other substances from decay and fouling, Mr. Charles Weightman Harrison, of South Kensington, proposes to dissolve the crystalline hydrocarbon known as ozokerit in any of its solvents, such as benzole, petroleum, oil of turpentine, or resin oil, and he then mixes the solution in any desired proportion with other suitable bodies, according to the purpose for which it is required. He mentions that his experiments have been made with ozokerit as a type of the mineral hydrocarbons, which are built up of molecules, containing not less than 20 atoms of carbon, such minerals being capable of resisting the action of all acids at ordinary temperatures, and suffering no deterioration from atmospheric influences. On this account he has found them valuable for mixing with gums, resins and colors applicable to a great variety of purposes for preserving, as they impart thereto a high degree of permanence. He explains that a simple and ready mode of preserving bright metals from rust is to rub them over occasionally with a wax formed by melting together equal parts, or nearly so, of ozokerit and beeswax. It is easily applied in a thin coat by rubbing the compound on the metal with a cloth. In applying this compound wax to iron he sometimes adds finely powdered plumbago to give it the color of the metal. Another compound or solution for preserving metals he forms by dissolving in a sand bath (say) four ounces ozokerit and four ounces marine glue in two pounds benzole, and then adds four pounds linseed oil and one-half pound essence of turpentine. The mixture is kept gently boiling in the bath for an hour or so, after which it is ready for use, and may be applied to the metal by a soft brush.

PRIZES FOR INDUSTRIAL RESEARCH.—The *English Mechanic* says: "Among various subjects in connection with which the Industrial society, of Rouen, has just offered prizes are the following: A substance capable of replacing albumen of eggs in all its applications to printing of tissues, and considerably cheaper; new sources of albumen, either in natural products containing it, or by transformation of other proteic matters; a new dark vapor as intense and solid as aniline-black, but not weakening the cloth, and capable of being printed with any other colors without alteration at the point of contact; a method for volumetric determination of commercial glycerine; a solid blue coloring matter, applicable like indigo, but cheaper; new process for fixing indigo blue by steaming; new method of fixing aniline colors; a new thickening matter to replace Senegal gum; production of ozone in the concentrated state; new application of ozone; industrial production of oxygen; rapid and exact means of determining the reducing power of a coal or any carbon; utilization, in metallurgical or ceramic arts, of iron pyrites, desulphurized by roasting; process of concentration or precipitation of nitrogen and phosphoric acid in fecal matters, urines and sewage waters, yielding a manure of at least 5% nitrogen, and 20% phosphoric acid."

NEW WEIGHING INSTRUMENT.—The ordinary chemical balance is, of course, rather a costly instrument, it being difficult to make the two halves sufficiently alike, and to combine stability with sensitiveness. M. Payer proposes the following arrangement for small weights. A two-armed tube is filled with mercury, and on one of the mercury surfaces is placed a well-fitting plate, which can move in the tube without friction. This serves as the balance scale, and the body to be weighed is placed on it. The liquid will rise in the other arm correspondingly, and equilibrium is at once obtained with great certainty. Place a known weight, one grain, for example, and note how high the mercury rises. Then place a second grain and note the additional rise. Going on in this way, a scale may easily be constructed. As for each rise in one arm there is an equal sinking in the other. This scale can be applied to the other leg also, of course in opposite direction. The sensitiveness of the arrangement is considerable. It can be increased by use of the Torricellian vacuum, the plate, with the body to be weighed resting, in this case, on the mercury in the open arm. The scale can here have no fixed zero, since the air pressure varies, which is only a slight inconvenience.

A NEW CHEMICAL ELEMENT.—Haddam, Conn., has furnished the material for the discovery of a new element, as announced by Hermann in the German *Journal of Chemistry*. It is found in tantalite, of which it forms a little over 6%, the rest being metallic acids of tantalum, niobium and ilmenium. Hermann calls it neptunium. He has so small a quantity of the material at his disposal that he has been unable to reduce the oxide to a metallic state. With soda it colors microcosmic salt golden yellow. It is the first element discovered for many years by mineral analysis, although in the past 17 years five metals—cesium, rubidium, thallium, indium and gallium—have been discovered by spectrum analysis. The atomic weight of niobium is 118.2, giving neptunium acid the formula Np_4O_7 .

ACTION OF SEA WATER ON LEAD.—The *Journal of the Chemical Society* says that, after keeping strips of new cut lead in a bottle of sea water, frequently shaken, for four days, no trace of lead could be detected in the water, but the bright surface of the strips was coated with an insoluble lead compound. Hence, lead pipes may be used in marine aquaria without any fear of injury to their inhabitants.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 3.	Week Ending May 10.	Week Ending May 17.	Week Ending May 24.
Albion	124	8	111	63
Alta	90c	50c	35c	60c
Andes	60c	35c	50c	20c
Baltimore Con.	15	5c	3.50	4.30
Belmont	11	1	50c	30c
Best & Belcher	204	114	164	104
Bullion	2.80	1.40	3.70	1.5
California	342	261	311	251
Challenge	90c	25c	1	40c
Chollar-Potosi	37	27	33	20
Confidence	1	1.05	60c	54
Con Imperial	35	261	311	251
Con Virginia	64	4	6	4.20
Crown Point	10c	5c	10c	5c
Dayton	19	16	17	15
Eureka Con.	3.35	1.60	2.60	1.80
Exchequer	15c	30c	25c	50c
Geddes & Bertrand	3.95	3.20	3.30	2.4
Gen Thomas	15c	30c	25c	50c
Grand Prize	3	2	3	2
Globe Con.	3	2	3	2
Golden Chariot	3	2	3	2
Gould & Curry	2.10	2.05	1.1	1.95
Hale & Norcross	15c	10c	10c	10c
Hussey	1.20	20c	1.05	15c
Julia	34	5	64	4
Justice	34	5	64	4
Knickerbocker	44	2	34	24
Kosuth	50	10c	10c	10c
Lady Bryan	2	1	2	1
Lady Wash.	2	1	2	1
Leopard	2	1	2	1
Leviathan	40c	30c	30c	15c
Leeds	3	2	3	2
Madison	74	63	7	64
Manhattan	10c	10c	10c	10c
Mansfield	10c	10c	10c	10c
Meadow Valley	84	4.90	7	5
Mexican	15	13	15	14
North Con Virginia	20c	5c	15c	10c
New York	25c	5c	15c	10c
Niagara	15	13	15	14
Northern Belle	4.15	34	4.05	34
Ophir	75c	50c	40c	25c
Overman	144	94	134	74
Pacific	184	94	134	74
Phil Sheridan	54	44	34	24
Panther	40c	25c	30c	25c
Poorman	34	24	24	24
Prospect	34	24	24	24
Rock Island	34	24	24	24
Sage	34	24	24	24
Seg Belcher	34	24	24	24
Sierra Nevada	80c	15c	50c	10c
South Chariot	50c	35c	45c	40c
Succor	34	24	24	24
Trojan	11	5	7	3
Union Con.	20c	5c	15c	10c
Wells-Fargo	64	34	6	3.50
Woodville	64	34	6	3.50
Yellow Jacket	64	34	6	3.50

Sales at S. F. Stock Exchange.

FRIDAY, A. M., MAY 18.	MONDAY, A. M., MAY 21.
225 Alpha	275 Andes
190 Andes	30c Alpha
1235 Best & Belcher	11111111
225 Belcher	3.30 30c Alpha
760 Bullion	3.30 30c Alpha
1385 Crown Point	3.30 30c Alpha
3515 California	27125 California
3360 Con Virginia	27125 California
250 Chollar	21222 California
100 Confidence	21222 California
1650 Caledonia	2.21 15c
200 Challenge	50c
510 Exchequer	2.40 21c
2150 Gould & Curry	54 54c
750 Hale & Norcross	615 Hale & Norcross
300 Julia	1.30 70c
540 Mexican	50c 54c
360 Ophir	94 94c
1650 Overman	14 14c
645 Savage	2.80 2.85
645 Sierra Nevada	1.10 30c
30 Seg Belcher	15 15c
1000 Trojan	21 21c
650 Union Con.	21 21c
200 Utah	9 9c
150 Yellow Jacket	54 54c
860 Best & Belcher	94 94c
60 Belmont	34 34c
35 Bullion	34 34c
775 Con Virginia	25 25c
1250 California	26 26c
250 Crown Point	30 30c
620 Con Imperial	55 55c
100 DeFrees	20 20c
150 Eureka Con.	18 18c
550 Exchequer	2.10 2.10c
75 Empire Id.	25c
1025 Grand Prize	44 44c
1415 Gould & Curry	1.40 1.40c
260 Hal & Norcross	13 13c
300 Justice	21 21c
300 Jackson	21 21c
100 Jefferson	15c
975 Leopard	1.45 1.45c
60 Leeds	30c
115 Modoc	30c
125 Manhattan	70 70c
495 Mexican	4.80 4.80c
280 Northern Belle	15 15c
300 New Coso	31 31c
210 Ophir	1.10 1.10c
1085 Overman	10 10c
100 Raymond & Ely	41 41c
85 Utah	2 2c
260 Union Con.	3.30 3.30c
SATURDAY, A. M., MAY 19.	
235 Alpha	8 8c
1235 Andes	45 45c
960 Best & Belcher	104 104c
550 Belcher	31 31c
550 Bullion	2.50 2.50c
440 California	25 25c
440 Crown Point	54 54c
150 Caledonia	1.10 1.10c
2475 Con Imperial	45 45c
575 Exchequer	1.80 1.80c
1175 Gould & Curry	54 54c
550 Grand Prize	44 44c
300 Hale & Norcross	1.80 1.80c
290 Julia	1.15 1.15c
610 Justice	4 4c
100 Jackson	1.40 1.40c
50 Leviathan	30c
530 Leopard	1.10 1.10c
550 Mexican	5 5c
200 Overman	3.10 3.10c
875 Prospect	35 35c
80 Raymond & Ely	5 5c
340 Sierra Nevada	1.40 1.40c
10 Seg Belcher	1.15 1.15c
340 Savage	2.20 2.20c
100 Trojan	54 54c
550 Union Con.	2.45 2.45c
100 Ward	54 54c
100 Yellow Jacket	54 54c

370 Union Con.	2.40 2.40c
590 Yellow Jacket	54 54c
AFTERNOON SESSION.	
60 Alpha	8 8c
680 Best & Belcher	104 104c
50 Bullion	2.50 2.50c
260 Belcher	31 31c
540 California	25 25c
625 Con Virginia	25 25c
1000 Crown Point	4.80 4.80c
320 Con Imperial	55 55c
530 Caledonia	1.10 1.10c
50 Eureka Con.	18 18c
250 Exchequer	2.10 2.10c
250 El Dorado S.	50c
1280 Gould & Curry	54 54c
700 Grand Prize	44 44c
90 Golden Chariot	30c
400 Hale & Norcross	1.10 1.10c
255 Justice	4 4c
500 Leopard	1.35 1.35c
280 Manhattan	70 70c
335 Mexican	5 5c
320 Northern Belle	15 15c
140 Overman	3.10 3.10c
60 Ophir	1.40 1.40c
225 Sierra Nevada	1.40 1.40c
305 Savage	2.30 2.30c
200 Trojan	54 54c
160 Utah	9 9c
420 Yellow Jacket	54 54c
WEDNESDAY, A. M., MAY 23.	
170 Alpha	8 8c
490 Best & Belcher	110 110c
175 Bullion	2.95 2.95c
100 Belcher	31 31c
200 Caledonia	1.10 1.10c
610 California	25 25c
40 Chollar	20 20c
15 Confidence	30c
60 Con Imperial	35c
50 Con Virginia	26 26c
215 Crown Point	4.60 4.60c
40 Exchequer	2.15 2.15c
610 Gould & Curry	54 54c

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M., MAY 17.	THURSDAY, A. M., MAY 24.
240 Alpha	8 8c
170 Andes	30c
510 Best & Belcher	94 94c
115 Belcher	2.80 2.80c
150 Bullion	2.70 2.70c
1420 California	25 25c
1345 Con Imperial	45 45c
35 Chollar	18 18c
725 Con Virginia	24 24c
50 Caledonia	1.10 1.10c
400 Crown Point	4.20 4.20c
605 Exchequer	1.70 1.70c
815 Gould & Curry	4.40 4.40c
815 Hale & Norcross	1.55 1.55c
45 Julia	1.10 1.10c
1000 Justice	4 4c
600 Leviathan	25c
45 Leopard	1.20 1.20c
400 Morning Star	2 2c
210 Mexican	4.10 4.10c
200 North Con Vir.	5c
235 Overman	74 74c
515 Ophir	34 34c
450 Phil Sheridan	74 74c
900 Prospect	40c
100 Raymond & Ely	41 41c
215 Savage	2.30 2.30c
120 Sierra Nevada	1.40 1.40c
20 Utah	9 9c
575 Union Con.	2.30 2.30c
120 Yellow Jacket	4.80 4.80c
AFTERNOON SESSION.	
1375 Best & Belcher	110 110c
560 Belcher	31 31c
225 Bullion	3.20 3.20c
1210 Con Imperial	45 45c
150 Chollar	20 20c
1290 California	25 25c
1215 Con Virginia	25 25c
310 Crown Point	4.55 4.55c
310 Caledonia	1.10 1.10c
50 Empire Id.	25c
135 Eureka Con.	16 16c
450 Exchequer	2.05 2.05c
400 Golden Chariot	1.30 1.30c
100 General Thomas	15c
1260 Grand Prize	4.15 4.15c
2285 Gould & Curry	54 54c
355 Hale & Norcross	1.55 1.55c
50 Jefferson	1.50 1.50c
360 Leopard	1.40 1.40c
730 Modoc	30 30c
50 Manhattan	70 70c
230 Mexican	4.10 4.10c
250 Northern Belle	14 14c
355 Ophir	9 9c
505 Overman	74 74c
100 Panther	74 74c
100 Prospect	40c
100 Raymond & Ely	41 41c
500 Rye Patch	14 14c
200 Savage	2.10 2.10c
185 Sierra Nevada	1.40 1.40c
150 Utah	9 9c
145 Yellow Jacket	54 54c

Pacific Board—Latest Sales.

WEDNESDAY, A. M., MAY 23.	
20 Alpha	8 8c
100 Andes	30c
550 Best & Belcher	110 110c
50 Belcher	31 31c
495 Bullion	3.10 3.10c
140 Crown Point	4.40 4.40c
600 Con Imperial	37 37c
70 Con Virginia	26 26c
60 Chollar	20 20c
300 Caledonia	1.10 1.10c
50 Empire Id.	25c
135 Eureka Con.	16 16c
450 Exchequer	2.05 2.05c
400 Golden Chariot	1.30 1.30c
100 General Thomas	15c
1260 Grand Prize	4.15 4.15c
2285 Gould & Curry	54 54c
355 Hale & Norcross	1.55 1.55c
50 Jefferson	1.50 1.50c
360 Leopard	1.40 1.40c
730 Modoc	30 30c
50 Manhattan	70 70c
230 Mexican	4.10 4.10c
250 Northern Belle	14 14c
355 Ophir	9 9c
505 Overman	74 74c
100 Panther	74 74c
100 Prospect	40c
100 Raymond & Ely	41 41c
500 Rye Patch	14 14c
200 Savage	2.10 2.10c
185 Sierra Nevada	1.40 1.40c
150 Utah	9 9c
145 Yellow Jacket	54 54c

California Board—Latest Sales.

WEDNESDAY, A. M., MAY 23.	
170 Bullion	2.95 2.95c
150 Best & Belcher	110 110c
150 Bullion	2.95 2.95c
120 California	25 25c
120 Caledonia	1.10 1.10c
80 Crown Point	4.40 4.40c
130 Con Virginia	25 25c
120 Con Imperial	35 35c
170 Exchequer	2.10 2.10c
200 Gould & Curry	54 54c
100 Hale & Norcross	1.55 1.55c
120 Justice	4 4c
650 Mexican	5 5c
50 Modoc	30c
200 Northern Light	34 34c
100 Ophir	1.40 1.40c
40 Overman	74 74c
100 Pictou	25c
70 Savage	2.70 2.70c
300 Sierra Nevada	1.20 1.20c
100 Trojan	54 54c
530 Trojan	54 54c
40 Utah	9 9c
75 Union Con.	2.45 2.45c
30 Yellow Jacket	44 44c

MINING SHAREHOLDERS' DIRECTORY.

(Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.)

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
American Flat M Co	Washoe	7	25	May 18	June 20	C A Sankey	331 Montgomery st
Baltimore Con M Co	Washoe	15	50	Apr 6	May 25	C A Sankey	331 Montgomery st
Bullion M Co	Washoe	3	200	Apr 6	May 31	J S Kennedy	419 California st
Leopard M Co	Washoe	7	50	Apr 3	May 15	J H Brown	428 California st
Empire M Co	Idaho	13	100	Apr 26	May 30	W H McClintock	330 Pine st
Gould & Curry	Washoe	3	100	Apr 5	May 10	A K Durbin	309 Montgomery st
Hale & Norcross	Washoe	54	50	Apr 5	May 9	J P Lightner	309 Montgomery st
Hussey Con M Co	Washoe	3	10	May 3	June 7	R H Brown	428 California st
Julia Con M Co	Washoe	3	100	Apr 5	May 10	A N	419 California st
Jefferson M Co	Washoe	3	100	Apr 13	May 14	C A Sankey	331 Montgomery st
K K Con M Co	Washoe	3	100	May 1	June 9	B B Minor	309 Montgomery st
Knickerbocker M Co	Washoe	18	50	May 16	June 21	J H Sayre	330 Pine st
Leopard M Co	Washoe	2	50	May 3	June 4	E H Brown	428 California st
Mint G & S M Co	Washoe	17	10	Apr 6	May 9	D A Jennings	401 California st
North Con Virginia M Co	Washoe	8	25	Apr 18	May 23	J Maguire	419 California st
Overman M Co	Washoe	37	30	Apr 16	May 21	G D Edwards	414 California st
Phil Sheridan M Co	Washoe	14	50	Apr 16	May 18	W R Townsend	339 Montgomery st
Savage M Co	Washoe	27	100	Mar 29	May 1	E B Holmes	309 Montgomery st
Sierra Nevada M Co	Washoe	48	100	Apr 21	May 24	W W Stetson	339 Montgomery st
Silver Hill M Co	Washoe	11	100	Apr 11	May 7	W E Dean	419 California st
Utah S M Co	Washoe	16	200	Apr 12	May 16	G C Pratt	309 Montgomery st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Aureola M Co	New	4	10	Mar 23	May 19	June 11	T S Fifth	240 Montgomery st
Bonanza M Co	New	1	10	Apr 19	May 29	June 19	W Martin	19 First st
Barcelona Con M Co	New	2	25	May 2	June 4	June 26	J P Moore	320 Sansome st
Booth G M Co	Cal	2	5	Apr 30	June 4	June 25	G R Spinnery	320 California st
Con Bonanza S M Co	New	1	10	Apr 19	May 29	June 19	W Martin	19 First st
Con Bonanza S M Co	Arizona	2	10	Mar 13	May 29	June 13	J H Jewell	507 Montgomery st
Dioures Con M Co	New	1	10	Feb 17	Mar 26	June 15	J W Clark	418 California st
Excelsior S M Co	New	—	10	Apr 24	May 25	June 18	W A Kollmyer	306 Post st
El Tesoro M Co	Lower Cal	2	10	Mar 31	May 16	June 13	W H Chickering	220 Sansome st
Equitable Tunnel & M Co	Utah	14	25	Apr 3	May 8	May 26	H H Healy	Merchants' Ex
El Dorado Water & Deep Gravel Co	Cal	16	10	May 12	June 18	June 23	C S Oles	524 California st
Gold Bar Con M Co	Cal	1	25	Apr 3	May 3	May 31	C R Hopkins	438 Union st
Gold Run M Co	Cal	1	25	Apr 3	May 20	June 7	C G Palmer	41 Market st
Low Range M Co	Washoe	2	3	May 21	June 25	July 17	F E Luty	5087 Montgomery st
Mariposa Land & M Co	Cal	10	100	Mar 28	Apr 30	May 28	L Leavitt	309 Montgomery st
Merrill M Co	New	2	50	Mar 10	May 12	June 1	A C Hammond	401 California st
Maryland M Co	Washoe	5	10	Apr 2	May 10	June 3	C C Chesley	333 Montgomery st
Mitchell G & S M Co	Washoe	2	25	May 22	June 23	July 10	A C Hammond	401 California st
New England T & M Co	Cal	4	10	Apr 25	May 31	June 23	A C Hammond	401 California st
Occidental Reduction R & M Co	Cal	3	100	Apr 2	June 7	June 30	A C Hammond	401 California st
Silver King South M Co	Arizona	1	5	May 8	June 9	June 27	H P Ledyard	240 Montgomery st
Silver Sprout M Co	Cal	—	5	May 23	June 25	July 16	T B Wingard	328 Montgomery st
Union M Co	Cal	14	10	May 1	May 1	June 1	W H Vinton	Crane Alley
Yuma America M Co	Nev	6	15	May 12	June 16	July 12	R H Brown	426 California st

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

MAHONEY.—Amador Ledger, May 14: This mine is now being operated by the company. S. D. R. Stewart is entitled to much credit for the enterprise he has displayed. Under his management the mine has been successfully operated, and in now surrendering the property in consequence of the expiration of his lease, he leaves it in first-class working condition. Mr. Benjamin is the new Superintendent, with Humphrey Rose as foreman. The working force, we believe, is to be kept fully up to the standard of the past year. There is plenty of pay ore in sight, and while this is in process of extraction, prospecting will not be neglected. The company have no mill of their own, though it is asserted on good authority that the quartz now in sight is sufficient to justify the erection of a mill; and perhaps the one dollar assessment just levied has something to do with securing such facilities.

Good Hope.—The water is being taken out of the shaft, preparatory to sinking. The work of draining is now about completed. Good Eastern men are furnishing the wherewith to develop the property, and are prepared to expend \$500 per month in prospecting. This will be quite an item for Jackson. We have never heard but one opinion expressed concerning this mine. All experts unite in pronouncing it a paying property, and the management is good management. The shaft is now down 150 feet, with a fair sized ledge of ribbon rock running from the surface to the bottom.

ZACATERA.—This mine is situated at West Point, Calaveras county. F. C. Hall, of Lone City, is now sole owner. This week the old boiler and smoke-stack used at the Onida mine was shipped to the Zacatera. A 10-stamp mill is being constructed and will be completed in a few days. The Zacatera has not been prospected sufficiently to determine its value. Plenty of good rock has been extracted, and there is plenty more in sight. The custom work around West Point is ample to justify the putting up of the mill. The quartz of this locality is much softer than any met with on the Amador vein. With 10 stamps it is calculated to crush about 40 tons per day.

BUTTE.

LOW WATER.—Oroville Mercury, May 19: Leander Delavan, J. C. Biorco and Daniel Paxton are mining in the Middle fork of Feather river, opposite to J. N. Turner's mill, at a place known to be very rich, but which has never been worked on account of the great amount of water in the river. This year it is low and in three weeks' time every drop of it will be running through a flume, and the bed of the river left dry to work. We shall not be surprised if they come out with a good lot of gold to the man. They are deserving of good luck, for they work hard and are honest men.

WILL BUILD.—A. J. Severance has begun the construction of one of the new mining machines, just above the bridge, to cost \$10,000, and to be completed by the middle of June. It will be recollected that Messrs. Hedge & Butterfield, the owners of the right, went some three weeks ago to San Francisco and formed a company, which was in due time incorporated. The capital stock was \$100,000, divided into 100,000 shares of \$100 each. Every dollar of the stock that they would sell was quickly taken. As they own a piece of the river above the bridge, Mr. Severance, now one of the company, will build the boat and the company wash the gravel.

MISNO MACHINE.—Again they are at work on the celebrated mining machine, the one with the lengthening cylinder. They moved the machine to a piece of ground owned by Col. J. C. Logan and W. S. Higgins, which was deeply covered with tailings. The cylinder was found to be long enough only to reach through the tailings and about a foot into the original bed of the river. The last two hours that it worked it took up \$60. With a cylinder long enough to work well, there will be no trouble in taking out \$500 per day. These gentlemen who own the ground are men not easily excited and have rare good judgment, and they claim that the machine will do all that is claimed for it. It is certain to get gold out of the river if there is any in it.

STILL BURNING.—Last week, just before going to press, we learned that Poppe's tunnel, at Cherokee, was on fire. We supposed that our information was correct. Since that time we have been informed by parties that it is only the rock that has been dumped at the mouth of the tunnel and the mouth itself that is on fire. It should be borne in mind that not a single piece of wood is in the tunnel or at its mouth. All the fire and smoke come from the rocks or some substance contained in them. Any way the mouth of the tunnel is so hot that it is impossible for one to get near it so as to see in or to work. The smoke arising from the dump is very thick, and the men's ranch. The fire is very strongly impregnated with the smell of sulphur. It certainly is something unusual, and for which no one has yet been able to account.

CALAVERAS.

GWIN MINES.—Calaveras Chronicle, May 19: We continue to hear the most favorable reports from the Gwin mine. The 1300-ft level has now been extended nearly or quite 100 feet since the pay shute was struck, and there is as yet nothing to indicate that the level is approaching the extremity of the body. Stopes are being rapidly opened, additional batteries set at work and the ore producing and crushing capacities of the mine are being urged to their full extent. The present condition and future prospects of the mine are excellent; in fact, more flattering to-day than at any other period of its history.

NEW MILL.—A new 10-stamp mill is being erected at the Wallace and Ferguson mine, at Sheep ranch. The lumber is nearly all on hand, and the work is to be pressed forward with vigor. The yield of Wallace & Ferguson, with only a five-stamp mill at work, has been marvelous. What will it be with 15 stamps?

QUARTZ MILL MOVED.—The 10-stamp quartz mill, owned by the Hughes Bros., situated in Chile gulch, about a mile this side of the Junction, was recently moved to the mine, belonging to them, in Old Woman's gulch. The mill was moved a distance of two miles—a large number of hands and a 16-horse team taking part in the transportation. Putting the battery in close proximity to the mine will very materially reduce the expense of milling the ore. The cost of hauling the rock will now be merely nominal, and we learn that water for milling purposes can be obtained at much lower figures than where the battery originally stood. The mill will be ready for operations in a few days. Good rock is being taken from the old Anderson Flat mine, which is under bond to an English company. A crushing of rock is being taken out, which, if it proves of a fair quality, will determine the sale of the mine. Rock from the Granite mine, owned by White & Co., is being crushed in the mill at the Josephine. A large quantity of ore—some 200 tons or more—is on the dumps. Extraordinary rich rock was lately discovered in the Lacey mine, about a mile this side of the Point. The ledge shows about a foot wide and the rock is said to be

incredibly rich. At the Champion mine active operations are progressing. A large force of hands is employed, running levels and stoping, and the mills will be set at work again in a few days. Splendid developments have lately been made in the mills owned by the Enterprise Consolidated mining company. A large body of rich ore has been uncovered, and all the indications warrant the belief that the mine will prove a permanent and paying one. At Railroad Flat, Clark's mine is running on custom rock. A new five-stamp battery is being erected on the Chapman mine at Railroad; expected to be in readiness for operations in a week or 10 days. Fair-grade ore is being taken from the Sunderland mine, at Independence, and there is an abundance of it.

INYO.

THE REX MOUNTS.—Inyo Independent, May 12: Among the notable local events of the next two or three weeks will be the starting up of the Rex Mounts (the old Silver Sprout) mill for the summer's work, it having been almost entirely rebuilt and supplied with the most improved reduction machinery for the use of the new company. Of the almost innumerable rich but small ledges which cut through Kearsarge mountain, the Rex Mounts veins present the greatest number in the smallest space, and have so far made the best returns for the amount of capital invested in working them. The mill, which is the result of incidental expenses of building trails and improving the old mill, the company realized handsome returns over and above the cost of prospecting, mining and milling. The Rex Mounts proper, consisting of four parallel ledges within a width of 150 feet are the most important so far as developed—in fact the first one of the four is the only one upon which any considerable work has been done. In all there are 15 ledges, including the four mentioned—the Potosi Nos. 1, 3, 5, 7, 8, 9, 11, the Boomerang and Arctic, which vary in width from 12 inches to four feet, all carrying the rich ore which has proved so productive by a working process. On the principal mine three openings have been made by tunnels running in on the ledge from the end, all showing distinctly the ledge and yielding good ore. Unless for drainage and ventilation, where run to tap the bottom of an existing shaft, we have but little faith in tunnel enterprises as a means of prospecting, but above all other mining districts in our knowledge Kearsarge hill presents the best inducements for an operation of this kind. A tunnel 6,000 feet in length would either cross-cut these 15 ledges or enter the highest at a point nearly 3,000 feet deep, where, from the pitch of the outer veins, all would enter. The matter of 75 feet of snow in the cañons near the present workings, as is the case now, wouldn't make much difference with mining operations then.

KERN.

TEHACHAPI COAL MINE.—Kern County Courier, May 17: Two miles from the railroad in Tehachapi, below what is called the Charley Moore canyon, in San Joaquin, at the left of the lake, a coal lead has been found which promises to be of greater value. It was located by J. B. Malin, Col. A. Lewis and Thomas Eveleveth, and is on a Government section. The owners are now working a ledge seven feet thick, and croppings can be found over the whole section. A mile square. It is likely to prove of more value than all the other mines in the county.

MONTEREY.

COAL AND MARBLE.—Castroville Argus, May 17: We were told while in Monterey, a few days ago, that work was going on actively at the Carmelo coal mine, 10 men being now employed, and that there was no longer any doubt of the property being a valuable one. It is said that the stockholders of the mine were made the victims of a "freeze-out" game, by which persons from abroad acquired control, but it is also stated that the former will, in due time, make a determined effort to wrest from the "sharps" the pretended ownership and management of the mine. The coal deposits, which are understood to be very extensive, are located some seven miles south of Monterey, and only a mile or two from the city of Carmelo. Further south there are quarries of fine marble, which are now being developed, and which, together with the coal discoveries, promise to bring additional capital and enterprise to old Monterey. These quarries lie near the coast, at a distance from Monterey of about 25 miles, and, as we learn, are in the hands of men of energy, who are laying them open with all practicable speed. The number of hands employed at the present time, though it is probable that a larger force will soon be put on, further discoveries (these of a bluish marble) having been made within the past fortnight.

NAPA.

OAT HILL.—Cor. Napa Register, May 19: The Oat Hill mine has closed down for the present. They are building a 16-ton furnace, which will be completed by the first of June, when work will again be resumed. Mr. McGee, the Superintendent, informs me that hereafter they will work white men altogether. No Chinamen "need apply."

THE GREAT EASTERN is still closed, and it is rather doubtful if they start up again for some time.

MR. GARRETT, of St. Helena, has a force of men at work on his copper mine, about five miles from this place, with a very good prospect. He has many tons of good paying ore on the dump.

JOHN LAWLEY has a large force of men at work on the Phenix mine, and is getting out a great deal of rich metal.

NEVADA.

BIG BLAST.—Nevada Transcript, May 18: The Milton mining company put off a big blast in the Manzanita claims, at Sweetland, on Sunday last. They used five tons of the new Judson powder, and those who saw it acknowledged it to be the most successful blast ever put off in that part of the county. It was placed in a drift 75 feet long and in the 75 150 feet each way, and it broke the ground full 80 feet beyond the powder line. The agent of the Giant and Judson powder, Mr. O. W. White, assisted in arranging the blast, and of course he was as much pleased with the effective work the powder did as were the owners of the claims. We understand a blast of about four tons will be put off in the North Bloomfield gravel mining company's claim and they will use the Judson powder, as it does its work most thoroughly.

GOING TO START UP.—Dennis Desmond & Co. have leased the mine near the New England, which is known by the name of the Mohegan. The company is composed of old miners of this city and Grass Valley. On account of the trouble with the water and the inability of the former owners to put up machinery, work was suspended on it a long time ago. The shaft is now down 45 feet and the last rock taken out yielded \$87 to the ton. The New England mine has drained the water from the Mohegan, and the lessees are going ahead determined to thoroughly prospect it, and if the water troubles them they will make arrangements immediately to put up machinery. They are practical miners, and we have no doubt they will soon be able to demonstrate that they have a good paying mine. In addition to the large number of mines that are now in operation. If the work goes on as vigorously in the next few months to come as it has during the past few months, we shall soon see Nevada City assume its pristine celebrity.

A BAR of gold worth \$2,600 was sent to San Francisco a few days ago, it being the result of a ten days' washing in the Main street bridge and extending below the Broadway bridge. It was thrown up by Chinamen to turn the water of Deer creek.

ABOUT A DOZEN Chinamen are working the tailings in Deer creek. In past years when worked by white men good pay was taken out, and we are of the opinion that the almon-eyed fellows are doing well.

NEW MILL.—We understand that Crosby & Mitchell, owners of the Main street bridge, at Grass Valley, propose putting up a 20-stamp quartz mill at their place,

for the purpose of crushing rock. As soon as they get the sulphurets works in active operation the new mill will be put up. It will be a great accommodation for quartz miners in that section, and be the means of encouraging prospectors, as the rock will be milled at a very low rate, and the sulphurets can be sold on the ground to the owners of the sulphurets works.

QUAKER HILL MINE.—Grass Valley Union, May 19: The Quaker Hill mine, owned by George F. Jacobs and A. A. Sargent, is taking out gold to the satisfaction of all concerned. Ordinarily at this season of the year, the owners have had plenty of water of their own to wash with, but this year have to purchase what they use. Even with the expense of water the mine is paying handsome profits. A portion of the claims will have to be worked by drifting, but that plan need not necessarily be adopted for several years to come.

PLACER.

WATER SEASON.—Dutch Flat Forum, May 17: The weather continues cool and we have been favored with considerable rain for this time of year, all of which aids in prolonging the water season. There is no change worthy of note in the various claims that are running. They are all under full headway, and the Superintendents appear determined to wash as continuous as possible while the water lasts.

THE BAKER is preparing for a blast of 300 kegs of powder, which will be ready in a few days. The blast in the Baker claim proved to be another success, and loosened a large amount of gravel on the west side of the pit. This claim is now using water nine hours per day. The Summer-set cleaned up on Saturday last, producing the largest result realized from that claim in a long time. At Gold Run, the North Star, Bonanza, Illinois and the claims of the Gold Run Hydraulic M. Co. (limited), continue washing with vigor.

LITTLE YORK MINES.—Work in the Empire mine has been interrupted considerably of late, caused by the sliding of a loose strata on top. The Christmas Hill company turned off last week and cleaned up, and the further working of the mine is laid over until such time as a change is made in its general workings, as the present tunnels, etc., are of no further use, and new ones will have to be constructed.

LOST CAMP MINES.—Hydraulic in the Harkness mine has been in steady progress since the first of January, during which time but one general clean-up has been made. This claim embraces 400 acres of mining ground, with an average depth of 100 feet, 1,000 inches of water is used, which is supplied by a ditch belonging to the mine, drawing its supply from Blue Canyon ravine, and is capable of furnishing a stream of 1,000 inches five months in the year. The Boston claim is worked under the supervision of John Rathburn and Wm. Bellows, and is an extensive drifting mine, which is successfully worked during the entire year, and has continued to pay well since opened.

LOWELL HILL MINES.—Work in the Swamp Angel mine is being prosecuted with vigor. The main tunnel continues to be opened, and new drifts are being run up, all of which looks well and yields well as worked. The various prospecting tunnels in this vicinity are being advanced as fast as circumstances will permit, and a number of which will soon tap the auriferous gravel, which, when accomplished, no doubt this divide will be able to boast of several more dividend paying mines.

LIBERTY HILL MINE.—Washing continues in the Liberty Hill mine. The work of removing the lower strata is making slow but steady progress, and is thought will pay well.

YOU BET MINES.—A blast of 550 kegs of powder was exploded in the Neece & West mine on the 13th inst., which did splendid execution, enough of the gravel being pulverized to make a large run. Water was turned on the same evening. Owing to the scarcity of water the washing, and the conclusion of several successful runs, has shut down for the season. Washing in the Hussey continues with unabated success. The Nevada M. Co. are now washing from four points, all of which are doing well. The yield of gold from this mine, it is said, will be very large this year. The large tunnel under construction from Wilcox ravine, which will tap the bottom of the channel in this mine at a distance of \$9,000 feet, is now advanced 850 feet.

REMINGTON HILL MINES.—The Rhode Island Co. still have sufficient water to continue ground sluicing and are doing well. The advancement of both tunnels in the Wide West mine is progressing rapidly and paying well. The side drift opened east of tunnel No. 2, is extended 50 feet. At this point the channel is several feet deeper than where it is tapped by the tunnel, and is also said to be considerably richer. Breasting out has also been commenced, the returns of which are sure to be large.

GREEN VALLEY MINES.—The Opel Co. has suspended further hydraulic, as it was found that the upper strata besides being very hard, did not carry sufficient gold to pay for its working. The lower strata is known to be rich, and will yield large returns for drifting, which work is now under progress. The Hayden Hill Co. continues to work hydraulic at intervals, and supply of water not being sufficient for continuous washing, but they expect to accomplish enough work during the season so enable them to disturb a good dividend. The Novey Co. has tapped the cement in the lowest part of the channel. The mill is now in operation crushing. There are deposits of loose gravel mixed with the cement which is being washed without crushing. The mine is looking splendid.

GOOD ROCK.—Fleecer Herald, May 19: Sheriff and Landlord recently struck and mined a new ledge near Crosby's ranch, about a mile and a half north of Auburn. The rock taken out in sinking up to a recent date amounted to about three tons, which they have had crushed at the Evening Star mill, and realized from it \$410.10, or a little over \$130 per ton. This they say is average rock, and for an average it certainly is not bad.

PLUMAS.

BLUE GRAVEL.—Plumas National, May 19: This company, whose claim is just across the Middle fork from Pauley's hotel, are still running their tunnel from the shaft, in bedrock, and are now about 100 feet from the shaft. They will run a tunnel and connect it with the gravel this week. The new machinery works smoothly, and does all that was expected of it. The prospects for this company are bright in the extreme, and the boys deserve them, for they are all hard working men, who have a right to a fortune, whether they get it or not.

RICH CLAIM.—The somewhat noted mining claim on Footman's creek, purchased by a San Francisco company, last summer, from Healy & Lanthier, is turning out splendidly. The run of water is necessarily light this dry season, as the ground is situated well up on the creek, but we are informed that the company have made big pay, and that with the usual run of water they could easily have cleaned up \$25,000 for the season's labor. There are plenty of just such claims in Plumas, and they will come to light as fast as capital and well directed labor commence the search for them.

ANOTHER RICH LEDGE.—A strike has recently been made at Last Chance, a place about six miles below Onion valley, near the Middle fork of Feather river, by Mr. McMartin, which bids fair to be a rich thing in quartz. The ledge, we are told, is six or eight feet thick, crops out for a long distance and prospects well and uniformly. If it were in the Greenville section, it would be the subject of much comment. The ledge is now being worked, and a place like Last Chance, it will be some time before its merits will be thoroughly discussed. The owners, McMartin & Mullen, are making arrangements to prospect it thoroughly.

FRANKLIN.—On Monday we stopped a few minutes at the Franklin shaft, on Willow creek, and found everything in a fine state. The shaft is now down something over 100 feet, and the lava is changing considerably in character, being mixed with washed gravel, iron-ore, quartz, etc. Considerable water is coming in, the calculation being that the pump is raising 82 gallons per minute. It is not increasing, however, and can be handled without trouble so far. They expect to break through into gravel in the next 20 feet, and to get bedrock in the next 40 feet.

SURVEY MADE.—Surveyor Keddie has lately been down

at French ravine, making a survey of the ground of the ground of the Rich Bar quartz company. The owners of this celebrated mine are making arrangements to get a patent.

GIBSONVILLE.—On Sunday last we paid a flying visit to this old-time mining camp, and found it looking lively, mining and smelting, having returned in full measure. Several of the gravel claims in that vicinity are paying well, and many workmen are employed, who, with the usual recklessness of Californians, apparently only use the hard-earned wages to "make it lively." On the whole, Gibsonville looked lively and prosperous, and the opinion of mining men in that vicinity, who are well posted in the state of the mine in the vicinity of that town, is almost inexhaustible. The United States Book companies are now hiring a large number of men, and the ground is paying well in each claim. The North American, at Newark, is also doing well. Several large gravel claims will soon be opened, and we can see no reason why this section should not continue to prosper for years to come.

SAN BENITO.

COAST MINES.—San Benito Enterprise, May 19: From Andrew Paulson, who has been working in the Salinas mine for the past year, we learn that its managers are driving a tunnel for the purpose of tapping the main shaft. They expect to be able to do it in 600 feet. The tunnel is now 400 feet. Similar to the one now being run on the Comstock, Con. Wonder and other mines in that range. The Salinas mine is being worked for quicksilver, of which there is a splendid prospect; while the other claims are mostly operated for antimony. Some very high grade cinnabar has recently been struck in the Wonder tunnel, also in the Comstock. The Ham-burg mine has been attached by the employees for wages, and temporarily shut down in consequence. The Stanton mines still continue to produce large quantities of fine antimony, but the furnaces, for some cause unknown to our informant, still remain idle.

SIERRA.

SOUTH FORK.—Mountain Messenger, May 18: Preparations are being made to renew work in this claim at Forest City.

THE EMPIRE mining company of Sierra county have declared a dividend of \$1 per share, amounting to \$10,000.

VERY RICH.—Out of a candle box of quartz from the North Fork claim, Forest City, the handsome amount of \$42 was taken.

BRANDY CRY.—Hickey and Arnett are still running. Bunker Hill company commenced work last week, and are running their tunnel in to sink down on the channel for which they are searching.

Nevada.

WASHOE DISTRICT.

JUSTICE.—Gold Hill News, May 23: Daily yield, 400 tons of ore, keeping the mills steadily crushing. The ore breasts and stopes are yielding well from the 400 down to the 800-ft level. The bullion returns show an increase in the value of ore milled, and the appearances are that the yield will be continuous and uninterrupted for months to come. The winze below the 800-ft level is being continued steadily downward, the bottom still in good ore. The entire size of the south drift on the 800-ft level is in a solid body of fine ore, requiring continuous blasting. This ore is of splendid character, and to all appearances is liable to form an extensive and very valuable body. This drift shows that the ore extends much further to the northward on the 1000-ft level than it has on any of the levels above, and indicates that the extent of pay ore in that portion of the mine will far exceed both in quality and amount the production of any level yet opened.

YELLOW JACKET.—The station for the 3200-ft level eastward from the bottom of the north winze being opened, the main drift east, cross-cutting the vein, as well as a lateral drift south, are both commenced and each is in about 25 feet to-day. The new shaft is down 700 feet. Material at bottom hard, andesite, with considerable water to contend with.

CAIRO.—Daily yield, 500 tons of ore. The ore stopes on the 1600, 1550 and 1500-ft levels are all looking well and yielding the usual quantities of rich ore. Winzes are being sunk below the 1600-ft level to connect with the lateral drift on the 1650-ft level for ventilation purposes. The north drift in the ore vein on the 1650-ft level is making slow progress on account of the intense heat. A breakage of the crank-shaft of the driving engine of the Con. Virginia mill has somewhat interfered with the regular bullion returns from that quarter, but the decrease in the production by that mill is being much more than made up by the Sacramento and Occidental mills, both of which have been started up and are now crushing California ore.

CON. VIRGINIA.—Daily yield, 400 tons of ore, keeping the mills running to their full capacity. The ore stopes on the 1650-ft level are yielding rich ore, but are intensely hot. The south ore stopes on the 1550-ft level are also yielding splendid ore. The ore stopes on the 1400-ft level are looking well. The 1750-ft station of the C. & C. shaft is finished, and a drift has been started to cut the ledge, which is now in a distance of 50 feet, the face in hard blasting ground.

GOULD & CURRY.—Putting in the new pump bob at the head of the main incline is being pushed, with all possible vigor. The south drift on the 1700-ft level was connected during the first part of the week with the Savage combination winze, giving a splendid circulation of good air, and greatly cooling the entire southern portion of the mine.

CALEDONIA.—Sinking the shaft is making the usual excellent progress, the bottom still in quartz of a fine character. The body of quartz has a very appearance of being large, is heavily impregnated with pyrites of iron and assays from \$5 to \$20 per ton.

CROWN POINT.—The main east drift on the 2000-ft level continues in porphyry mixed with quartz, which assays from \$5 to \$6 per ton. The flow of water is still strong and the drift intensely hot, so that the progress is necessarily very slow.

THE UPRIDE from the 1465-ft level continues in a fine character of quartz, carrying some spots of fine ore.

NORTH CON VIRGINIA.—For several days past operations in the mine have been suspended in order to make some necessary changes and improvements to the machinery.

OVERMAN.—The east drift on the 1400-ft level is being pushed ahead, the face still in quartz and ledge marker. A drift north from the east drift has been started to connect with the south drift from the Belcher on the 1000-ft level. The west cross-cut on the 1100-ft level is still in fine quartz and has not yet reached the west wall of the ledge.

BULLION.—A drift has been started north from the east drift on the 1600-ft level to determine the character of the vein in that direction. The body of quartz on the 2000-ft level has crossed the Eschequer line, and preparations are now being made to run an east cross-cut in the Eschequer ground to determine the value of the ore vein.

SILVER HILL.—The north drift on the 650-ft level yesterday cut through the casing of the ledge and encountered a strong flow of water, which forced a temporary suspension of the work until the head of the water is drawn out.

ATLANTIC CON.—The main tunnel has been temporarily suspended for the purpose of sinking a winze on the ore vein below the tunnel level.

BEST & BELCHER.—Cross-cut No. 1, on the 1700-ft level is being pushed steadily forward, the face in porphyry, carrying spots and streaks of very favorable quartz. Cross-cut No. 2, now under construction, is being pushed on Saturday last, with strong indications of water in the face, so that it was deemed best to stop the drift until the pumps of the Gould & Curry were ready to receive it.

JULIA.—The face of the main south drift on the 1800-ft level continues in quartz and ore of a fine character. This drift is being pushed with energy, the body of quartz through which it is running having every appearance of being an immense deposit.

THE ENGINEER.

Transmission of Power by Wire Ropes.

The first attempt to transmit power at a distance by means of metallic belts or ropes, was made by the brothers Hirn in 1850, at a calico weaving establishment, near Colmar, Switzerland. An immense mass of scattered buildings seemed to forbid the possibility of using them, and yet placing the motive power at any one point. In this emergency, they first tried the method of force transmission, using a riveted steel ribbon to each building from the engine-house. The steel bands were about two and a half inches wide by one-fifth of an inch thick, and ran on wood-faced drums. This presented two inconveniences; in the first place, on account of its considerable surface, the band was liable to be agitated by the wind; and secondly, it soon became worn and injured at the points where it was riveted. It served, however, very well for 18 months to transmit 12-horse power to a distance of 80 meters. The success of the principle was complete, but much remained to be done before the wire rope and the rubber or leather-lined driving-wheel solved all difficulty and brought the principle to a practical reality.

The number of applications of this method of transmitting power increased very rapidly. At the end of 1859, there were but few applications in use. In 1862, there are known to have been 400, and in 1867 about 800. At the present time there are several thousand in successful operation. In 1864, a terrible explosion almost entirely destroyed the great powder-mill at Otkhta, situated about six miles from St. Petersburg, Russia. The whole establishment was rebuilt. After studying many combinations, an artillery officer proposed to profit by the resources which the telodynamic cables offered to engineers, and thus to realize the only combination which could prove successful in a powder-mill, namely, a great distance between the buildings, so that the explosion of one should not entail the ruin of the rest. The new establishment which went into operation in 1876, consists of 34 different workshops or laboratories, to which motive power is transmitted by means of wire ropes driven by three turbines, thus distributing a total of 274-horse power along a line nearly a mile in length.

The largest transmission is that employed to utilize the falls of the Rhine, near Schaffhausen, in Switzerland. Advantage was taken of the rapids at one side to put in a number of turbines, aggregating in all 600-horse power. As the steep rocky banks forbade the erection of any factories in the immediate vicinity, the entire power was transferred diagonally across the stream to the town, about a mile further down, and there distributed, certain rocks in the water being made use of to set up the required intermediate stations. In the industries, we frequently meet with a similar case. Many valuable sites for water power are lying idle in this country for want of building room in their immediate vicinity. New England especially abounds with them. Coal being so dear there, their value is all the greater. Since the water can only be let down hills in certain directions, the cost of a canal or flume would in most cases come too high, and so the power remains unimproved. By wire-ropes, however, we can convey the power of a turbine or water-wheel in any direction, both up and down stream; up an ascent to the top of a bank or down a slope. The power need not be confined to one factory, but may be distributed among a dozen, if necessary, located so as to suit their particular business, and not to suit the often-times inconvenient location of a canal. Thus, by means of the transmission of power by wire-ropes, we may utilize all this power that is now being wasted, and devote it to a useful purpose.

The history of the application of the wire-rope to the transmission of power (the facts of which, as given above, we take from the *Builder*) would be incomplete without acknowledgement of the valuable inventions of A. S. Halladie, of S. F. His work is well known on this coast, and readers of the *PRESS* will count him for a high place in the progress of wire cable utilization.

Cement and Broken Stone for Culverts.

A writer in the *Railway Age* aims to meet the needs of builders, by describing culverts of grout made with cement mortar and broken stone for culverts, in a country where stone of good quality is scarce.

For a two to six feet culvert, make a good stone foundation, laid in a trench dug for the purpose, and cover it with grout made of cement mortar mixed with coarse gravel or broken stone, in or on which lay a penstock of desirable diameter, the staves made of any cheap lumber, one inch in thickness and four or five inches wide, properly hooped, laid on the grout, and cover it with grout from three to six inches, according to the diameter of the culvert, covering the grout with dirt as the work progresses, so it will not dry, but harden. Two or three months' durability of the penstock would be all required of it.

In cases where larger culverts are required and stone can be procured for side walls, and money can not for cutting the stone to make a stone arch, lay up the side walls to the height required, the whole length of the culvert to be made. Then make a strong wooden arch, well braced, from five to ten feet long, with its span

or base line a little shorter, say one or two inches, than the distance (or width) between the side walls of the culvert, which we might call the abutments of the arch. Then commence at one end of the culvert and set the wooden arch so one end will rest firmly on the inner side of the top of one of the abutments, and the other on a piece of plank lying on and projecting over the inside of the other abutment on a line of about two inches of the inner face of the abutment. It would require about three pieces of plank at equal distances and made to support that side of the arch by putting heavy stone on the part of the plank lying on the abutment. Or, that side of the arch might be made six to twelve inches longer than the other, and rest on strong pieces of wood built in the wall the same number of inches from its top. Or, the base line of the arch might be made about four inches less than the distance between the abutments, and both feet of the arch rest on two or three boards laid across the abutments at equal distances. After the arch is adjusted in place, lay stone along the base of each side to prevent the grout from falling inside, and then put on the grout over the entire arch to the desired thickness, covering it with dirt as it progresses, to favor the setting of the cement, and as soon as it is sufficiently hard, saw or cut out the wooden supports and take out the wooden arch from the inside, move it below and set it up close to the section of grout arch built, and complete another section, repeating the operation until the whole culvert is completed.

I have in my mind a culvert with side walls laid as in an ordinary box culvert, about five feet apart and six feet high above the pavement.

Longest Tunnel in the Union.

The *Baltimore Gazette* says: "Few people know how great an engineering enterprise is going on in Baltimore county. For one thing alone, a tunnel six and four-fifths miles long, 36,510 feet, is being built under ground, for over four-fifths the distance through hard gneiss and granite. It will be the longest tunnel in the country, and there will be only two larger in the world—the Mont Cenis, which is eight miles in length, and the St. Gothard, now in progress of construction, and which is to be nine and a quarter miles. The fact that the water supply tunnel lies near enough to the surface to allow of numerous shafts, greatly facilitates its construction. The tunnel is a circle 12 feet in diameter, and extends from the Gunpowder river, about eight miles from the city, to Lake Montebello—the distributing reservoir—near the Hartford turnpike, about a mile and a half from this city, the direction being 26° west of south. This tunnel will conduct the water from the Gunpowder river to Lake Montebello. Thence a conduit, 4,120 feet long, known as the Clifton tunnel (from the fact that it passes under a portion of the Clifton park), conducts the water to a point just south of the Hartford road, where it enters six mains, each four feet in diameter, which convey the water to the city, a distance of 1,900 feet. The country along the line of the works is hilly, and the tunnel varies in depth below the surface from 67 to 353 feet. There are 15 shafts in the main tunnel, the deepest extending 294 feet below the surface. The water rains down from the crevices of the rocks, and pours along the bottom of the drift. Gangs of men, each with his miners' lamp attached to his hat, are hard at work picking and delving in the flinty bowels of the earth; and the monotonous clang of the hammer upon the drill is constantly heard, except when everything is in readiness for firing a mine, when all retire to a safe distance, and thunderous reports roll through the rocky corridors. The work of the tunneling is all done by hand, it being cheaper than the machine work in a drift of such narrow diameter."

MEIGGS' NEW ENTERPRISES.—We read in the *Railway Age* as follows: Henry Meiggs, the Peruvian railroad contractor, who has been probably the largest foreign purchaser of American railroad material and the largest employer of American engineers also, has this month resumed work on some of the unfinished lines on which work has been suspended for some time for lack of money, under a contract which gives him control of the great Cerro de Pasco mines, which, since the Spanish conquest, are said to have yielded \$500,000,000 in silver, but have been substantially abandoned for some time because of the cost of working at the depth attained, where it was almost impossible to bring heavy machinery, and drainage is indispensable. Mr. Meiggs not only intends to make the mines more accessible by a railroad, but to excavate a drainage tunnel, and it is claimed that this is likely to expose to easy working as much ore as has already been taken out from the mine. The government is to receive from 30% to 50% of the yearly net product of the mine, according to the amount taken out. Mr. Meiggs is to obtain the capital for the new works, the government guaranteeing interest and appropriating guano to secure it. Capital is not likely to be easily obtained on these terms, and Mr. Meiggs begins by issuing \$1,250,000 of his own circulating notes to provide for the opening of the work. In the company formed by Mr. Meiggs there are besides himself, Messrs. John L. Thorndike, Charles S. Rand, James H. Sherman, Minor K. Meiggs and W. H. Cilley, some of whom are well known to American engineers. Some of Mr. Meiggs' former employes have been recalled from America for this new work, but it is not likely to require, at present at least, anything like his former force of engineers.

One of the Famous Bridges of the World

The Cincinnati Southern railway will be famous in the engineering world for its bridges, two of them ranking in certain respects, above all others yet constructed. That over the Kentucky river just completed and successfully tested, is the highest as well as one of the longest, in the world, rising to the lofty elevation of 275 feet, with a total length of 1,125 feet. The center span measures 375 feet, the two other spans 300 feet each, and the attachments adding 150 feet more. The next highest bridges in existence are one in Switzerland, 254 feet high, with a span of only 154 feet, and one in the Andes in South America, 252 feet high, with spans of 125 feet. The bridge to be erected for the same railway over the Ohio river will claim pre-eminence for length of span. The channel span will measure 520 feet, and will thus be the longest truss span in the world, exceeding by five feet, the great bridge of the State railway across the river Leck, in Holland, and, by the same length, the three spans of 515 feet each across the Mississippi at St. Louis. Engineering skill is constantly growing more daring, and it may almost be said that there is no abyss so deep or so wide that our bridge-builders cannot throw across it a firm highway for the locomotive.

DRAINING OF THE ZUYDER ZEE.—Active preparations are going on for the immediate commencement of the long-projected work of draining the Zuyder Zee. A dam 40 kilometers (24 miles 1,504 yards) long, and 50 meters broad at its base, is to be carried across the gulf, built up to a height of half a meter above the ordinary level of high tide. Upon this pumping machines of 10,000-horse power will be erected, capable of pumping up from the enclosed sea, and discharging on the outside of the dam, 6,500,000 cubic meters of water daily. Taking the average depth of the water at four and a half meters, it is estimated that the work of pumping will be completed in about 16 years from its commencement. The total cost of reclamation is set down at 335,000,000 francs; but, huge as this sum is, the undertaking is confidently looked upon as likely to prove a most remunerative speculation. The success of the scheme will add to the kingdom a new province 195,300 hectares—nearly 500,000 acres—in extent. Judging from previous experiences in connection with Haarlem sea, it is reckoned that at least 176,000 hectares of the land thus won will be applicable to agricultural purposes, which, at an average value of 4,000 francs only per hectare, will richly repay the enterprise and treasure lavished on the gigantic undertaking.

Some of the Mines at Ward.

The *Ward Reflector*, in an article describing the mines, says: The first mine met with as you penetrate the upper air from Ward is the Paymaster, the first mine discovered in the district. A short distance above the tunnel a small bunch of croppings still protrude, near which Tom Ward sunk a shaft to the depth of 38 feet in '72, missing a body of rich ore by a few feet. These solitary croppings account for our presence here to-day, for in the event they had not existed, all of us would have been elsewhere. The prospector, as is well known, is not averse to crossing desert wastes—they have no terrors to him—in search of argentiferous or auriferous deposits; but when it comes to delving, running cuts or trenches he weakens, that sort of thing would be degrading, would detract from his capacity to judge from surface indications, etc. The peculiar traits of the inveterate prospector being taken into account, we naturally conclude that Ward would not be known even now were it not that these croppings still rear their heads above the deposits of earth that sun and frost and cloud-burst had lodged against them for centuries.

We had designs on the Ready Cash, and followed a trail leading to it, and in due time put in an appearance, but found to our disappointment that work was suspended on the seventh day at this particular mine, and as there was no one to interview, attention was directed to a body of carbonate ore extracted from a strike mentioned about a week since, which looked refreshing. Disappointed at not meeting any one at this mine, our course was at once shaped for the

Defiance,

A "way-up" mine, at least it occurred to us that it was pretty high up, before the home station was reached. On arriving, the services of Ed. Kenney, foreman, was secured to lead the way, and this carbonate-producing mine was "taken in" to the best of our ability. The very latest development in the Defiance, and which may be heard from in a substantial way, is a body of gray carbonate struck on the 5th inst., which gives promise of opening up better than anything struck in the mine up to this time. If it holds its own a drift will be run from the south winze in order to tap it about 110 feet below where the body is worked at present. Gray carbonate, as is well known, is the best quality of smelting ore found in Nevada or Utah. The Defiance, we understand, is to be worked eventually through a shaft.

The objective point, after leaving the Defi-

ance, seeing that nothing was doing elsewhere, it being Sunday, as before stated, was the

Paymaster.

We have visited this mine several times before, but not until Sunday last was the opportunity offered for a thorough investigation. The mine is worked through two tunnels—an upper and lower—the distance between them on the perpendicular being 100 feet. The lower tunnel is now in about 1,100 feet. At about 900 feet from its mouth the

White Chamber

Has been opened up on the west side, its dimensions being about 60 by 25 feet, the timbering of which has been about completed by B. T. Snell, who has charge of that department, and by whom we were piloted through the workings until relieved by W. G. Lyons, the foreman of the mine. The ore of this chamber is said to assay \$450 throughout. It leaves the contact to the east and is entirely in porphyry. The practical miner calls it granite, but the geologist pronounces it porphyry. At any rate it is a difference without a distinction. It matters little what the formation is so the ore is there, and we believe it is. If the formation was granite the inevitable mica would be there, but it is not; consequently we conclude it is not granite. That this defined body of ore goes down is a reasonable supposition, for it is not possible for it to shut square off with the level of the tunnel. Future explorations will determine this, so it is useless to raise the question at this time. Next in importance to the White Chamber at this time is the

Lyons' Winze,

Where a large body of rich ore has been encountered and is now being sent down through a chute to the lower tunnel. The greater portion of this ore is quite as good as that coming from the White Chamber, and then again, some of it will double discount it. Large quantities of ore going as high as \$5,000 have been taken from this winze, and a body of it is still exposed. Mr. Lyons we consider the right man in the right place, and if the opportunity presents itself, will not be found wanting. He has an eye on several bodies of ore that have been exposed along the line of these tunnels, which until now have remained undisturbed. It takes some little time for a man to become thoroughly acquainted with the ramifications of the Paymaster, and to comprehend it thoroughly it is necessary to apply one's self assiduously. The

Clay Chamber

Of this mine, which is being worked through a shaft, now down about 70 feet, is, according to our way of thinking, a bonanza in itself—a bonanza as is a bonanza. The shaft, as above stated, is 70 feet deep, and with the exception of about 15 feet of surface ground, is all the way in ore. How wide, long, broad, or anything about its extent is not known by any one at present. A number of assays have been made from this body of ore, some going as high as \$1,500, and none as yet lower than \$700. It has not been deemed necessary to have assays made from the waste, for the dividing lines are too plainly marked. Give us our choice and we will take the Clay Chamber all the time, even though other portions of the mine produce richer ore, its extent compensating for what it may lack in richness.

Electric Exploders.

In view of the recent disastrous discharges of exploders at the Sutro tunnel, some interesting experiments have been instituted by Mr. Sutro with a view of ascertaining the cause, and more especially to determine whether the electricity of the body might not have, in this high altitude, something to do with it. In speaking of these experiments, the *Independent* says:

Electric exploders made by different parties were taken, one after another, and placed in a strong wooden box, which again was placed in another box in Mr. Sutro's parlor. This room is covered with a heavy Brussels carpet, walking over which causes the human body to be speedily charged with electricity. Mr. Hancock, the chief blaster, assisted in the experiments and held the wires, while Mr. Sutro walked around the room two or three times, with slippers, sliding his feet gently over the carpet. After doing this he approached the end of one of the wires with his fore-finger, and instantly a loud report was heard, the exploder having been discharged.

The experiments clearly established the fact that exploders may be set off by electricity accumulated in the human body, and the men about the tunnel were at once informed of the fact. Instructions were also issued for handling them hereafter, and a sheet-iron plate was placed on the floor of the exploder house, to which is connected a wire reaching into the water flowing from the tunnel. The men in handling the exploders now stand on this iron plate, and have instructions to wet their boots before entering, and to put on India-rubber gloves before touching the exploders. If these precautions are properly carried out there need be no danger of explosions hereafter. Any electricity accumulated in the human body will be carried off through the iron plate, while the rubber gloves, being non-conductors, form an additional protection. No accidents from these explosions have ever occurred in the tunnel, for since the place is very wet no electricity can be retained in the body.

Adulteration of Foods.

Editor's Notice.—Having just read an article on the adulteration of food in the *Toronto Globe* of April 27th, 1877, it reminds me that we, too, might as well begin to rebel against eating trash. I never use spices, mustard or anything from the grocers in cans and bottles under those fine-looking labels, but that I feel reproached for wasting hard earned money and imposing on the stomach of those that partake of the food. If I could procure a small hand-mill that I could grind things fine enough with, I never would buy another box, bottle or can of anything again. I think if the newspapers would take the trouble to investigate and expose the adulterated brands of condiments it would make manufacturers more honest. It comes very hard on the class of working people to pay such high prices for necessary articles and find them unfit for use. I had to throw away a two and a half pound can of pepper, as it was so mixed with decomposed wood or browned sawdust, or something that made it smell unfit for use, and I have many times put a whole bottle of cinnamon in a baking of pumpkin pie, and they would not taste stronger than if one teaspoonful of the pure article had been used; and the bottle cost 25 cents, while one teaspoonful of the pure article ought not to cost above five cents. The last sack of fine table salt I bought was so adulterated that I could not safely use it. I was afraid it contained lime. The sufferings of dyspeptics are greatly enhanced, and many cases probably caused by this dishonest practice, and who knows how much life is destroyed by it in time.—Mrs. G. E. CHILDS, Santa Barbara, Cal.

The subject which our correspondent broaches is of the highest importance. It is an evil which has been felt in all states and countries. The remedy is by means of laws punishing adulteration and the appointment of State analysts and microscopists to furnish evidence against adulterators. Our correspondent is doubtless aware that charges of adulteration must be accompanied by actual proof that foreign substances are introduced. To show this there must be official analysis, and then the press can put forth statements which will enable people to shun the dangerous and the counterfeit. Until these necessary facts are set forth, the newspaper can do little more than throw out general warnings. These may do good in many cases, but they cannot have the definiteness which the descriptions of the evil should possess. Few editors have the ability, and none, whom we know, have the time to pursue studies of manufactured foods with the thoroughness which should characterize them. The matter should be handled by State examiners, and adulteration should be punished by rigorous laws.

So far as we know, the English have done more than any other government to protect its citizens against the crimes of the adulterator. There are government examiners in all towns, and they are zealous in testing everything which is presented to them or which they have reason to suspect. The result is that adulteration of foods in England has declined to a wonderful extent. So careful and wide-reaching have been the achievements of these examiners, that numbers of books have been printed showing forms and substances used in adulteration, and the ways of detecting them, and the whole people have been awakened on the subject. With the description of the evil there is also given, in all cases where it is possible, simple tests to determine the purity of materials which are of great practical use to the people.

In the United States there is springing up renewed interest in this important question. We are not aware how many States have special laws and official examiners, but Massachusetts has the system in good working and great beneficial result to the people. New York, during the last winter, passed a new law against food adulteration. During the last few months in New York City sellers of impure and watered milk and vendors of other fraudulent articles have been brought to grief for their evil practices. In our own State there are laws against adulteration, but though the laws may be good, we are not aware that they are supplemented by the necessary agencies for detection and presentation of evidence for prosecution. The following is Sec. 382 of the Penal Code, which makes adulteration a crime:

"Every person who adulterates or dilutes any article of food, drink, drug, medicine, spirituous or malt liquors, or wine, or any article useful in compounding them, with a fraudulent intent to offer the same or cause or permit it to be offered for sale as unadulterated or undiluted, and every person who fraudulently sells, or keeps or offers for sale the same, as unadulterated or undiluted, is guilty of a misdemeanor."

The purity of articles sold as food is of vital importance. We appreciate this fully and are ready to do everything in our power to convince the people that they should be protected against evil workers. Perhaps in this way the attention of the law-makers may be gained and the State will assume the responsibility for the detection of fraud, which is its province. We cheerfully offer to make microscopic examination of any material which our readers suspect of being adulterated, and we may thus expose the methods and materials used by the adulterators. The microscope is excellent evidence on many points of adulteration, as has been shown in the English literature on the subject.

The case of poor salt which our correspondent mentions was probably the result of natural impurities. Nearly all, if not all natural salt (*Sodium chloride*) contains chloride of lime in varying quantities, and if this is not removed the salt is not fit for table use or curing purposes. Although it is probable that nothing was added to the sample which our correspondent found unfit for use, it was fraudulent to put forth as "pure table salt" an article containing offensive natural impurities.—*Rural Press*.

USEFUL INFORMATION.

Facts about Metals.

Four hundred years ago but seven metals had been discovered, and we are now acquainted with the existence of 51, 30 of them, nearly three-fifths, having been made known to us since the beginning of the present century. It is not perfectly clear of two or three of these that they are really elementary substances, but it must be remembered that these doubts only apply to metals of such extreme rarity that chemists have not had a fair opportunity to examine their properties, and, if possible, decompose them.

Great weight seems to be associated with our ideas of metals. This is true of many of them, as platinum, osmium and iridium, all more than 20 times as heavy as water, the sp. gr. of the last being 22.66. Gold, lead, mercury, palladium, rhodium, ruthenium, silver, tungsten and uranium are 10 or more times as heavy as water; while bismuth, potassium, sodium and lithium are lighter than water, the sp. gr. of lithium being only .5336. A cubic inch of iridium weighs 5,720 grs., and one of lithium only 150 grs. The weight of most metals is greatly increased by hammering. Pure iron, obtained by electrolysis, has the sp. gr. of 8.14, considerably higher than the purest wrought metal.

Most of the metals are of a white or grayish color, sometimes bluish; but to this there are a few exceptions. Gold, barium, strontium and calcium are yellow, though the last is of a very pale shade; copper is red; bismuth reddish-white; antimony and platinum approach the nearest to blue. In hardness there is as much diversity. Iron, tungsten, chromium, rhodium and iridium are remarkable for extreme hardness; rubidium is as soft as wax and potassium and sodium can be readily kneaded with the fingers. Antimony, arsenic and bismuth are so brittle that they can be pulverized in a mortar. Iron is the most tenacious of all metals. Gold is the most malleable metal, as it can be beaten into leaf 1-280,000 of an inch in thickness. One grain can thus be distributed over 56 square inches of surface. Through very thin gold leaf light passes with a greenish tint. Gold and silver are remarkable for ductility. One grain of the former can be drawn out into 500 feet of wire; of the latter into 400 feet. Many metals are very refractory to heat, and one, osmium, has never yet been melted. Platinum and iridium are but little less infusible; the fusible point of mercury is, however, 39° below zero, and that of rubidium 33.5° above. Potassium, sodium and indium fuse below the boiling point of water. The most electro-positive of all metals is cesium; then come rubidium and potassium. The most electro-negative is arsenic. Several metals are volatilized by artificial heat, and some of them exhibit beautiful changes of color. Gold, yellow at ordinary temperatures, is a bluish-green color when fused, and by intense heat can be converted into a beautiful purple vapor. The vapor of potassium is of a violet; that of rubidium of a greenish-blue and that of palladium of a rich green color. The atomic weight of gold is the highest, 196; that of glucinum is the lowest, only 4.7.

BOILER EXPLOSIONS DUE TO GREASE AND LIME.—A French paper says: A commission, appointed to report on a boiler explosion at La Villette, Paris, attributed it to an insoluble deposit, composed chiefly of a calcareous soap, which formed near the opening of the water feed-pipe, and which was due to the nature of the feed-waters. Some of the water was furnished by the city, containing calcareous matters; some came from condensers, bringing fatty particles from the machines, in which they had been used as lubricants. The commissioners cite numerous accidents which have occurred during the past 15 years, all of which are attributable to the same source. They, therefore, think it important that all manufacturers should be warned of the danger, and if they are obliged to use such a mixture of waters they should use all possible precautions, such as the purification of the calcareous waters by carbonate of soda; the filtration of the condensed waters, by passing them through wool or felt; the skimming of the grease from the surface of condensing cisterns; and frequent drawings off from the surface of the water in boilers.

COLORATIONS ON ZINC.—An original recipe for giving beautiful and durable rainbow colorations to zinc is reported. The zinc may be in any form, cast or sheet, but must be pure, dry, polished, or filed, and the coloration is the more brilliant as the materials of the bath are pure, so that the best effects are got with chemically pure re-agents. The bath consists of 30 grammes tartrate of copper (weinsaures Kupferoxyd), 40 grammes caustic potash, and 480 grammes distilled water. On subjecting the zinc to the action of the bath for a couple of minutes it appears violet; for three minutes, deep blue; four and one-half minutes, green; six and one-half minutes, a golden yellow; eight and one-half minutes, purple violet.

BODY COPAL VARNISH FOR COACHMAKERS' USE.—Fuse eight pounds fine African gum copal; add two gallons clarified oil; boil slowly until quite stringy; mix with three and one-half gallons turpentine, and strain. The boiling will take four or five hours.

"Equality Country."

Mr. Ruskin has opened near Sheffield a museum for workmen. It is the first school established under the St. George's company for the workmen and laborers of England, to whom the *Fora Clavigera* is inscribed, and as soon as he had selected the site Mr. Ruskin called some of the Sheffield men together and explained to them the reasons of his choice. He was well pleased with the workmen, spoke to them in the most familiar and friendly strain, and remarked that he had come to learn and not to teach. Having found they appreciated the boon he was about to confer upon them, he has sent to the museum many rare and interesting objects. On his paying a second visit to Sheffield several workmen, who had embraced the doctrine of Robert Owen, were anxious to obtain an interview with him, especially as he was reputed to be of an exceedingly amiable and affable disposition, and to hear his opinion as to the feasibility of establishing a "co-operative village," consisting of houses, works, dining and lecture hall, library, etc., and surrounded with plenty of fresh air and pure water. Out of the funds of St. George's company he has now purchased at Ableydale, Sheffield, a beautiful estate of 13 acres, at a cost of altogether \$11,000, and has expressed his willingness to accept his co-operative friends as tenants until the annual interest they may contribute shall have cleared off the capital; that the estate is to be known as Equality Country; that 12 families have united in the undertaking, and that all their earnings will be thrown into a common stock, are matters of surprise to those who have taken a leading part in the movement. At most two families will live on the estate until it is known that the scheme is a success, the object of its promoters being simply to carry on the boot and shoe making trade on co-operative principles in antagonism to the modern system of producing, by means of machinery, cheap and nasty goods, and if in this they succeed, they may gradually increase the number of their dwellings and form the whole into a co-operative village. The garden produce will be simply to meet their own requirements, but, in whatever direction they may extend their present programme, Mr. Ruskin has not been asked to furnish them with the requisite means to carry out the movement.

FIVE THOUSAND DOLLARS REWARD FOR A NEW INVENTION.—The Directors of the London General Omnibus Company offer to award a prize of £1,000 for an invention or a scheme for effectually recording or checking the receipts of their passengers' fares, and which may be accepted by them as being so effectual. But the acceptance of any invention or scheme is to be entirely in the discretion of the Directors, who will not be bound to accept any invention or scheme at all, nor to give any reason for non-acceptance.

GOOD HEALTH.

Nervous Exhaustion.

Dr. J. H. Jackson has a word on this subject in the last issue of "The Laws of Life," which is sensible and deserving of a place here. He says:

Seek to remove, in the first place, the causes, whatever they may be, which have induced prostration. No doubt the nervous centers, from which all nervous power and force are derived, are exhausted, and where this is the case, time is required in order that their nutrition may be thoroughly re-established. Let the person then avoid overdoing, always working or taking his pleasures within the limits of any taxation of body or mind; let him secure agreeable social associates; live largely in the open air; sleep as much as possible; eat nutritious but unstimulating food, such, for instance, as is afforded by the various preparations of milk, fruits and grains, principally of wheat, so far as grains are concerned, because it contains more of the nerve-making constituents than other grain. Avoid the use of condiments of all kinds and alcoholic liquors; remembering, however, that if the person is not already accustomed to such a diet, the change must be made gradually, although positively, in order that the nervous system may not be thrown into perturbation by sudden withdrawal of its accustomed stimulation. All of the habits of life, in regard to work, exercise, pleasure, eating and sleeping, should be in accordance with a thorough regularity of action in each 24 hours. He should take two baths each week, in which the body should be washed very thoroughly with tepid water, and rubbed afterward to insure good capillary circulation.

Some of the most eminent physicians are coming to advise as the best means for a permanent cure of nervous prostration and debility, a radical change in dietetic habits, embracing the use of unstimulating but nutritious food in the place of the more stimulating articles, such as meats and condiments. By carefully following such a course, health should be restored.

OATMEAL.—Oatmeal should only be purchased at places where there is a quick sale for it, as it absorbs moisture from the air, and very quickly becomes rancid and unpleasant.

Hints on Drainage and Sewage.

Prof. Hilgard, of the State University, writes to the *Oakland Tribune* giving some practical suggestions which we doubt not will be found of value to many readers. He says: It is important to devise some means of relieving the difficulties encountered in avoiding the fearful nuisance of open gutters running with filthy water, which poisons the atmosphere in suburban districts, and bear so large a share in infecting putrid fevers, diphtheria and dysentery upon the otherwise enviable dwellers outside of city limits. The points to be observed are briefly these:

1. To keep entirely separate the more offensive—kitchen and water-closet—sewage from the cleaner run of the wash-stand, bath-tub and wash-tub.

The difficulty in disposing effectually of offensive sewage is directly proportional to its bulk and offensiveness. Hence it is comparatively easy to dispose of the undiluted kitchen sewage alone, either by running it into a small cesspool covered with from six to 12 inches dry earth or charcoal; or else into a small similarly-covered (barrel) tank, from which the solid matter is frequently removed to the manure pile, while the water runs off into a small irrigating ditch in the garden, where the loose soil absorbs and disinfected it promptly. The manurial value of this kitchen sewage is considerable, whether for flower-beds or vegetable garden.

Water-closet sewage greatly complicates the problem, both from its great bulk and its offensiveness. However convenient apparently, the water-closet is an invention of questionable benefit to mankind, from the frequency with which it gives rise to malarious diseases in the household, and the immense increase of the cost of city sewage which its use involves. It should, wherever possible, be substituted by the earth-closet. It is surprising that this simple and effectual means of overcoming some of the most formidable difficulties in the way of domestic hygiene should thus far have been almost totally ignored on the Pacific coast; at least I have been unable to find in the great city of San Francisco even an agency for the sale of the ordinary appliances for the use of dry-earth closets. Fortunately, the essential things are within such easy reach of everyone, that none need wait for such machinery to be manufactured. A rough box, say, 12 by 18 inches, by 15 inches high, mounted on truck wheels, so as to be easily discharged, will serve as a receptacle for a week in a family of five or six persons. Another box, conveniently placed and filled with dry earth, and a grocer's scoop, hung on a nail above it, completes all the really needful appliances; dry earth, not sand, is not difficult to obtain in California during the greater part of the year; for the rainy season, a supply must of course be hoarded. It should be well raked over, so as to break or remove all larger clods. The contents of the receiving box may, however, be used over and over again five or six times, after drying, which can be done in a shed, without the least offense. The whole arrangement is so simple, inexpensive, and so thoroughly effectual in removing all offense and securing complete disinfection, that few will desire to dispense with after trial; and it disposes, most conclusively, of the most troublesome part of the sewage question.

The sewage of the wash-stand, bath-tub and wash-tub, being comparatively inoffensive, and without any considerable amount of solid matter, can be easily so directed as to serve for irrigation of ground kept loose by cultivation, either through a channel from which it distributes itself, or through the garden hose. I find it very convenient to so interpose a large gauge-cock in the leaden drain-pipe as to make it possible to use the water either way, as may be most desirable or convenient.

In times of scarcity of water, like the present season, the amount of water so contained for garden use is a matter of no small consequence. It is much more than any one who has never measured it would imagine; and when the use of water for garden or lawn irrigation is of necessity restricted or prohibited, an arrangement of this kind may make all the difference between being able to maintain your improvements, or seeing all your grass and flowers fall victims to the drouth.

SUBSTITUTE FOR SULPHATE OF QUININE.—Dr. Woodworth, Supervising Surgeon-General, calls the attention of medical officers of the U. S. marine hospital service to the extraordinary increase in the market price of quinia sulphate, and at the same time to the accumulating testimony in favor of the employment of the quinia, chinchonidia and chinchonia sulphates, of which the two first named are believed to be as efficacious as the quinia sulphate. He suggests that the less costly salts be accorded a fair trial, and that medical officers take this matter in consideration in preparing their next semi-annual requisition for medical supplies.

ASPARAGUS AND RHEUMATISM.—The advantages of asparagus are not sufficiently appreciated. It is said that those who suffer from rheumatism are cured in a few days by feeding on this delicious esculent, while more chronic cases are much relieved, especially if the patient avoids all acids. The Jerusalem artichoke affords a similar relief. It may be well to remark that most plants that grow naturally near the sea-coast contain more or less iodine, and in all rheumatic complaints iodine has long been used.—*Dietetic Reformer*.



W. B. EWER, SENIOR EDITOR.

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SAN FRANCISCO:
Saturday Morning, May 26, 1877.

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Reflections of the Week.

In some parts of this State during the past week we have had pretty good rains, which, however, did not do very much for the miners. In some parts of Feather, Stanislaus and Bear rivers the miners are at work on the river beds, the water being low enough to admit of this. Such low water has not been known for many years, and the upper part of Feather river particularly, is being wing-damed in many places where the miners are getting at the river bed. The rain spoken of above, although doing no great amount of good, will help a little to prolong the water season. The season for the hydraulic mines this year will be short, some having shut down already in some parts. In Placer county the principal claims are all washing away vigorously while the water lasts, and blasting their ground in every direction, so as to make the water go as far as it will.

There is nothing specially new to report on the Comstock, some 35 mines have shut down in that region in the past month, but others are still prospecting. The largest single shipment of bullion ever made, was made from there last week, which is something fresh to record at any rate. Mining stocks in the city show no improvement this week. The committee appointed by the Board of Brokers has issued circulars to the various large mining companies, asking information from them of their operations and expenses. It is to be hoped that facts will be elicited in this way which will have a beneficial effect on the mining interests, by calling attention to the details of expenditures, so that they can be reduced to suit the times.

Reduction of Expenses of Mining.

The depression existing in mining stocks, and the consequent falling off of profits of those interested in buying and selling them, has awakened this class to the fact that some change in the system of management is necessary. A number of brokers held an informal meeting last week and passed a resolution appointing a committee "to devise a plan to obtain an improved management of the mining interest, and to consult with the officers of those mines listed on the stock board for the purpose of suggesting some means of reducing the general expenses of mining."

We mildly suggest that it would not be a bad idea, when considering the reduction of expenses, to consult with officers of mines *not* on the stock board, for, as a general thing private mines are managed much better and more economically than those whose chief object is for stock dealing rather than legitimate mining. Those on the stock board have begun to reduce expenses at the wrong end. They have cut down expenses at the mine instead of in the office. They have discharged miners working at \$4 per day instead of Presidents at big salaries. The working force at the mine on small wages has been reduced, but not the other force in the office at large salaries. Most of them think that when expenses are to be reduced, the first thing to do is to send off a lot of hard working miners, whereas one would suppose that if legitimate mining was the object, this would be the last place for retrenchment. Without miners the mines cannot be developed, and unless it is developed there is no use in running any company at all. In some cases, perhaps, it would be well to shut down altogether, except to keep the water out, and wait for neighboring companies to develop ground in the near vicinity.

The discharge of workmen from the mines, however, while other expenses are continued, is a poor way of economizing, if they are going to mine at all. There are many little leaks through which money runs, in large companies, which could be stopped to good advantage if the managers honestly intend retrenchment; and by cutting off these expenses enough could be saved to keep as large a working force on as practicable. The discharge of workmen brings great distress among them, and does more to depress the mining interests than the lowness of prices in stocks. When people see the men discharged they begin to think the mine is worth nothing, and the impression becomes widespread. Stockholders do not often refuse to pay assessments in mines that are being honestly and economically managed, simply because they are for a while unsuccessful in the search for ore; but they are apt to refuse to be assessed if they see heavy expenses continue in every direction, except in the mine itself, where the real work ought to be done.

On the Comstock at present there are so many idle men that great distress prevails. So many mines have reduced expenses by discharging workmen, or closing down temporarily, that the whole mining interest of the section is fearfully depressed. But while this state of things continues there we have not heard as yet of any cutting down of salaries of Presidents, Secretaries, etc., at this end of the line. No case has yet come to light where there has even been a suggestion of reduction of office expenses. The salaries of some of these officials would keep a dozen or so miners' families from starving, and would aid at the same time in prospecting the mine. If they did anything for these salaries it would not be so bad, but they don't, in nine cases out of ten. Let some of these companies try and reduce the San Francisco expenses, instead of those at the mine, and the people will believe they run the mine for mining, and not for stock speculating purposes or to pay salaries to a set of favored officials.

Mining Education.

We notice in some of the English papers complaints that attention enough is not paid to the coal interests by the Science and Art Department in Mining. It is suggested that the School of Mines, Jermyn street, London, might establish and superintend a scheme of instruction for students, distributed about in the various collieries. It is found that the course of study required by the department referred to, is quite different from that required to obtain a certificate of competency under the Mines Act, and that hence the aid of the department cannot be had in supporting the kind of school needed in a coal district. The department insists on a knowledge of veins, lodes, cross-courses, ore stamping machinery, etc., of no utility to the coal miner; and seems to ignore the specialties of coal mines which figure so largely in the examinations held under the Mines Act.

From these complaints we should judge that even in England, where they have had so much more experience than we have had here, they make errors in the method of dissemination of mining information; and that the systems in vogue at present are not entirely satisfactory. It does seem as if with the large sums appropriated annually for technical education to the Depart-

ment of Science and Art, more attention should be paid to the largest and most important industry of the country. Although the miners there number over half a million there are only seven mining schools.

The lectures given before the School of Mines, Jermyn street, London, by Prof. Smyth, are excellent, and their wide dissemination by the press give them a standard character, which is recognized on this side of the water. Prof. Smyth, as Professor of Mining in the above institution, superintends the examinations of the Science and Art Department in Mining, and if the complaints are worthy of credence, he certainly has the ability to suggest suitable remedies. Even the system there, deficient as it is said to be, is far ahead of anything we have here; where, in a country with the most extensive mineral resources in the world, we have no official whose duty it is to gather information concerning them, much less impart it. The duties of the United States Mining Commissioner have devolved on the Director of the Mint, who already has more than he can attend to, and his first experiment towards his new duties, (in estimating the quantity of ore in a bonanza with its probable yield,) has not been so successful as to inspire the utmost confidence in his ability as a mining expert. The collection of information concerning the mines is almost a dead letter now, and even in the best days the official who had it in charge had great difficulty in doing anything from the meagerness of the appropriations. Then when he got all his facts together their value was impaired because it took so long a time to have them printed. When they were printed, so few copies were issued, that on this coast where they were needed most, perhaps 100 copies came to hand. As far as any trouble being taken on the part of the Government to have any official to gather and disseminate information concerning the mines, we have very little hopes in that direction. The public depend for their information entirely on the newspapers, so that the few journals making a specialty of this industry have double duty to perform.

Mining Speculators.

There are a good many people who might be called mining speculators; that is, there are several classes of them. Dealers in mining stocks are the most properly termed "speculators," and those also deserve the name who go about and secure mining claims without the most remote idea of ever working them, but intend disposing of them at a profit to others. A certain kind of these speculators, well known in every mining camp that ever was found, are those who want to "bond a mine." They are most unmitigated nuisances, and in nine cases out of ten are not what they represent themselves to be. These fellows sometimes introduce themselves as the secret representatives of certain wealthy San Francisco capitalists, who are willing and ready to advance money for development of any claim they may recommend. Again they come with flourish of trumpets and announce themselves as the agents of Eastern capitalists desirous of getting up companies to float in New York. Then again they have some friends at "the bay" who would go into a little mining speculation if it should be made worth their while, and they could get hold of a good little mine. These people almost always succeed in getting mines bonded to them for a period of three to six months, and after that is done they await new arrivals in the camp and endeavor to sell to, or take into partnership on the bond, anybody with money enough to advance something to them for board and whisky.

The miners who bond their mines to these people never get any profit, and the gain is all on one side. If the mine is actually sold on their recommendation they want the lion's share, as a matter of course. During the time in which the mine is bonded they are not at a cent's expense on the property, and work is going along all the time. If a strike is made meantime, and the mine becomes much more valuable, of course they have a better chance to dispose of it at a good price, so it is often judicious to bond a promising mine on general principles.

Lots of these speculators have neither money or friends, but of course it is difficult for miners to judge of this; although it may be stated as a fact that the more "cheek" they show and the more loudly they talk, the less credence should be given them. There are, of course, men who bond a mine honestly with the intention of enlisting the aid of capital, and this makes it easier work for the pretenders, as the miner finds it hard to judge which is which. These fellows have come to the surface in almost every mining camp of any pretensions on the coast, a new camp being naturally the best "stamping ground." Miners are always in want of capital to assist them in developing new ground and eagerly jump at any chance of enlisting its aid. They therefore naturally are glad to have any one interest himself in their mine who has a chance to meet with capitalists who might be induced to invest. Half of these people are, however, frauds, who never had any money and never will, but bond the mines because it costs them nothing and they are apt to get a good many little convenient favors done them which they would never receive, except as the supposed representatives of capital. Some of them become quite expert at the business and manage it so as to bring them in a pretty fair income—enough at least to live upon in a nomadic sort of manner.

Our Agents.

The agents of the Press who go out into the country aid us greatly in extending the circulation of our paper, and thus widen the field of its usefulness. They also do good service for the country through which they pass in noting facts of industrial progress and placing before our wide circle of readers in this and other States trustworthy information concerning the different parts of our coast territory. We have continual reason to thank our patrons for their kindness to our agents and the assistance which they render them in the prosecution of their work. We bespeak for those agents who are now in the field, a continuance of past favors. We make the following notes of the whereabouts and destination of some of our field workers.

Mr. Joseph Dimmick will visit upper Mendocino, Humboldt and Del Norte counties.

Mr. A. C. Champion labors in parts of Mendocino and Sonoma counties.

Mr. B. W. Crowell has his present field in Amador and the more southerly counties.

Mr. A. C. Knox labors in Sierra county and southward.

Mr. A. U. Strong will visit the people of Lake, Napa and Sonoma counties.

Mr. C. N. West will do good work in Santa Cruz and Monterey counties.

We trust that our friends in the counties named and elsewhere will aid our agents with notes of their doings and the progress of their localities, so that they may be enabled to furnish us with fresh correspondence full of practical notes and interesting descriptions. We ask also that they will aid them in the prosecution of their business for us, and will pave the agents' way with good words for our paper, to their neighbors whom they may meet. Our correspondence from our readers is full of kind, encouraging words concerning the value of our paper, and we can but remind all who feel friendly toward us that a word fitly spoken to one who should aid us with a subscription, will be a direct and substantial contribution to the improvement of our journal. Our aims are all for the advancement of our paper in the sphere of usefulness. Will not every reader help us to this end as occasion may offer?

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the office in this city:

In the Gould and Curry the connection of the south drift 1700-foot level with the joint winze has given a splendid circulation of air, and cooled the south end of the mine. It has also cooled off the Best and Belcher, admitting of better work in both mines.

The 700 and 750-foot levels of the Justice are still developing a well defined vein of average milling ore. The drift following ore body in the 1000-foot level also shows a decided improvement in the quality of ore produced.

Belcher is hoisting and shipping daily 70 tons of ore to the Santiago mill, which will average \$30 per ton.

The Grand Prize pump handles the water with care, and sinking the shaft is progressing.

The last clean-up of the Eureka (G. V.) mine was 200 ounces of amalgam.

Crown Point has a strong flow of hot water to contend with, but the air compressors are fully equal to the occasion.

The Hackberry mine, Mohave county, Arizona, made its first shipment of bullion on the 5th, consisting of five bars, aggregating 6,208 ounces, about 700 fine, the result of five days run.

There were 768 tons of ore extracted from the Chollar last week, averaging \$24.75 per ton.

Ophir is shipping 40 tons of ore per day to the Winfield mill.

They find it very hot in several places in the Consolidated Virginia and California mines, the heat greatly impeding work.

THE ADAMS HILL MINE.—The annual meeting of this company was held this week, when S. P. Dewey, W. W. Traylor, S. P. Middleton, Wm. B. Murray and E. E. Dewey were elected Trustees for the ensuing year. J. C. Powell was reappointed Superintendent, and W. W. Traylor, Secretary. From the President's report we extract the following summary of the work done the past year: The work done has been almost entirely of a prospecting character, and though no large or continuous veins of paying ores have been hitherto found, we are satisfied from the character of the ground, and its contiguity to the "bonanzas" found in the Richmond and Eureka Consolidated on our south boundary, as well as others developed to the north of us, that we have a very valuable property, which only requires developing to make equal to the best in the district. Confident in this belief, I have instituted measures for securing United States patents to all the ground belonging to the company. The financial report of the Secretary, also submitted, shows a cash balance to our credit of \$2,362.99.

A PLEASANT OCCURRENCE.—All hands connected with this office were invited to lunch with the publishers at J. V. Webster's new Palace restaurant, No. 218 Sansome street, on Saturday, May 19. The lunch was greatly enjoyed and highly complimented.

Earthquake Waves.

At the last meeting of the California Academy of Sciences, on Monday evening last, the President, Professor George Davidson, of the U. S. Coast Survey, exhibited an enlarged drawing of the regular tidal waves, and of the recent earthquake waves that reached San Francisco bay on the 10th of May.

At Fort Point the U. S. Coast Survey maintains a self-registering tide gauge whereby a sheet of paper is drawn horizontally over rollers that are moved by clock-work. The forward movement is nearly two feet in 24 hours. Over this sheet of paper a pencil moves athwartships by the lowering or rising of the float in the float box, and the wheel-work is so proportioned that one foot movement of the tide exhibits itself as a movement of one inch of the pencil. The drawing at the Academy was four times the length and breadth of the tidal sheet; that which we present to our readers is one-quarter the length and breadth of the same sheet.

H. L. designates high water large; L. L., low water large. H. S., high water small; and L. S., low water small. The first part of the curve from A to B exhibits the regular movement of the tide from 21 hours of May 9th (9 P. M.), to 6 hours of May 10th, when the tide was rising, and thence from B to C the normal movement of the tide is exhibited in the drawing by the broken line through the rapid fluctuations of the earthquake wave. On the sheet there is an apparent irregular ebbing of the tidal waters for a few minutes, and then a sudden rise, followed by a depression, until six large waves, of about nine inches each, had exhibited themselves in the space of one hour and 20 minutes. From the 6th to the 14th we find well-marked maxima or wave crests with intermediate double maxima well-marked and undoubted.

Then at No. 15 May 10th, 4 hours, occurs an

coast we ascertain that the earthquake wave was not noticed at open ports or landings, such as Santa Barbara, Gaviota, etc.; but its effects were exhibited in such harbors as Wilmington, Cayugas, and doubtless would have been especially noticed at the mouth of the Estero Limantour, in Drake's bay. In these harbors the rapidly advancing and rising wave would be concentrated as into a funnel and rise and fall rapidly and largely. It is reported that the rise and fall was seven feet at Wilmington, not noticed at Santa Barbara and Gaviota, and 12 feet at Cayugas.

The reported shock to two vessels near the entrance to this harbor, seems somewhat problematical. The waves entered the Golden Gate say one foot high and about 10 minutes long. We were at Fort Point at the time, and with a smooth sea, could detect no change of rise and fall on the beach where a very slight surf was running.

News of the earthquake waves coming in was telegraphed to Washington a few hours after they commenced, and from their length and height it was predicted that a great earthquake had occurred at a distant place.

Regulating the Flow of Water in Ditches.

Mr. L. A. Scowden, of this city, has just received a patent through the MINING AND SCIENTIFIC PRESS Patent Agency for an improved device for regulating a uniform flow of water, which is of special interest to miners and farmers. The device is intended for automatically regulating the area of an opening through which water is drawn from a reservoir or other source, so that the quantity of water which passes through the opening will be constant and unvarying under the fluctuations or rise and fall of the water supply or source. The invention is specially adapted for gauging the quantity of water to be supplied from a ditch, river, reservoir or other source, to customers for irrigation

A Short Lecture on Patents.

(Written for the PRESS by JOHN L. BOONE.)

There are two classes of persons that never succeed in any business. One is the class of persons who propose to give something for nothing, and the other is those who try to get something for nothing. A thing is worth just as much as it costs to produce it, taking into consideration the time, labor, and material required in its production. Time and labor are more or less valuable according to the nature of the employment; a hod-carrier can be hired for two or three dollars a day, because his employment requires no great amount of time or skill to acquire. The mason, however, must be paid five or six dollars per day, because he has learned his trade after serving a long apprenticeship at low wages. Skill in any trade or profession is expensive; expensive to acquire, and expensive when retailed out by the persons possessing it. A skillful man in any trade or profession always commands better wages than one unskilled, because his services are worth more; yet there are men who would rather pay a medium price for a "botched" job than a fair price for a good job. They expect to get the benefit of skill, and especially professional skill, for about the same wages that they can hire a day laborer. This is the case with many inventors. The inventors themselves, perhaps, are not so much to blame, because the country is full of unskilled patent solicitors, who, in order to get business, advertise to work for almost nothing, and inventors frequently being short of money are tempted to employ them. Inventors thus sacrifice themselves for the benefit of patent "shysters."

The greatest danger to inventors, however, is the wholesale patent agencies. These agencies, as they are managed, can well afford to work at low rates. Boys who receive four or five dollars per week are employed to do the inventor's work, and as a consequence it is imperfectly and carelessly done. An invention, which the inventor considers of great value, is put into this mill and ground out in some shape or other

The Justice Investigation.

It will be remembered that at the annual meeting of the Justice mining company, a committee of stockholders was appointed to investigate the financial condition, as well as the mining prospects of the company. The committee has made the following report:

The committee reports that the books of the company are kept in a proper manner, and find that no exception can properly be taken to the manner in which the business of the office has been conducted.

At the request of your committee, Mr. Henry Boden, the Assistant Superintendent of the mine, was summoned from Virginia City. Mr. Boden's statements were satisfactory in every respect, demonstrating the fact that the utmost economy had been exercised in every department of the mining operations of the company; that no workmen or attaches are employed whose services can be dispensed with; that every man on the pay-rolls of the company renders actual and valuable service, and that for the great expenses incurred, the stockholders have received a greater development than is usual in mining operations.

That the great expenses of the past year have been necessarily incurred in correcting the errors of former administrations, and have also been increased in a great degree by reason of the extensive operations of the upper levels having been conducted mostly in broken ground.

Mr. Boden also reports that the necessity of these extraordinary expenses has ceased, and that no great expense for the development and working of the mine will be necessary, excepting the furnishing of new boilers and one air compressor. This expenditure will, in the end, benefit the stockholders, by increasing the working facilities, and also by a reduction in the general expenses of the mine.

The committee also reports that the Trustees of the company are individually large owners of the stock, and every cent of disbursements is measurably paid out of their own pockets; and that as far as the committee have examined,

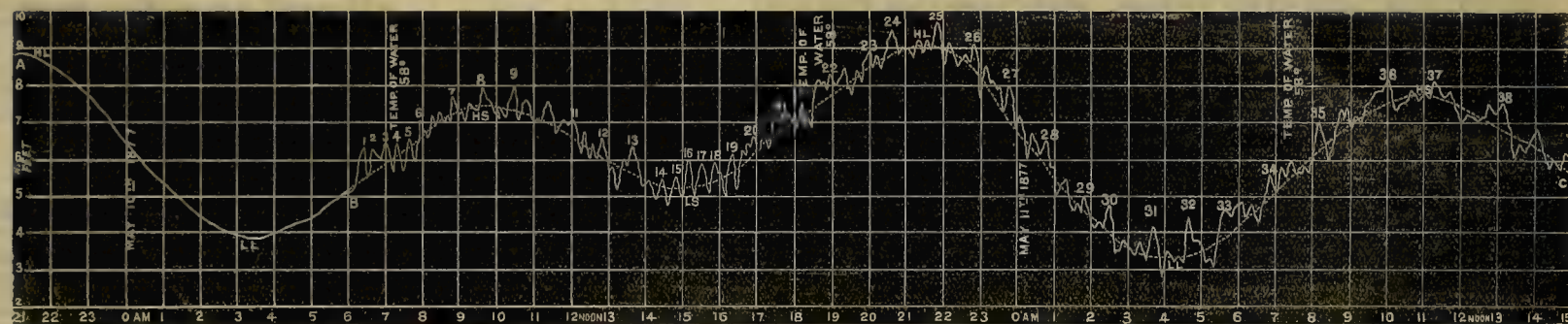


DIAGRAM EXHIBITING THE RECORD OF TIDAL EARTHQUAKE WAVES AT THE U. S. COAST SURVEY TIDE GAUGES, FORT POINT, MAY, 1877.

undeniable repetition of the first six waves; whether this be the result of a second earthquake, or whether it be the reflex waves of the first from another shore, is a problem for further investigation. Following these waves is a series of maxima, Nos. 20 to 23, rising quickly but having broken and prolonged crests, which harmonize closely with each other. The depression is so slight as to be equal only to the incoming tide.

Thence from No. 24 to 30 the maxima are marked, and the intermediate waves are recognizable as similar between the different maxima.

The largest waves are notably from the 30th to the 33d at low water, and exhibit ranges as great as 18 inches. It will be noticed that here the crests are 60 minutes apart. The earthquake waves continued thence forward to nearly noon of May 15th, when the last one registered itself; but long before this it was evident from the irregularity of time, elevation and form, that these were reflex waves reaching, from far off limits in the ocean. In fact, it seems likely that the reflex waves commenced certainly not later than the 30th, and possibly before that.

So far as we have been able to ascertain, the earthquake at Iquique occurred on the 10th of May, at 1 o'clock, A. M., but we must await more definite information before endeavoring to decipher the readings of the tidal register. Assuming, however, that the earthquake occurred at 1 A. M., we know the difference of longitude from San Francisco is three hours and 28 minutes, and that the first indication of the incoming wave occurred at six hours and 18 minutes at San Francisco. This would give eight hours and 46 minutes for the time occupied in the wave traversing 5,200 statute miles, mainly along the shores of South and North America; at a rate of 600 miles per hour, or 10 miles per minute.

This is much greater than the progress of the earthquake wave that left Simoda, Japan, on the 23d of December, 1854, and reached San Francisco in about 12 hours, traveling at the rate of 375 miles per hour, or 6.2 miles per minute. But the great waves of that earthquake were only eight inches in height and 35 minutes apart when they reached Fort Point. In the present case we see that the main principal waves were much higher, and their crests much farther apart.

Further information may place the locus of the earthquake away from Iquique. Upon this

purpose. A box or tank is used, into the upper part of which the water is allowed to flow through a pipe or other conduit. Across this box or tank, near its bottom, is made a horizontal partition in which at some suitable point is an opening of any desired shape. Mr. Scowden then takes a float from which is suspended a tapering or conical rod. This tapering rod is made to correspond in form with the shape of the opening and it is suspended from the float so that its largest end will be downward, or furthest from the float.

Now, when the float rests upon the surface of the water, the rod will pass down through the opening and leave only a space around the rod for the water to pass through. As the water rises the float is carried upward, so a larger diameter of the rod is brought opposite the opening, thus decreasing the area of the space or water passage as the height of the water and consequent pressure increases, so that the same quantity of water will pass through the reduced opening on account of the increased pressure as passed through the larger opening under the reduced pressure. Thus as the water rises or falls, the size of the opening or area of the water passage is enlarged or reduced in a reverse ratio; thus providing an automatic adjustment of the conical rod so as to provide a continuous flow of water of a uniform quantity under the varying pressures produced by changes in the level of water in the tank.

The tapering rod is usually suspended from the float by means of a screw rod, which forms an extension of the rod and projects upward from its smallest end. The float is then secured upon this screw rod so that it can be adjusted up or down as desired to give a greater or less flow of water. The upper end of this extension rod projects sufficiently above the float to pass through a hole in the top or cover of the box by which it is guided, and the position of the float maintained. The chamber below the partition receives the water after it descends through the water opening, and from this chamber it passes out at one side of the bottom through an opening and thence over a dam or weir, which indicates the quantity or flow by the depth of water over it. This provides an extremely simple device for regulating the area of the water passage automatically so that a constant and uniform quantity of water will pass through it at all times, independent of the height of the water in the box and the consequent pressure.

—no matter whether the patent is what it should be or not; it is a patent, it has a picture of the patent office on it and is signed by the Commissioner, and three-fourths of the inventors are satisfied just because they are in ignorance of what they really get. If it ever comes to the test of law they find out that they have nothing of value, and then they must pay a double price to have the patent reissued. If the invention does not go into public use, or the patent into the courts the patentee will possibly never know what a worthless patent he has. A party recently speaking of these Eastern wholesale agencies, said: "They run their patents out in mile lengths and cut them off to order." These agencies advertise that they charge a uniform fee for all cases; that is, they charge as much for preparing the papers and procuring a patent for a clothes-pin as they do for a threshing machine. How absurd such a proposition. As well might a blacksmith propose to iron a wagon for the same price that he would shoe a horse for. As well might a mason propose to build a brick house for the same price he would build a brick chimney for. These are incongruities that at once strike the mind as preposterous; yet they are the same thing in reality. "Poor pay, poor peach" is the motto, and,

Sugar-coat it as we will,
It still contains the same old pill.

While the inventor should be careful not to hire a solicitor simply because he is cheap, and will undertake to get him a patent(?) for a small amount of money, I do not counsel extravagance. The inventor need not depart from the usual rules of business which allow a man to settle with his attorney upon a price beforehand, so that the agent will know what he is to get for his work while the inventor knows what he is to pay. Each transaction should have its own basis, and the inventor should put himself into position to demand good and skillful work. In my judgment no person should be allowed to practice as a patent solicitor without first being examined as to his qualifications, and should be refused the privilege of practicing if found incapable. If admitted, he should be held responsible for a strict and faithful performance of his duties. Such a regulation would save thousands of dollars to the inventors of the country; first, in preventing them from spending their money for worthless patents, and secondly, from useless litigation based upon patents that will not stand the test of legal investigation.

economy seems to have been exercised in every part of the mechanical and business departments of the company.

As Mr. Boden, the Assistant Superintendent, assures the committee that the ore body in the lower level is solid in its character, and improving in quality with a promise of increasing richness, and that in a very short time this level will be fully opened, it is evident that patience on the part of the stockholders will demonstrate the fact that their faith in the Justice mine has not been misplaced in the slightest degree.

BULLION YIELD FOR APRIL.—The gross bullion yield of the mines during the month of April was as follows:

Belcher.....	\$ 65,400	Leopard.....	7,000
California.....	1,558,700	Leeds (Utah).....	27,400
Chollar-Potosi.....	67,300	Manhattan.....	88,000
Con. Virginia.....	1,142,000	ModocCon(InyoCo).....	82,100
Empire (G. V.).....	14,900	New Coso (InyoCo).....	97,200
Grand Prize.....	63,800	Northern Belle.....	119,500
Idaho (G. V.).....	67,200	Ontario (Utah).....	140,000
Hile (MariposaCo.).....	29,600	Ophir.....	11,800
Justice.....	244,900	Tybo Con.....	95,200
K K Con.....	55,000		
			\$3,960,000

The following show an increase over March: Chollar-Potosi, \$20,000; Con. Virginia, \$625,000; Idaho, \$14,000; Justice, \$28,000; Manhattan, \$4,400; Modoc Con., \$3,000; New Coso, \$7,000. All the other mines show a decreased production for the month.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Northern Belle, May 15th, \$12,438.06; Grand Prize, 16th, \$8,300; Modoc, 17th, \$7,270—total to date \$59,520.10; Northern Belle, 17th, \$12,340.09; Con. Virginia, 19th, \$234,933.66—first shipment for May account; California, 19th, \$322,841.78—total to date, \$714,389.46; Leopard, 18th, \$5,800; Arizona, \$2,660; Grand Prize, 21st, \$8,600; Modoc, May 21st, 233 bars, value, \$6,624.61—total to date, \$66,151.78; Northern Belle, 20th, \$18,018.99; Grand Prize, 19th, \$8,525.31.

We have received a very fine box of cherries from Dr. Strentzel, Alhambra ranch, Contra Costa county. The doctor is famous for his fruit, and also for his courtesy in remembering his friends in the city.

LEAD has fallen in England to £21 2s 6d to £21 10s for good ordinary brands.

The Bremen Mill, New Mexico.

The *New Mexico Herald* says: The Bremen mill, which is now completed and in successful operation, is as perfect as human ingenuity and mechanical skill can make it. It was rebuilt under the immediate supervision of Mr. Charles Davis, who has proved himself an adept, not only as the constructor of quartz reduction machinery but as a thorough and economical manipulator of ores. The chief aim in building this mill was to obtain the largest working capacity at least possible cost, and in that regard it is most acceptable to its owner. It is run by two engines, situated in opposite ends of the building, which is 106x80 feet. The 50 horse-power engine runs 11 pans and four settlers. The other, a 35 horse-power, gives motion to 10 stamps, a pulverizer and two jaw-crushers. The pulverizer is from the shop of Hendrie Brothers & Balthof, Central City, Colorado, and will crush as much ore with less power and do better work than a 10-stamp battery. All this immense machinery moves with the utmost regularity and without a perceptible jar, and so silently do the engines perform their work that the eye alone detects the motion. The larger of these engines and accompanying boiler was built by Fraser, Chalmers & Co., of Chicago. The other is the work of a Racine, Wisconsin, company, and both do credit to their constructors. Nearly all the castings, wheels, pulleys, shoes, dies, stamps, stamp-heads, etc., were made here in Bremen's foundry, by Robert Healy, molder. The internal arrangement is roomy and complete, has a floor and bins capable of holding a thousand tons of ore, a pulverizing room 13x15, sufficiently close to confine the dust; a room 11x15 for cleaning amalgam which contains a pan with mullers and which washes and frees the amalgam from all extraneous matter.

The fall from battery to pans and settlers is 18 feet. The settlers are some feet lower than the pans, and on the lower level is a retort and refining furnace. The retort is capable of holding 1,800 pounds of amalgam. Wet crushing is the process here—although ore for the ball crusher is first dried in pans and after the ore is reduced to impalpable powder it is amalgamated wet, same as that from battery. In the north engine-room is a Knowles four-inch pump, which supplies necessary water for mill and the immense tanks on top of building, a precautionary measure in case of fire. To this pump is a rubber hose of sufficient length to reach any part of the mill and when necessary can throw a stream over the entire roof sufficiently large to deluge the fiercest fire.

Five cords of wood is quite sufficient to run the mill 24 hours and 13 men only are required to operate it. Its capacity is 20 tons. The ore handled here is of an excellent quality, and all from Bremen's 76 mine, which is only about one mile and a half from the mill and is reached by an excellent wagon-road. Were this mine as at present developed, worked to its full capacity it would supply two such mills with ore.

In connection with the mill it is the intention of Mr. Bremen to erect an extensive foundry and will build a furnace or furnaces for smelting iron ore, which in this vicinity, is everywhere abundant, and carries at least 70 per cent. of metal, and whilst this is a fact, heretofore all pig metal has had to be brought from the States and hauled in wagons after leaving rail transportation 700 or 800 miles. When this last undertaking is in successful operation Mr. B. will be able to supply all demands for castings of every class and kind.

We are glad to chronicle such enterprise, it speaks well for the producing capacity of the country.

The Sespe Oil District.

A correspondent of the *Los Angeles Express*, writing from Sespe oil district, Ventura county, says:

So little seems to be known about this district that I thought a few lines on the subject might find a space in your valuable paper. The Sespe district has an area of about 32 miles, its initial point being the Cienega post-office, to which letters for the district should be addressed. The Sespe claim, so far, I believe, the only one yet patented, is in the heart of the district, about 60 miles from Los Angeles, and can be reached in one day from there, via rail to Newhall station on the Southern Pacific railroad, thence by road about 23 miles to the Los Angeles oil claim, which with several others, belongs to a company in Los Angeles, of which Mr. Patrick is President; the remainder of the distance, some five miles, has to be accomplished on horseback over a good trail. We believe that in a short time the wagon road will be completed right through to this part of the district where the Los Angeles company hold the rest of their claims. A very good line can be obtained, and the road could be finished almost without a charge of powder. A large number of claims have been located, more particularly around the Sespe claim. The Star oil company have got possession of a number, the Recorder of the district informed me yesterday that he had filed in 110 deeds for them, and as each deed would represent probably 20 acres, some estimate may be formed of the large extent of country they command.

The southern line of the Sespe oil claim is intersected by a finely wooded canyon running in an easterly direction, through which flows, not a "babbling brook" of sparkling limestone water, of which, by the way, there is plenty up here, but a dark steady stream of fine oil con-

densed more or less by evaporation, whose origin is to be found in numerous springs that dot the sides of the canyon. Hundreds of barrels of oil are here running to waste; at least 20 barrels a day on this claim alone are lost for want of a road or pipe to transport it away. All this oil flows spontaneously; none of it is the result of development of the springs from which it flows. There are numbers of other springs, though no claim shows so many as the Sespe, where the oil is in a like manner running to waste, and I think I do not exaggerate in saying that in the district there are 200 barrels a day running away. Further up the above mentioned canyon, in the Sespe claim, a reservoir about 10 feet square has been cut into the side of the canyon close to the oil stream, it is full of splendid oil, so good that, without refining, it burns excellently in a lamp. All the oil in the district is more or less of the same quality. All that is wanted to develop this region is a little capital. People as yet do not seem to appreciate the vast wealth that must accrue to southern California from this and the San Fernando district, and it will be a good thing for those who have an interest here when a little capital, employed in boring, has shown the vast amount of oil that is stored up here. The country around here is intersected by beautifully wooded canyons with clear streams of limestone water, for the water is clear though in most instances oil floats on the top.

Will it be Started Up?

Several weeks since we announced upon what we believed to be good authority, that negotiations were pending for the purchase of the Star Spangled Banner mine. Of late we have heard nothing about it. Has the project been abandoned? We hope not, for we feel confident that that mine, if properly developed, and economically managed, can be made to pay handsome dividends. There is no question about its being a fine piece of property, and that somebody will make a big thing out of it. As near as we can remember something like \$900,000 was taken out of the mine, and when the company quit work they had a six-foot ledge in the bottom of the 620-foot level, which paid \$12 per ton, but by some unaccountable mystery it cost \$13 per ton to mill it, and then they gave up the work. The mill, hoisting works, etc., were sold to the Nevada foundry, and not a day's work has been done on the mine for eight or nine years, and yet the people who are posted declare that it will yet be a leading mine in this district, and with that belief it seems strange that a company can not be formed for the purpose of opening it up. Everything is cheaper than it was at the time the works were closed down, and the quartz prospects in that immediate vicinity are showing up well. Then why should the Banner not be worked? The North Banner, the extension of the Star Spangled Banner, has a fine looking ledge which is about one and a half feet thick, and several experts who have examined it assert that it is a No. 1 prospect for a big mine. It is estimated that it would cost about \$20,000 to buy the mine and put it in a condition to take out rock. It appears to us that amount is very insignificant to raise when the real value of the mine is taken into consideration. We contend this piece of property is well worthy the consideration of capitalists, and the prosperity of the town would be greatly enhanced if it was started up. —*Nevada Transcript*.

TRIAL OF A NEW LIFEBOAT.—A lifeboat, constructed on a new principle, was publicly tried on Wednesday last, in the harbor of Cowpen Quay, Blythe, in the presence of a large number of people. The inventor of the boat is Mr. George Milburn. The new craft, which in appearance is yawl-shaped, is 15 feet long, four feet six inches broad, and its extreme depth is three feet eight inches. It is fitted on deck with a cabin, into which persons, in case of necessity, will descend by means of a man-hole door, where they will be able to securely lock themselves in until picked up by a passing vessel or till the land has been reached, in addition to being provided with a sail and steering apparatus; oars are also placed on board, so that when the weather turns out favorable, pulling may be adopted. Compartments for provisions and fresh water are placed at each end, and, in addition to carrying eight men, who form its ballast, the boat, as at present constructed, will also carry sufficient food to serve them for four or five weeks at least. The trial, which had been announced for 6 o'clock, commenced shortly after that hour, when Mr. Milburn, the inventor, and three boys fastened themselves in, and the boat was at once turned over by means of ropes. Almost immediately she righted and rose on the wave. Another trial with three able-bodied men and the inventor was shortly afterwards made, when the boat, as was expected from the increased weight she contained, rose still swifter to the surface than she had done before. —*Iron*.

THE GEORGIA GOLD MINES.—The Gainesville Southern has the following: "The mines in and around Dahlonega are now all in active operation, although the mining work, being mostly in open cuts, has been more delayed by storms and bad weather than ever before since they started. Work on the new 20-stamp mill at the Hand company mine is already commenced, and that an addition of 10 stamps to present mill is contemplated. This would make 50 stamps at the Hand mine, and would largely increase the amount of gold receipts with a small corresponding expense.

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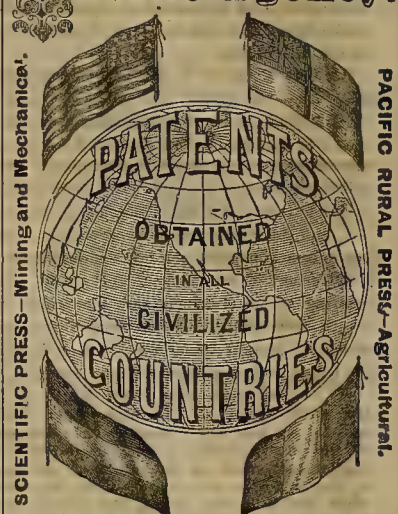
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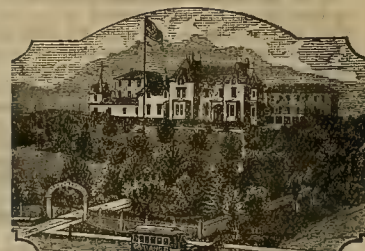
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Continued from page 325.

BEUCHER.—Daily yield, 80 tons of ore. Sinking the main incline is making good progress. Sinking the drain shaft is also going steadily forward.

OPHIR.—Daily yield, 30 tons of ore. The opening of the 1900-ft station is making good headway. The flow of water at that point has decreased until it gives no trouble whatever now.

CHOLLAR-POTOSI.—Sinking the Combination shaft is going steadily forward, the bottom in good blasting ground.

IMPERIAL CON.—The north drift on the 2135-ft level is still advancing toward the Alpha line, the face in very favorable ground.

UTAH.—The southeast drift on the 1150-ft level has cut through the wall of the ledge and is now running in dry, solid vein matter.

HOMESTEAD.—Work in the shaft has been suspended for the past month on account of making certain necessary improvements on the surface, which are now nearly completed.

HALE & NORCROSS.—The repairs to the cave in the main incline below the 1900-ft level are about finished. The water is now reduced to a point 63 feet below the 1900-ft level.

MORNING STAR.—Sinking the main shaft is being pushed vigorously downward.

ALTA.—The opening of a station for the purpose of drifting for and prospecting the ledge is soon to be commenced.

DAYTON.—The ore bodies on both the 400 and 220-ft levels are opening up much better than was at first expected. Arrangements are being made for milling the ore.

SAVAGE.—The pumps are kept steadily at work, and are gradually gaining on the flow of water, even while running at a less rate of speed than heretofore.

SUTRO TUNNEL.—Total length of tunnel, 16,827 feet; face in hard porphyry, with streaks of quartz and clay coming in, showing a change for the better.

ELY DISTRICT.

ALPS MINE.—Pitche Record, May 19: The usual amount of ore is being taken from this mine; the prospect in the winze on the 204-ft level is very encouraging. The Condr mill continues running night and day on Alps and custom ore. The Alps mill will start up as soon as sufficient water can be obtained to run it regular. The prospect of getting this water appears very good at present.

PICHOE BULLION.—Bullion shipped by Wells, Fargo & Co. during the past week, being the product of ore from this district, amounted to \$10,517.73.

RAYMOND & ELY.—Considerable good ore is being extracted from the upper levels, and developments on the 1200-ft level are looking better as work progresses. The strata lying along the hanging wall shows a ledge of four feet in thickness, but where the ledge is run through by cross-cuts, the ledge matter is much wider. Much of this vein is of the finest character of quartz containing gold. The ore that is silver is richest in gold. One assay showed as high as \$37 in gold, while others went \$30, \$12 and \$10 in gold. Captain Day, the Superintendent, thinks this a splendid prospect, and has no doubt of it improving rapidly, as it has done heretofore as the work progressed. The last assay, made yesterday, went \$207.63 in silver and \$72.73 in gold.

BULLIONVILLE FURNACE.—The Bullionville furnace has been leased by Osborne & Co. for the purpose of working the concentrations at the Dry Valley mill. McCormick, a banker at Salt Lake City, has telegraphed word that he has sent a man from that place to do the smelting, one that understands the business thoroughly, so then the furnace will soon be to work and will be of immense benefit both to Bullionville and this place. The process of shipping the concentrations to Utah was entirely too slow to make it a paying business.

EUREKA DISTRICT.

THE ATLAS FURNACE.—Eureka Sentinel, May 14: As most of our readers know, the Atlas is running on Hamburg ore, the smelting company, in fact, taken a lease of the Atlas works. The furnace was fired up a few days ago, and is doing splendidly. There is on hand 824 tons of ore and 22,000 bushels of coal. From 45 to 50 tons daily are being put through the furnace. Yesterday's shipment consisted of 190 bars, weighing 20,060 pounds. Everything is moving along in excellent shape.

Idaho.

GOLDEN CHARIOT.—Owyhee Avalanche, May 19: The Golden Chariot is wearing a more promising look than ever. The 13th level is now in 325 feet. The vein matter has changed somewhat in appearance recently. It exhibits more mineral and has a more healthy indication as the work progresses. All the signs here are propitious for the opening up of a magnificent bonanza at this level. As a result of the systematic and well-directed operations that have been in progress in this mine for the past few months, the existence of three promising veins, east of the Chariot, viz.: The middle vein, Crane & Driggs, and the East Side is now very clearly defined, and each is contributing its quota to the general yield of the mine. Quartz hauling has commenced and the mill is crushing away at a lively rate.

The Belle Peck is looking splendid again, and the work is being carried on both night and day. Rich rock is being taken from the ledge in the lower levels, and now that the water is being kept at bay, everything in and about the mine has a promising appearance. The pay streak is from two to a half foot wide.

The operations at the Empire and Belle Peck give increased interest and importance to the expected developments at the Poorman, where the great bonanza of that section of War Eagle mountain undoubtedly exists. A few weeks judicious and well directed labor in the Poorman would open up the real source of wealth in that promising mine.

Operations are being vigorously prosecuted in the Potosi, where the workmen are sinking a winze about 40 feet below the main tunnel level. This operation will enable them to take out about 300 tons of very rich ore.

Montana.

ORE.—Butte Miner, May 12: Two men are working on the Lena mine, taking out some very high grade ore, as saying from 400 to 1,400 ounces per ton.

DEVELOPMENT was commenced yesterday on the Little Darling lode. The surface ore sample 63 ounces; it holds good the extraction of ore will continue until a 25 or 30 ton shipment is piled upon the dump.

Work is progressing very favorably on the Uinta mine. Several tons have been sent to mill to get at a correct sample of the ore now being taken out of the mine.

Last week we mentioned that a small lot of ore from the Friedland lode, owned by Messrs. Roubush & Young, was to be crushed in the Burlington mill as a test of its value. The result was quite satisfactory, the ore running up to something over 40 ounces per ton in silver, and saving a high per cent. of the assay, showing that the ore contains very little base metal and can be profitably mined and milled.

Utah.

DRY CANYON.—Cor. Salt Lake Tribune, May 19: The mines are all looking well. The Hidden Treasures employ from 90 to 100 men, and is shipping large quantities of ore. The Herschel, owned by Spangler & Keller, bids fair to become one of the leading mines of the Territory. The Mono is retimbering, and intends putting on a new force of 50 or 60 men. The Josephine has commenced shipping ore. In fact, the mines are doing a prosperous business, and everything seems to warrant lively times for the next six months and a permanent prosperity for the camp.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

FOR WEEK ENDING MAY 15TH, 1877.
190,685. FRUIT DRIER.—H. Kelly and D. Cole, East Portland, Ogn.
190,690. PILE DRILL.—I. Piles, Yankton, D. T.
190,771. MACHINES FOR PUNCHING AND SHEARING METALS.—A. Lee, Forest Grove, Ogn.
190,794. HOP DRIERS.—S. R., J. C. and J. H. Templeton, Brownsville, Ogn.
190,806. HORSESHOE BAR.—A. Barton, Nevada City, Cal.
190,808. ORE WASHER.—D. Beaumont, Sacramento City, Cal.
190,928. BLOWING MACHINE.—T. A. Cochran and J. Hendy, S. F.
190,840. GANG EDGERS.—D. Evans and W. Snyder, Salm-on Creek, Cal.
190,911. WATER REGULATOR.—L. A. Scowden, S. F.
190,919. EFFLUVIA EXTRACTOR FOR WATER-CLOSETS.—W. Smith, S. F.
190,923. ROTARY ENGINES.—T. F. Sparrow, Denver, Col.
7,679. SLOP-HOPPER.—J. Marquis, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

BLOWING MACHINES.—Joshua Hendy and Thos. A. Cochran, S. F. This invention relates to certain improvements in that class of blowing machines in which one or more radial vanes are secured to a cylinder or axial shaft inside of a cylindrical case or shell, and in which a rotary abutment is used for closing communication between the air inlet and exhaust passages; said rotary abutment being provided with a longitudinal recess in which the vanes are received and passed from one side of the machine to the other. In blowing machines of this class the rotary abutment is operated by a gear connecting with the main shaft in such a manner that the outer ends of the vanes will successively enter the recess in the abutment at the proper instant, while the rotation of both will allow the vane to pass from one side of the machine to the other and at the same time preserve a sufficiently air-tight joint between them. Heretofore the vanes have each been made in a single piece which would not yield to any irregularity of the cylindrical movement. The machine was therefore liable to be broken or rendered useless by the natural wear upon the parts. This difficulty is remedied in the invention by constructing the vanes in two parts, so as to allow them to yield to any irregularity of motion. Other improvements are also provided which render this class of blowing machines more durable and reliable than heretofore.

HORSE-SHOE BAR.—Arthur Barton, Nevada City, Nevada Co. This is a compound iron and steel horse-shoe bar, which is so adapted and combined that when the bar is bent or formed into a horse-shoe, the iron will form the upper part of the shoe, or portion which comes next to the foot of the horse, while the steel forms the wearing surface or lower part. The steel portion or sole is only about half as wide as the iron portion, so that it will form when welded to the bar the proper outline for the base of a horse-shoe. When this bar is bent into the proper shape, this steel ridge or sole will form a wearing surface for the shoe, while the iron portion comes next to the horse's foot; the steel can then be hardened as much as desired, so as to form a shoe of great durability and one which is much cheaper and easier made than an entire steel shoe. By making the upper inside edge of the shoe inclined or beveled towards the center of the shoe, any dirt which may get jammed in between the horse's foot and the shoe will be displaced by the jar of walking and will readily fall out.

PHOTOGRAPHING.—We have received a number of fine views taken by Mr. S. P. Sanders, photographer of San Jose. We learn also that Mr. Sanders has decided to visit some of the prosperous towns of the State this summer, and has chosen the somewhat novel manner of taking pictures in a tent. It will be commodious, cool and airy, and a great improvement over the small cars which are sometimes the only local accommodation afforded our country friends. Mr. Sanders takes with him some three hundred select stereopticon views, which he sometimes exhibits, and which will repay any one who embraces the opportunity of seeing them. We have known Mr. Sanders since 1862, and can recommend him as a competent artist and a worthy and reliable gentleman.

THE starting of the Richmond and Eureka Con. smelting works on the 1st is announced on reliable authority. Both companies have developed large bodies of ore outside of the ground in dispute.

THE largest single shipment of bullion ever made from the Comstock was made on the 19th inst., consisting of 150 bars of bullion, valued at \$568,720.81.

THE sales of the San Francisco Stock Board last week amounted to \$1,400,000.

Coast Railroad Items.

Over 2,000 men are at work on the railroad between Bantas and Oakland, and the amount of money paid out for labor alone on this enterprise exceeds \$80,000 per month. The work will be finished within three months.

The controversy between the city of Stockton and the Stockton and Visalia Railroad Company has been settled. The city has agreed to pay \$200,000 of the bonds, the remainder—something like \$500,000—being destroyed.

The Contra Costa Gazette of Saturday says: On Wednesday last ten miles of the rails had been laid from the junction of the Western Pacific toward Antioch; and as they are being laid down at the rate of about a mile a day the locomotive of the construction train will doubtless be at Antioch before the close of the month.

The Alameda Independent says that the South Pacific Coast Railroad Company, or the men who control that company, have secured from the authorities of the town of Alameda the right of way through that town for a narrow-gauge railroad to be built in a southerly direction, so as to connect at Newark with the railroad already constructed from Dumbarton Point to Santa Clara and San Jose. They are required to expend \$30,000 within six months on it and to complete six miles of the road within one year.

Articles of incorporation of the Fulton and Guernville railroad have been filed, the object being to construct and run a railroad from Fulton station, on the line of the San Francisco and North Pacific Railroad, in Sonoma county, to Guernville in the same county. The capital stock is \$675,000, divided into 6,750 shares at \$100 each, and the directors are Peter Donahue, Edward Martin, Michael Reese, Thomas J. Bergin and Patrick E. Dougherty. Peter Donahue is President, Michael Reese, Vice-President, and Patrick E. Dougherty, Secretary.

The annual meeting of the Eureka and Palisade Railroad was held at Eureka on the 21st. The company have decided not to extend the road southward this season.

Important to Miners.

J. A. Williamson, Commissioner of the General Land Office, in reply to an inquiry made by A. C. Fisk, of Denver, Colorado, has rendered a decision of the highest concern to all who are engaged in mining upon the public domain:

"In the case presented by Mr. Fisk, where a party discovered a mine on the 1st of July, sunk a discovery shaft ten feet in depth, and made record of his claim on the 28th of August, 1876, the first annual expenditures should be made prior to July 1st, 1877."

The above decision is important, and the following requirements and conditions result therefrom:

First. The date of the beginning and origin of the title to a new lode claim will be the exact day on which it shall be first discovered by the uncovering and disclosing of the same.

Second. The recorded location notice (or certificate) should, in all cases, state the date on which the discovery was made.

Third. The time in which annual expenditures must be made will begin and end yearly on the date of discovery, not on the date of record.

Fourth. The work of sinking the discovery shaft ten feet deep, or said portion of said work as shall be performed after the date of discovery, may be accounted as part, or a whole (as the case may be), of the first annual expenditure.

Fifth. Claims located prior to January 1st, 1872, are not affected by this ruling. The law of Congress requiring annual expenditures not having gone into operation until that date, claims located prior thereto were given a full year to do their assessment work; that is to say, that these old titles may be represented at any time in the year, between the first day of January and the last day of the succeeding December.

THE Postoffice Department gives notice that the schedule days of departure from San Francisco of mails for Japan and China, have been changed, and the number of trips increased as follows: The Pacific Mail Company will dispatch its steamers from San Francisco, May 29th, June 20th and July 14th. The vessels of the Occidental and Oriental Company will leave the same port on June 9th, July 3d and July 27th. Increased frequency of trips will continue throughout the season.

The bullion shipments from the Benton office of Wells, Fargo & Co., during the month of April, amounted to the value of \$53,921. Mono county must be looking up.

A MINER named James Bailey committed suicide at Virginia City last week, by jumping down La Plata shaft, 150 feet deep.

JOSEPH T. GOODMAN, has been proposed for membership of the San Francisco Stock and Exchange Board.

A LOT of 16 tons of ore recently arrived from the Silver King mine, Arizona, was sold for \$2,449 per ton.

CAPTAIN MARTIN WHITE, of the Martin White mining company, Ward district, Nevada, has gone to China.

General News Items.

AN entire row of wooden buildings were destroyed by fire at Chico, Butte county, on Tuesday last.

NINE persons were crushed to death while launching the steamer *Saratoga* at Chester, Pennsylvania, on Tuesday.

ABOUT 16,000 men are already locked out from the Clyde ship-building yards. The Clyde shipwrights at a meeting resolved to submit their dispute with the masters to arbitration.

THE New York Herald's London special says: The Chinese question is looking up. A shipload of Chinese laborers is expected in London, and an immense Chinese laundry is to be established in Holland park.

THE Postoffice Department has contracted with J. K. Warren, of Albany, Wisconsin, for mail service between Paddock, Nebraska, and Custer City, in the Black hills. This will make six mail routes in the Black hills.

NEWS is received of the total destruction of the town of Creswell, near Plymouth, North Carolina, by fire, on Friday night. All the mails in the postoffice were consumed. But little insurance was held by the property-owners and the greatest distress prevails.

ADVICES from Peru to the 28th, state that an uneasy feeling prevails in financial circles, and fears of a crash were entertained. Senor Pedro Bernales, the banker and merchant had failed for a million and a half soles, and the associate banks were thought to be in a precarious condition.

GENERAL SHERIDAN proposes to send an expedition to the scene of Custer's fight with Sitting Bull, for the purpose of getting the remains of the gallant band who were massacred upon that occasion, and giving them burial with proper military honors, at such a point as may be designated by the War Department.

SECRETARY SHERMAN is pleased with the New York Custom-house investigation, and will probably repeat the experiment at Philadelphia and Baltimore. A great reduction of force is everywhere expected. A new Naval Surveyor and Appraiser will probably be appointed at New York.

At a coal meeting in New York, on Monday, all the companies were represented, and every one present voted to suspend mining from June 15th to July 15th, with the exception of Mr. Hoyt of the Pennsylvania Company, who did not object to the arrangement, but declined to vote for it.

The Bozeman Courier of the 8th contains the annexed: Barney Hughes, the noted Mormon prospector, has reached Camp Brown, Wyo., badly wounded by Indians. He and his five partners were attacked on the Badwater on the 16th ultimo, and two were killed and three are missing.

The boot has been most decidedly changed to the other leg at the Wamsutta mills, in New Bedford, Mass. A little while ago the strike was in full blast, and all the machinery was still. Now the managers of the mills daily reject over 100 applicants for work at the old rates.

THE forty-seventh call for the redemption of 5-20 bonds of 1865, and consols of 1865 was issued on Monday. It is for \$6,000,000 of coupons and \$4,000,000 of registered bonds, instead of \$7,000,000 of coupons and \$3,000,000 of registered bonds, as originally intended. The principal and accrued interest will be paid at the Treasury at Washington on and after the 21st of August, when interest will cease upon the bonds.

THE Secretary of the Interior to-day issued an order requiring cash reports of receipts, disbursements and balances to be made to him weekly, by all disbursing officers and other agents of the department in Washington and throughout the country. The order is issued with the two-fold purpose of exercising more intelligent supervision and affecting a control of business expenditures, and with a view to preventing the perpetration of clerical or other errors.

THE GRAND PACIFIC HOTEL.—Such a thing as occurred at the Southern Hotel, in St. Louis, where thousands of dollars worth of property was destroyed and several lives lost, would not be apt to happen at the Grand Pacific in Chicago. The features for security against fire are exceptional. The construction is such that it will be impossible for a fire to extend beyond the small section in which it might originate. The fire electric system is adopted, furnishing instant alarm from all rooms. Four standing pipes of iron connect with the steamers at the sidewalk. By its own watchman alone the whole hotel could be flooded in a few minutes, and in all these features the hotel has been guarded carefully against fire. These, with the first-class appointments of the house, make it a favorite with the traveling public.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
B. W. CROWELL—Amador, Placer, Calaveras and Tuolumne counties.

G. W. McGRAY—United States.
C. K. KNOX—Plumas, Sierra, Lassen, Placer and Nevada counties.

C. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMPION—Sonoma, Marin and Mendocino counties.

A. U. STONE—Lake, Napa and Solano counties.
E. T. PLANK—Dakota Territory (Black Hills).
JOSEPH DIMMICK—Mendocino, Humboldt and Del Norte counties.

METALS.

WHOLESALE.

THURSDAY, M. May 24, 1877.

IRON.—			
Amalgam Pig. ton.	32 00	33 00	
Best Pig. ton.	32 00	34 00	
White Pig. ton.	31 00	—	
Oregon Pig. ton.	31 00	—	
Refined Bar.	—	—	34
Horse Shoes, keg.	5 00	—	34
Nail Rod.	—	—	7
Norway, Oval.	—	—	7
Rolls.	—	—	—
Copper.—			
Copper Tinned.	37 00	40 00	
Sheeting, B.	37 00	—	
Sheeting, Yellow.	21 00	22 00	
Sheeting, Old Yellow.	10 00	—	
Composition Balls.	21 00	—	
Composition Bolt.	24 00	—	
STEEL.—			
English Cast, B.	14 00	25 00	
Anderson & Woods, ordinary size.	16 00	—	
Flat Bar.	15 00	20 00	
Plow Steel.	24 00	12 00	
TIN PLATES.—			
104 1/2 C. Charcoal.	9 00	9 50	
Hanna Tin.	24 00	—	
Australian.	19 00	20 00	
ZINC.—			
By the Cask.	11 00	—	
Sheet, 7 1/2 ft. x 7 to 10, B.	11 00	—	
7 1/2 ft. x 11 to 14.	11 00	—	
8 1/2 ft. x 8 to 10.	12 00	—	
8 1/2 ft. x 11 to 10.	12 00	—	
NAILS.—			
assorted sizes.	3 25	3 37 1/2	
QUICKSILVER.—			
By the lb.	16 00	—	

LEATHER.

WHOLESALE.

WEDNESDAY M. May 23, 1877.

Sole Leather, heavy, lb.	26 00	27 00
Light.	22 00	24 00
Jodot, 8 Kil. doz.	48 00	50 00
11 to 13 Kil.	68 00	69 00
14 to 19 Kil.	62 00	64 00
20 Kil. Choice, H. & C. 16 Kil.	57 00	67 00
Cornellian, 12 to 16 Kil.	57 00	67 00
Females, 12 to 13 Kil.	63 00	67 00
14 to 18 Kil.	71 00	73 00
Simon Ullimo, Females, 12 to 13 Kil.	58 00	62 00
14 to 15 Kil.	56 00	60 00
16 to 17 Kil.	72 00	74 00
Simon, 18 Kil.	61 00	63 00
20 Kil.	55 00	67 00
24 Kil. Choice, H. & C. 16 Kil.	57 00	67 00
Robert, 7 and 9 Kil.	35 00	40 00
Kips, French, lb.	1 00	1 35
Cal. doz.	40 00	60 00
French Sheep, all colors.	8 00	15 00
Eastern Cal. for Backs, lb.	1 00	1 25
Sheep Hides for Topping, all colors, doz.	5 00	12 00
For Linings.	5 00	10 00
Cal. Russet Sheep Linings.	1 75	4 50
Best Leg. French Cal. pair.	4 00	5 00
Good French Cal.	4 00	4 75
Best Jodot Cal.	5 00	5 25
Leather, Harness, B.	35 00	38 00
Fair Bridle, doz.	48 00	50 00
8 Kil. B. C. 3 Kil.	33 00	37 00
Welt, doz.	30 00	50 00
Buff, ft.	—	—
Wax Side.	17 00	18 00

Gold, Legal Tenders, Exchange, Etc.

(Corrected Weekly by SUTS & Co.)
SAN FRANCISCO, May 23 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 24th & 25th SILVER.
5/64 Gold in New York, 106.
Gold Bars, 880/890. SILVER BARS, 10/15 1/2 cent. discount.
EXCHANGE on New York, 50/55-100 1/2 cent. premium for gold; on London, 48; Commercial, 49; Paris, five francs 9/10; Mexican dollars, 94/95.
LONDON Consols, 93 1/2; Boars, 106.
QUICKSILVER in S. F., by the flask, 1/4, 41/42.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1877, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notices must be personally served upon each stockholder, or in lieu of personal service, must be sent, through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Booth Gold Mining Company.—Location

of works, Auburn, Placer county, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the thirty-first day of April, 1877, an assessment (No. 2) of five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, No. 320 California Street, Room No. 5, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the fourth day of June, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the twenty-sixth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors.
GEO. R. SPINNEY, Sec'y.
Office, 320 California St., Room 5, San Francisco, Cal.

California and Arizona Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, Cedar valley, Mohave county, Arizona.
Notice.—There are delinquent upon the following described stock, on account of assessment No. 2, levied on the third (3d) day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Edmund Burch.	13	50	\$1 00
Edmund Burch.	15	500	10 00
Edmund Burch.	17	500	1 00
Edmund Burch.	18	4 000	—
Edmund Burch.	19	200	4 00
Edmund Burch.	21	200	4 00
Edmund Burch.	24	100	2 00
Benjamin Flint.	89	4,000	80 00
W H Hall.	41	2,500	50 00
James W Thrift.	43	2,500	50 00

Name.	No. Certificate.	No. Shares.	Amount.
E E Rice.	44	2,500	50 00
T E Jewell, Trustee.	40	50	1 00
Martin Corcoran.	50	1,250	25 00

And, in accordance with law, and an order of the Board of Directors, made on the third (3d) day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at Room B, No. 507 Montgomery street, on Monday the fourth (4th) day of June, 1877, at the hour of two (2) o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

T. E. JEWELL, Secretary.

Office, 507 Montgomery Street, San Francisco.

Consolidated Bonanza Silver Mining Co.—

Principal place of business, San Francisco, California. Location of works in Eagle and Washoe Valley Mining District, Ormsby county, State of Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 19th day of April, A. D. 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on Tuesday the 26th day of May, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 19th day of June, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Directors.
W. M. MARTIN, Secretary.
Office No. 19 First Street, San Francisco, Cal.

Dolores Consolidated Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda county, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Blasdel, H. G., Trustee.	16	10,000	\$1,000 00
Blasdel, H. G., Trustee.	17	5,000	500 00
Blasdel, H. G., Trustee.	18	5,000	500 00
Blasdel, H. G., Trustee.	19	5,000	500 00
Drexler, L. P. & Co., Trustee.	8	25,000	2,500 00
J. D. Trustee.	7	10,000	1,000 00
Kelso, J. R., Trustee.	9	10,000	1,000 00
Talbot, W. C.	3	100	10 00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of sale.

J. W. CLARK, Secretary.

Office, 418 California street, San Francisco, California.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of April, 1877, to the 16th day of May, 1877, and will then be held at the same hour and place named above. By order of the Board of Directors.
J. W. CLARK, Sec'y.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of May, 1877, to the 15th day of June, 1877, and will then be held at the same hour and place named above. By order of the Board of Directors.
J. W. CLARK, Sec'y.
May 11th, 1877.

Empire Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, War Eagle Mountain, Owyhee County, Idaho Territory.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-sixth day of April, 1877, an assessment, No. 13, of \$1 (one dollar) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 330 First Street, Room No. 5, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the thirtieth day of May, 1877, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the twenty-sixth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
W. M. McCLINTOCK, Sec'y.
Office, 330 First Street, Room No. 5, San Francisco, Cal.

Mariposa Land and Mining Company of

California.—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, California.

Notice.—There is delinquent upon the following described stock, on account of assessment, No. 10, levied on the twenty-eighth day of March, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

COMMON STOCK.

Names.	No. Certificate.	No. Shares.	Amount.
Adams, Thomas.	1165	100	100 00
Ambleman, Edgar M.	1492	100	100 00
Ambleman, Edgar M.	1493	100	100 00
Ambleman, Edgar M.	1494	100	100 00
Ambleman, Edgar M.	1496	100	100 00
Ambleman, Edgar M.	1528	100	100 00
Ambleman, Edgar M.	1530	100	100 00
Brumagim, J. H.	1112	100	100 00
Brumagim, J. H.	1113	100	100 00
Brumagim, J. H.	1115	100	100 00
Brumagim, J. H.	1342	100	100 00
Brumagim, J. H.	1347	100	100 00
Brumagim, J. H.	1349	100	100 00
Brumagim, J. H.	1350	100	100 00
Brumagim, J. H.	1360	100	100 00
Brumagim, J. H.	1361	100	100 00
Brumagim, J. H.	1362	100	100 00
Brumagim, J. H.	1381	100	100 00
Brumagim, J. H.	1384	100	100 00
Brumagim, Fred P.	1644	100	100 00
Brumagim, Fred P.	1645	100	100 00
Brumagim, Fred P.	1646	100	100 00
Brumagim, Fred P.	1647	100	100 00
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Brumagim, Fred P.	1652	100	100 00
Brumagim, Fred P.	1653	100	100 00
Brumagim, Fred P.	1654	100	100 00
Birmingham, D. Walton	1473	100	100 00
Boody & Co., D. A.	225	50	50 00
Collins, C. A.	1200	100	100 00
Collins, C. A.	1203	100	100 00
Collins, C. A.	1206	100	100 00
Collins, C. A.	1237	100	100 00
Curtis, W. B.	272	100	100 00
Connor, W. P.	1268	100	100 00
Cowles, Jos N.	A22	25	25 00
Cowles, Jos N.	A23	25	25 00
Glendinning, Davis & Amory.	291	100	100 00
Homans, E. C.	1242	100	100 00
Homans, E. C.	1415	100	100 00
Harriott & Noyes.	1102	100	100 00
Harriott & Noyes.	1103	100	100 00
Harriott & Noyes.	1104	100	100 00
Harriott & Noyes.	1250	100	100 00
Harriott & Noyes.	1253	100	100 00
Hedgcs, Allen.	1160	100	100 00
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Hedgcs, Allen.	1394	100	100 00
Hedgcs, Allen.	1395	100	100 00
Hedgcs, Allen.	1396	100	100

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Established for the Manufacture of
RAILROAD AND OTHER IRON
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Every Variety of Shafting,
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Is Extensively Used in the East and

TAKES THE PLACE OF ALL OTHERS,
Wherever introduced, because it can be run with less
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Selling Agents for the Pacific States,
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THE O'HARRA CHLORIDIZING FURNACE

Guaranteed to Chloridize from 85 to 95 per cent. of any
gold or silver ores that are not more profitable for smelt-
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Cost of Roasting and Chloridizing by this
Process:

Two cords of wood at \$6.....	\$12.00
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1,500 lbs of salt at 10c.....	22.50
Wear of shoes and power.....	1.50
Cost for 15 tons.....	\$44.00
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In a furnace of three or four times this capacity the
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The furnace is now working successfully at the Pog Con-
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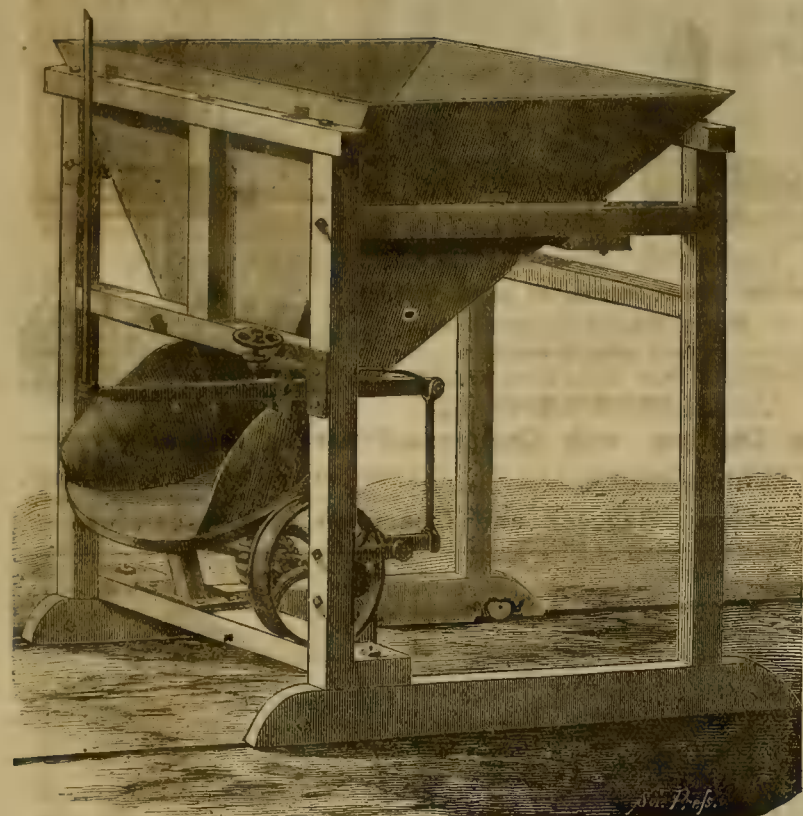
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At the Tenth Industrial Fair of the Mechanics' Institute.



It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

REFERENCES.

A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them." A letter from Mr. C. C. Belding, of Amador County, speaks in the highest terms of them. Two of the machines were shipped to the Bunker Hill Mill, also Gover Mill, Amador County. Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen. Soulsby Mill, Tuolumne County. California Company, Nevada City. Omaha Gold Mining Company, Grass Valley. St. Patrick Mill, Placer County.

\$1,000 CHALLENGE.

Backward in Coming Forward.

C. P. Stanford Fails to Come to Time on the Challenge of \$1,000 to Test the Merits of His Ore Feeder as Against Mine. The Challenge is Still Open to Him or any one else. GENTLEMEN, Put up or Shut up.

A letter has been received from the Crescent mine, Plumas County, in which it states that the Tulloch is a failure as against the \$1,000 Challenge Feeder of Hendy's.

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References: United States Government Buildings and the principal manufacturing establishments in the East and on the Pacific Coast; the principal mines and mills in Nevada, etc., etc.

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(Patents issued September 4, 1869; October 5, 1869; October 4, 1870; May 9, 1871.)

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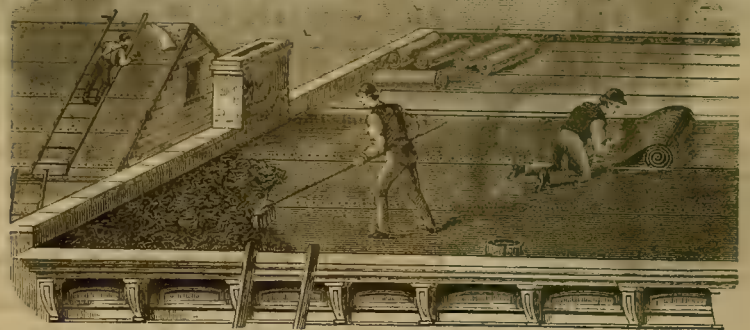
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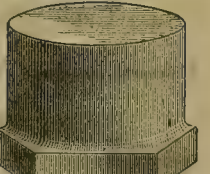
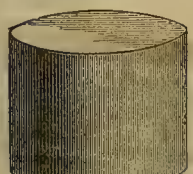
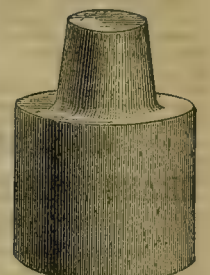
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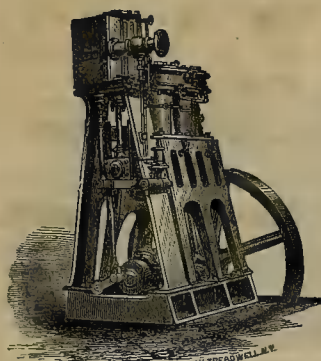
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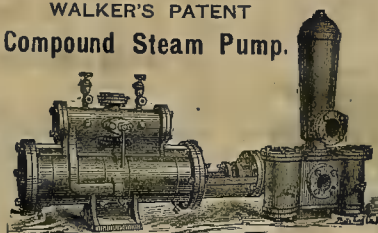


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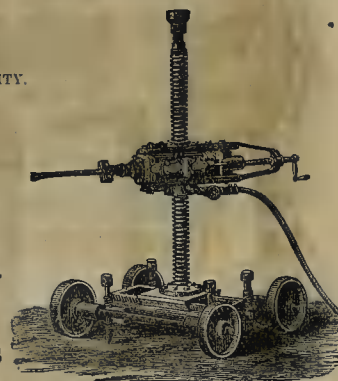
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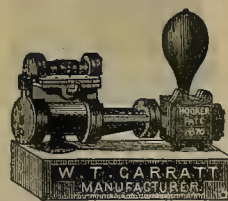
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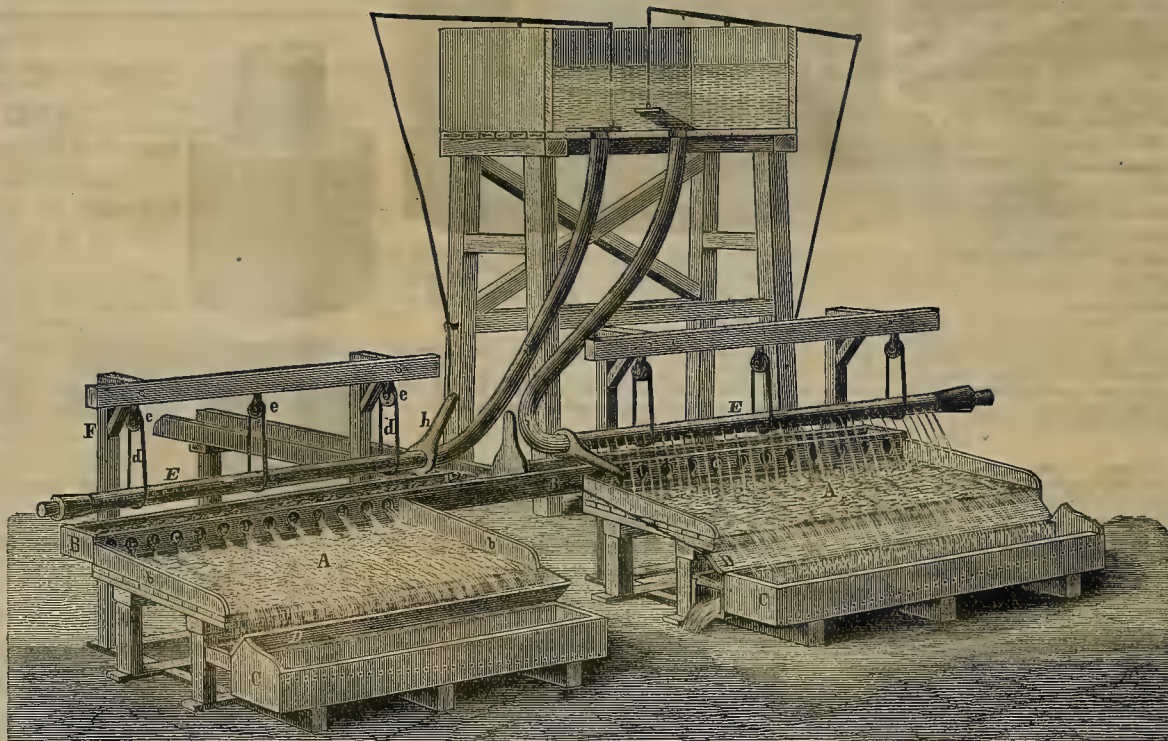


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TOLLES IMPROVED CONCENTRATING TABLES.

Improved Concentrating Tables.

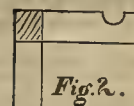
The illustration on this page represents an improvement in concentrating tables for ores recently patented through the Mining and Scientific Press Patent Agency, by J. U. Tolles, of Virginia City, Nevada, who has been using the apparatus very successfully in several places. In the engraving, A represents a flat inclined table provided with a surfacing of cloth or other suitable material of any kind, and with the ledges b, to prevent the material from passing over the ends. B represents a peculiarly constructed feed box extending along the upper edge of the table and provided in its front side with a row of discharge openings, c, of the form shown, each narrowing down to its lower end and of such a size as the nature of the material requires. C represents a receiving box or trough, extending along below the lower edge of the table. D represents a leaf or board hinged to the rear side of the trough or box C, in such a manner that it may be turned under the edge of the table to conduct the valuable material therefrom into the box, the refuse passing over the edge of the table and discharged upon the ground, or into the box in the rear of the box C. E represents a rotating tube or pipe suspended lengthwise above the upper edge of the table by endless belts d, passing over pulleys e, supported in the rigid frame f, or by brackets fastened to the frame and extending out the proper distance over the table, the tube resting and rotating upon them as shown in Fig. 2. The tube is provided from end to end with a row of perforations, and with a hand lever, h, at one end, and is connected by a hose i, to a tank, pump or reservoir, delivering water at a pressure of from eight to 12 feet of head, as the nature of the case requires.

In operating the machine the feed box is narrowed to about one inch at its farther end, or has a strip of board set edgewise in the bottom, and running obliquely across the same from the rear to the front side, causing the material to gradually be brought to the front and discharged through the feed holes c, upon the table, thereby insuring an even distribution and steady flow of the material to be treated; a steady and copious supply of water is maintained in the box, and the ores, sands or tailings introduced therein. The water escaping through the openings, c, flows down in a thin light stream over the face of the table. The mineral particles are deposited upon and retained by cloth or other surfacing material on the face or bed of the table, while the light refuse matter is carried over the lower edge and discharged outside of the box C. After the collection of a suitable amount of metal upon the

table, the supply of water, etc., to the feed box is stopped by the gate and turned upon the other table. Clear water is now supplied to the first pipe, E, and allowed to run down over the table, for a moment, washing off the remaining refuse sands, and at the proper time the hinged leaf D, is drawn (by the rod) under the edge of the table, the pipe being rotated or turned and the water thrown through the perforations upon the table in a row of fine jets, forming an almost continuous sheet or film. By means of the lever h, (which should be fastened on the pipe at right angles to the line of perforations), the tube is turned and the sheet of water swept over the table from the top to the bottom so as to drive all adhering particles therefrom and wash them down into the box C. After this operation the jets are stopped from the tube, the leaf

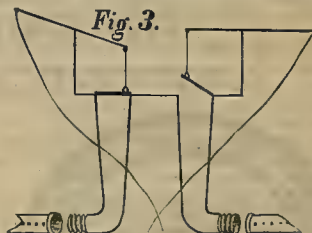
The object in arranging the perforated pipe so that it can rotate is to permit a gradual change in the direction of the jets, so that their point of impact upon the table can be advanced from its upper to its lower edge, and thereby every portion of the surface subjected in turn to the direct impact of the jets, in order to effectually loosen and drive forward the particles therefrom.

The flow of water can be regulated by the valves operated by the cords. The gate shown in the feed trough, G, will throw the water into either feed trough as desired.



thrown back, and the gate shipped to the other feed box, the feed water coming back on the first table, the operation being repeated as often as it is seen the tables are changed with the sulphurets or other valuable metals.

By employing the proper kind of cloth, grooves, riffles, or copper plating, or all of them combined, and giving the tables the proper grade, and properly regulating the flow of water, the inventor finds that he can effect a very rapid and thorough separation without agitating the table, and without power of any kind except the manual labor requisite to change the feed from one table to another, and washing them off by means of the water used in the pipes; he also finds by the employment of the fixed table he can separate particles which cannot be retained in machines which vibrate. By use of the feed openings, c, of the form shown, the discharge of the sand, ore or other fine material is rendered very steady and gradual, as it will be carried through the narrower portion of the openings, while the lighter water will pass over the same through the upper large end of the openings, taking up the material very gradually and distributing it very evenly upon the table. It is obvious that the rotating tube may be substituted in any other manner, and that it may be connected in any suitable manner with the source of the water.



The plugs in the ends of the pipes, E, are for the purpose of freeing them of any obstructions.

Fig. 3 represents the most convenient form of erecting the tank or reservoir which supplies the tubes with water, it usually being placed directly overhead with water shed underneath.

Mr. Tolles with this apparatus does not profess to do what many others claim to do, but he is running many of them where everything else has failed. He has been running several of these tables on the Comstock for nearly two years and is now building more. By using the proper kind of sizing apparatus in connection with the tables, the inventor is doing some close work with them at a nominal expense of constructing, running and keeping in order. He states that any person using anything of like nature, or any portion of the same for like purposes, without first obtaining license or instructions, will be prosecuted for damages for such use. Persons at a distance can build and run them by first obtaining license and instructions from the inventor, John U. Tolles, at Eureka, Humboldt county, California, or W. S. Tolles, his authorized agent at Virginia, Nevada.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JUNE 2, 1877.

VOLUME XXXIV.
Number 22.

DOUBLE SHEET EDITION, 24 Pages

Mechanics' Liens on Mines and Mills.

A case has just been decided by the Supreme Court of the United States on the subject of mechanics' liens which is of great interest to mechanics as well as to owners of mining property. The decision was on an appeal from the Supreme Court of Montana Territory, Andrew J. Davis, appellant, vs. Harvey Alvord, et al. Work was done by the plaintiff under a contract with the defendant, made August 1st, 1869, on two distinct parcels of property in Montana Territory; one a quartz mill and the other a quartz mine, separated a considerable distance from each other. The work on the mill was completed in the fall of 1869 or in the summer of 1870. Nothing was done afterwards except to make occasional repairs as they were needed. The work on the mine was done in 1870, but it was not shown when the work was commenced. In June, 1871, upon an accounting between the plaintiff and the defendant, there was found due to plaintiff a large sum, which the parties agreed should be a lien upon the mill and mine in equal proportions. Notices claiming a lien upon each for the amount as thus apportioned were accordingly filed in the recorder's office.

The Court decided that a suit to recover judgment for labor performed by the plaintiff upon a quartz mill and mine in Montana, to enforce a mechanics' and laborers' lien on the defendant's interest in the premises for the payment of a judgment, is a suit in equity, requiring specific directions for the sale of the property, such as are usually given upon the foreclosure of mortgages and sale of mortgaged premises. The fact that, according to the modes of procedure adopted in the Territory, a personal judgment for the amount found due is usually rendered in such cases, with directions that, if the same be not satisfied out of other property of the debtor, the property upon which the lien is adjudged to exist shall be sold, and the proceeds applied to its payment, does not change the character of the suit from one of equitable cognizance, and convert it into an action of law.

Mechanics and laborers asserting a lien upon real property for their work, and claiming priority over mortgages and others, who have acquired interests in the property, must furnish strict proof of all that is essential to the creation of the lien; and that requires them to prove when the work was commenced, the character of the work, and when it was completed.

It was held by the Court, 1st. That a lien did not arise from the contract of apportionment or from the special contract, referred to above, under which the work was done, but for the work itself which was performed upon the property. 2d. That the work being done on different parcels of the property, the lien claimed on one was to be considered separately from the lien claimed on the other. 3d. That the notice, so far as the mill was concerned, was filed too late, the statute requiring the notice to be filed within 60 days after the completion of the work; and that the occasional repairs subsequently made could not be added to the work done months before, so as to render the whole work one continued performance for which a single lien could be claimed within 60 days after the last repairs. 4th. That it not appearing when the work upon the mine was commenced in 1870, it will not be presumed that it was commenced before the mortgage of the defendant was executed and recorded in September of that year, so as to give to the lien for the work priority over the mortgage.

The decree of the Court was that whilst the statute giving liens to mechanics and laborers for their work and labor is to be liberally construed so as to afford the security intended, it cannot be too strongly impressed upon them, that they must not only bring themselves by their notices, as was done in this case, clearly within the provisions of the statute, but they must be prepared, if the priority of their lien be disputed, to show a compliance with those provisions and fix with certainty the commencement and completion of their work; in which particular the proof here is wanting.

The decree of the District Court of the Territory, therefore, has to be modified so as to give the mortgages held by the defendant, Davis, a priority over the lien of the plaintiff in the distribution of the proceeds arising upon the sale of the interest of the defendant, Hendrie; and the cause was remanded to the Supreme

Court.

THE NEW MINES. — Ralph Woodward has received some more samples of ore from the recently discovered mines near the Battle Mountain road, about 30 miles northwest of Austin. The Reveille says the ore shown from these mines is solid, argentiferous galena. The ledge from which it was taken is named the Eureka, its width is short nine feet, and the discoveries have sunk on it to a depth of thirty feet. The mines are within the limits of Reese River dis-

River Mining.

As there is very little snow in the mountains, there being but little rain last winter, a good many miners find it a good opportunity to try their hands at old-fashioned river mining again. In the early days this "summer mining" was done in many places by putting in wing-dams, pumps, wheels, etc., by which the miners could sink down to the natural bed of the river and get at the rich deposits on the bottom. The hydraulic operations which have been carried on for so long have had the effect, however, of filling up the beds of many of the rivers with heavy, deep deposits of debris, gravel, etc., and of late years this style of mining has been considered impracticable. To get over the difficulty some companies are at work sinking shafts on the banks, with the intention of running drifts out under the beds, and working that way. The low stage of the water, however, this summer has induced many to go to work in the old-fashioned way, and lots of them are hard at it now. Feather river is being flumed and wing-dammed from high up in the mountains down as far as it will pay. The Butte Record says there are probably three times as many companies at work on it to-day than ever before at one time. We were informed by a miner from up country this week, that the Stanislaus river is also being worked in the same way in places. The Bear river is also being mined in this style. The Grass Valley Union gives an account of the undertaking of Webster & Harrison, of Colfax, who have commenced operations this season by putting in a dam across the mouth of Greenhorn creek, at its junction with Bear river, and digging a canal from thence for some distance down the river, which will supply water to run the wheels for pumping out a claim which they have located below the junction. They are also building a long wing-dam on their ground to throw the water of Bear river to the east bank, by which means they will keep the surface of the claim dry. There is no probability that the water will increase in Bear river this season, as there is but little snow in the mountains, and they have the prospect of a long season's work before them. At the point at which they will work the river has filled up with tailings to the depth of twenty-five or thirty feet, and heavy stripping will have to be done to reach the bottom. It requires pluck and faith to go into such an enterprise, and the projectors certainly deserve a rich reward.

MINE MODEL.—A device for showing the character and interior of mines has been placed in the United States Circuit Court-room, in readiness for the trial of the suit of the Richmond mining company of Nevada vs. the Eureka mining company, to determine disputed boundary rights, which is expected to come on almost immediately after the court reopens for business. The model is made altogether of glass, and represents the principal tunnels, shafts, inclines, ore chambers, etc., of the Richmond and adjacent mines in Eureka mining district, as they would appear if cut by horizontal and vertical planes, passing through Ruby hill at points indicated by the glass plates upon a scale of 40 feet to an inch. The size of the model is six feet by four feet, and three feet in height to the apex of the mountain. There are altogether 40 large plates of glass besides the uprights, and the contour of the surface is the exact shape of the ground. The lodes and veins of ore are boldly shown, painted in red, and the drifts are traced in black ink. Every detail is distinctly marked, so that it is easy to gain clear knowledge of all particulars. N. Westcoat, civil and mining engineer of Nevada, made the surveys and he, assisted by C. T. Healey, constructed the model. This device is similar to the one showing a model of the New Almaden mine, exhibited at the Mechanics' Institute fair a few years ago. That, however, was on a smaller scale, although made in the same way.

On the 22d inst. the Hite mine shipped bullion valued at \$11,100, making the total shipment for May amount to \$22,318. This mine, so long a private institution, is now worked by a corporation.

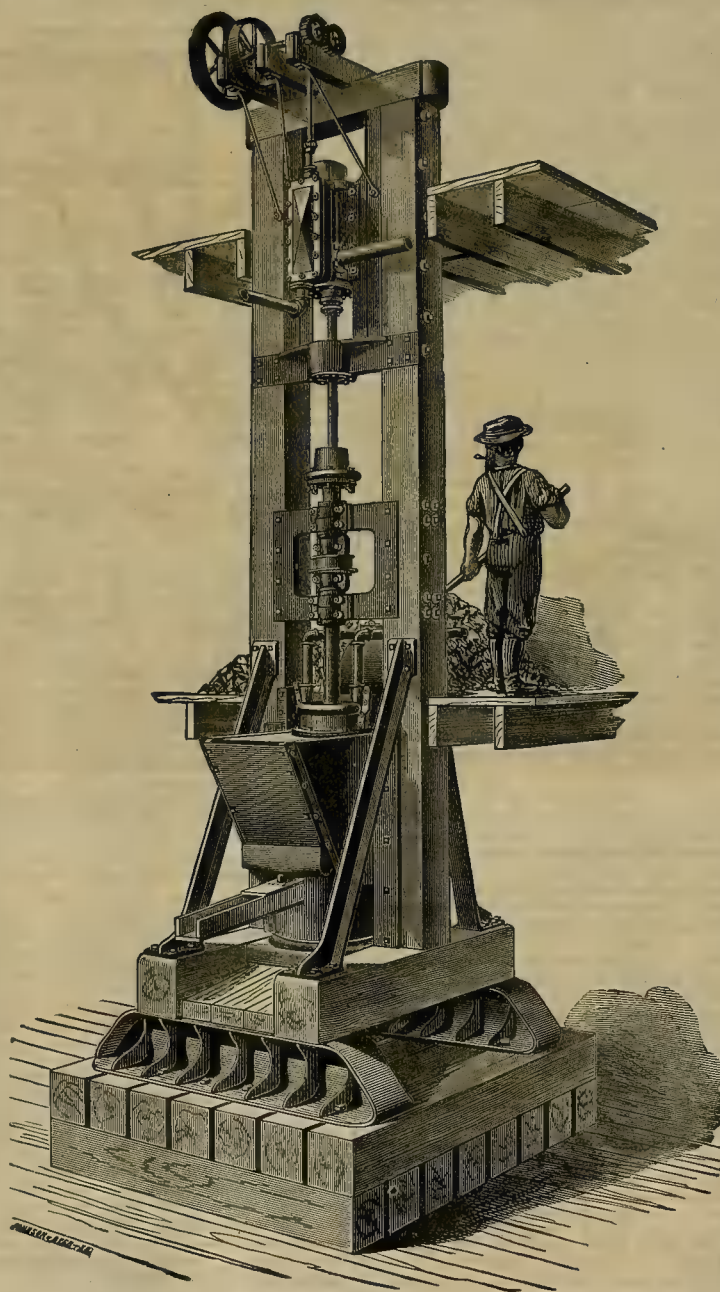


FIG. 1. PERSPECTIVE VIEW OF THE BALL STEAM STAMP. (See Page 345.)

Court of Montana, with directions to modify the decree in that respect.

PATENTS TO MINES.—The following patents have been issued by the Department of the Interior: Edith company, of California, for the Maud, Golden Gate, St. George and Eagle lodes; also to the Allison Ranch mining company, for the lode of same name; to E. A. Wall, Bullion No. 3 lode, Utah; to Adams Hill Consolidated mining company, the Wide West lode, Eureka, Nev.

MEMORIAL day was observed in a becoming manner in this city.

strict, said district having been extended to take them in, so that they might be governed by its old-established laws.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Grand Prize, May 25th, \$6,800; Modoc, 23d, \$11,341.48; total to date, \$77,493.77. Northern Belle, 24th, \$12,216.51; Standard, 24th, \$9,479.75; California, 26th, \$321,190.34; total to date, \$1,035,579.81. Con. Virginia, 26th, \$227,466.97; total to date, \$462,390.63. Tybo, 22d, \$8,735.07; total to date, \$53,690.83.

CORRESPONDENCE.

A Sketch of the Mining in Plumas Co.

Quartz is at present attracting unusual attention. The center of the interest is at Greenville, in the upper part of the county, 25 miles above Quincy. The immediate cause of the excitement may be attributed to some reported late rich discoveries at the head of Soda creek, about 10 miles from Greenville. The ledge is represented to crop out boldly for 600 feet, showing much gold to the naked eye in the surface quartz. One claim,

The Washington, Although a mere surface prospect, changed hands soon after its discovery at \$20,000. Many other locations have been made, believed, as a matter of course, by those most interested, as even more promising. A good wagon road is in active process of construction, connecting the mines with Greenville, and prospecting may be said to be the general order of the day.

The interest has, perhaps, been deepened by the comparatively recent developments on Wolf creek, which has been favored by the introduction of San Francisco capital. Better still, the investments have been judiciously made and skillfully managed, the operations thus far proving successful and profitable. As a consequence the contagion prevails to some extent at Taylorville, Crescent mills, and other places in this portion of the county, spreading as far south as Quincy. In addition to this there are a number of drift claims just on the eve of giving forth their treasures, while some new gravel deposits are about being opened up, or companies organizing for the purpose, all of which seems to give just at this time, an exceedingly promising outlook for the mining interests of this county. The oldest citizens say, in fact, that the prospects were never brighter or better.

The New York Mine, One mile south of Greenville, the property of Messrs. Whitlock & Treleven, is one of late discoveries here, and at present vigorously worked. The general course of the vein is north and south, average width three and a half feet for the distance of 225 feet, and explored by several tunnels, the lowest tapping it at the depth of 300 feet from the surface. Formation, porphyritic granite.

The rock taken from tunnels so run has been submitted to three different working tests; the first paying \$12 per ton, the second \$15.75, and the third \$28. A good 10-stamp mill, run by water power, has just been finished and is now in complete running order, into which the quartz is dumped directly from the mouth of the lower tunnel. As any quantity of ore can be extracted to keep the mill supplied, there can be no question as to the result.

The Indian Valley Mine, In the same vicinity, owned by Mr. J. N. Blood, has been developed by shaft to the depth of 650 feet, making some 1,300 feet from foot of same to the apex of the hill through which the ledge runs. It lies between the syenite and the porphyry, and averages about 12 feet in width, the quartz milling \$15 per ton. It has a good record, and work upon it is expected to be resumed within a few days.

The Gold Stripe G. M. Co., Mr. H. C. Bidwell, Superintendent, is a San Francisco incorporation, with mine and mills at Wolfe creek, six miles from Greenville. The country rock is porphyry and talcose slate, the richest pay being found in the decomposed gangue which forms a large proportion of the quartz. The width of vein in the main working tunnel is 33 feet—the whole of quartz being extracted and milled. The company commenced active operations less than a year ago, since which four different levels have been run, the main working tunnel after it struck the ledge, following it through pay ore the distance of 170 feet, and attaining a depth from surface of 146 feet. A shaft following the hanging wall the same distance was run through a solid mass of quartz, and a cross-cut on the vein 70 feet west of shaft was run north to foot wall, the opening also developing a fine body of quartz. Many other details promptly furnished by Mr. I. Prowattin, Assistant Superintendent at the mine, are necessarily omitted. This much, however, may be added. A new level is now being run, which is designed for the future main working tunnel, which will tap the vein at a further depth of 180 feet, and a fine tramway from mine to mill has just been completed, which will greatly facilitate the operations. The company are blessed with milling facilities, having a small water mill of eight stamps, a 24-stamp mill and another of 32 stamps each run by steam, and contemplate the erecting of a 16-stamp mill in addition to those in use. The crushing and amalgamating department is confided to the charge of Mr. Geo. Standart, and it is scarcely necessary to add that the work is well performed, and that the rock is paying the company handsomely.

Adjoining this valuable property on the same ledge is

The Great Western.

It is, as might be expected, very similar in

character. It is being thoroughly prospected by four tunnels, and the results are so encouraging as to shortly warrant the erection of a 40-stamp mill, which the owners are said to have in contemplation.

The Clear Creek, the third extension, and some half a dozen other claims in the neighborhood, are represented to show fine prospects. Wood and water is found in great abundance. This camp is at present among the liveliest in the State, and gives promise of even a far brighter and more prosperous future.

The Crescent Mill and Mining Co's Claim, Six miles from Greenville, on the road to Quincy, has been worked more or less for the past 14 years, having added in that time an immense amount to the bullion product of the State. It came into the hands of the present company two years ago, since which it is represented to have paid a considerable sum over and above expenses for working and developing. It is looked upon as a very valuable property when once properly opened, and its future prospects thought to be flattering. The company have commenced to sink a new shaft 600 feet east of the old works, giving them a more central location, and better ground for attaining a greater depth, to which point the hoisting works will be removed.

They have three veins—the Horse-shoe, eight feet wide, with four dollar rock; the Pet, on which the new shaft is located, two feet and paying \$15, and the Crescent or main vein, which averages two feet in width and pays about eight dollars per ton, the whole rock for April having averaged \$12. The formation is granite and slate. The mines and large 32-stamp mill adjacent are under the superintendence of Mr. J. F. Jewell. He gracefully submitted to an interviewing and granted the desired information without a resort to the force pump. The mine is probably not on the boards.

The Green Mountain Mining Company.

This mine has been worked for 12 years. The lowest level, the seat of present workings, is at a depth of 700 feet from surface. By far the larger portion of the vein above this level, from which the company are now stopping, remains to be worked. The vein is known to be exceedingly large, but its entire length and breadth has not been fully explored, and while the grade of the ore is by no means first-class, it is found in such large bodies and so easily extracted and crushed as to place it among the best paying mines of the country.

Such is its reputation at least in the vicinity. The mill consists of 32 stamps, run by a hurdy-gurdy wheel—the water being brought from Round valley by a ditch seven miles long, belonging to the company.

The quartz is conveyed from the mine to mill by an incline tramway 1,600 feet in length, the mill being so situated that 350 feet of backs could be obtained by running a tunnel on the level of the mill. In short, the mine is very admirably situated, and everything around it most conveniently arranged for successful working. Mr. E. Green, President of company; Mr. C. G. Rogers, Superintendent of mine.

The Kittle and the Caledonia, first and second extensions on this ledge, and owned principally by members of the Green Mountain company, will be eventually worked through the same tunnel. The original location is known to be 60 feet from wall to wall, and to have three distinct veins within them—facts forgotten in their order—and the more recent locations doubtless possess the same characteristics, they may be looked upon as almost equally valuable. Two miles north of Quincy is

The Belle G. M. Co.,

Mr. R. Z. Belle, Superintendent. The mine has been prospected on its line the distance of 600 feet by open cut and tunnel, from a point on the vein where the shaft is located. The tunnel reaches a depth of 150 feet from the surface. The shaft is 30 feet below the water level and 50 feet lower on the vein than the tunnel. From the developments the vein is found to be from 40 to 50 feet in width, the gangue made up principally of partially decomposed quartz and talcose slate, and the whole carrying gold in sufficient quantities to justify the company in erecting a mill. They begin with 10 stamps, including in the plan, arrangements for 10 additional stamps when required.

Besides many satisfactory tests from the ledge, not less than \$750,000 have been washed from Betsy gulch, immediately below where the gold has been deposited by the wearing and washing away of the decomposed ledge matter for ages past. The claim is situated in the slate range, but in near contact on one side with the granite.

The O'Neil Ledge,

In the same vicinity, is four feet in width, prospects well in free gold; the quartz also much decomposed and thought to work as high as \$15 per ton.

From three to four locations have been made on this lode—all represented as promising prospects—and work has been commenced in earnest. The owners evidently mean business.

No details were obtained in regard to

The Plumas Eureka Mine

In the southern part of the county, as it is understood to be the property of an English company who prefer to have little publicity given to their affairs. It is well-known, however, to be one of the best paying quartz mines of the State. The company have a large 48-stamp mill, a Bruckner roasting furnace, 22 concentrators, two pans and two settlers, all admirably arranged for successful working, and

give employment about the mine and mill to not less than 150 men.

Drift and Hydraulic Mining.

Your readers have been so well posted in the "Mining Summary" columns of the Press, by extracts from the *Plumas National*, in regard to the gravel deposits of the county, but little remains to be said—and even that little is written under the risk of much repetition.

Would that all the local papers were as careful in their statements. It would greatly enhance the value of this department of the MINING AND SCIENTIFIC PRESS, and be a great benefit (instead of an injury, as often, from the reaction from overdrawn pictures) to the localities they represent. It might be well to preach a short sermon, say once a quarter, to your exchanges on the subject. Their intentions are all right. Their opportunities for gathering accurate information are certainly far superior to those of a traveling correspondent, while the temptation to give colored and flattering reports cannot be greater. Lay it on a little mild, something after the schoolboy's "infinite stretch of elongated veracity" mode of expressing it, and rest assured it will result in a great blessing to editors, readers, individual communities and to the grand public whereof we all form a part.

A New Enterprise.

The Grizzly Ridge mining company has been just incorporated, for the purpose of prospecting a portion of hitherto undeveloped ground nine miles southwest from Quincy.

It is thought to be on the great blue lead, and is fine drifting ground. It is supposed to be quite extensive, and sufficient pay has been found in the gravel to raise expectations in that direction to a high pitch.

Munford's Hill Gravel Deposit,

Ten miles west of Quincy, is about 20 acres in extent and from 30 to 50 feet deep, with a quartz ledge underlying.

The gravel has been rich in coarse gold and pays fair profits yet; say about \$15 per day to the man while water lasts. The quartz ledge, known as the Diadem, underlies the gravel at the bottom of the channel, and is of an average width of 50 feet, with wall rocks of clay and talcose slate. Veinstone mainly of magnesian limestone, much decomposed into a soft red mass, carrying fine free gold, with strata of talcose slate, containing gold-bearing sulphurets. Coarse gold is here found associated with talcose slate. A large portion of the ledge contains from \$2 to \$5 per ton of free gold, while some smaller veins thereon give assays up to \$40. A shaft has been sunk \$100 feet. There is an aqueduct on the ground run by water, used for prospecting. It is the intention of Messrs. Edman & Co., the owners, to work the ledge by hydraulic, when the gravel is washed off.

The Golden Enterprise,

Owned by Mr. Richard Jacks, is a hydraulic claim, situated on Spanish creek, eight miles west of Quincy. The flume is 12 feet wide with partition in the middle, and is set at a grade of one and one-half inches to 12 feet. It has been already extended 720 feet, and a cut also just opened (wide enough to receive the flume) 366 feet in length, which will open up the whole basin above, and what is believed by the owner to be one of the finest gravel deposits in the State. By a resort to a reservoir, if necessary, 800 inches or more of water can be had, the year around, with a pressure of 200 feet or upwards. Chinamen are now working on the ground above the flume and making fair wages, four men in one month having realized by means of ground sluicing as much as \$480. As much money has been required for the undertaking, it is to be hoped that the owner will soon be amply rewarded for the means and time expended.

The Plumas Mining and Water Co.,

Mr. N. Cadwallader, President and Superintendent, have 20 acres on Gopher hill, six miles from Quincy, 160 acres on Bear hill, four miles above Spanish ranch, and about an equal amount of ground at the Mountain house, two miles above. The company are at present working their claim on Gopher hill, using 1,200 inches of water, (pressure 240 feet,) and six Little Giants, with three of them in constant use. The deflector invented by Mr. H. C. Perkins, Superintendent of the North Bloomfield M. Co., was found here, giving excellent satisfaction. The bank is in the neighborhood of 150 feet in height—40 feet of the gravel nearest the bed-rock containing the pay. The yield from the mine within the past three years is not far from \$82,000. Last year two and three-quarters acres were worked, producing \$30,000, leaving a margin for profits of \$16,000. The ground is expected to yield the present season in like ratio, as the amount of \$7,900 already cleaned up is about at that rate.

Zinc Amalgam

Is used here in lower end of the sluices and has been found very effective in saving the gold at the same time, with less loss in quicksilver. Owing to its peculiar affinity for gold, it seems to have the effect of thoroughly cleansing it of rust. The fact, although not wholly unknown, was accidentally discovered by the company from washing off a portion of their ground on which an old blacksmith shop had stood, and around which lead, zinc, solder and other refuse had accumulated. The same having lain over all winter in the lower end of the sluice was cleaned up in the spring. The quicksilver having eaten up the solder and other refuse and heavily charged with the contents, was used

during the following season. When it was continually strained a certain amount remained in the cloth. Fifteen pounds were obtained during the season that yielded, after retorting and turning into a bar, \$600. Like all wide-awake miners they immediately turned the accident to good account, and have been using the zinc amalgam greatly to their advantage, as they fully believe, ever since.

Messrs. Conly & Gowell, at Laporte, have worked successfully on rich ground, and expect a good clean-up for the season. The Dutch company's claim at the same place, recently purchased by a San Francisco company has had a large amount of ground worked with good results. The new company intend to bring in the South Fork of Feather river by a tunnel through the mountain one and one-half miles in length, giving them, it is said, one of the finest water rights in the northern part of the State. They are represented to have over 3,000 acres of good virgin ground and the enterprise is spoken of as one of the grandest that has for many years been undertaken.

Favorable news may be looked for the ensuing season from Nelson Point and Sawpit Flat, as some of the claims are expected soon to be in readiness for advantageous working.

A. C. K.

Notes from New York.

EDITORS PRESS:—New York harbor, including, of course, the "North," "East" and Harlem rivers, is full of interest, even to the casual observer, and I find, on looking over my note book, that a few trips across one of the "long ferries" have given me matter enough to fill my column, and more, too, perhaps. For the last two months, I judge that there have been more vessels lying at the docks between the Battery and Grand street than have been seen before for a year or two. Vessels discharging, English and coast steamers discharging, vessels in the floating docks, and others near by, for repairs, made the river seem very lively, and during the early part of the winter there seemed to be scarcely a dock empty for a mile above the Battery, on the New York side. Early in March, I saw an English freight steamer, which came in by way of

Long Island Sound and Hell Gate.

So far as I can learn, this is the first and only boat that has taken the new route. In spite of all the talk, Long Island sound cannot be made popular with the captains and owners of ocean steamers, and until it is, the new channel through Hell Gate will not be much used, except by the coasting trade. Speaking of Hell Gate brings to mind one of the results of the increased water way, and that is a seeming increase in the velocity and duration of the tides in the East river. I have no figures at hand, but it seems as though the boats upon the Roosevelt street ferry are much longer in making their trips, when the tide is against them, than formerly. The boats, in leaving and entering the slips, also seem to be more affected by the currents, so our gain has not been an unmixed good. As Hell Gate was what is called the controlling action of the river, any enlargement there will be followed by a decided increase in the volume and velocity of the water flowing in the river. The increase will probably go on until all the operations for improving the river are finished.

One of the prominent features of

New York Harbor in the Summer,

Is the immense number of excursions in all directions. The steamers used for this purpose range in size all the way from a tug-boat up to river steamers like the *Plymouth Rock*, capable of carrying some thousands. Many of these are old boats, but of late years the business has become so profitable that new boats are built for this especial purpose. The last and most unfortunate of these was the *Rockaway*, of which the papers have given such full accounts. She was built in Norfolk, Va., and was intended for an excursion boat between this city and Rockaway. She was wrecked, however, on her way to this city, having broken up at sea during a gale, and went ashore at Cape May. The owner, nothing daunted, means to have a boat ready by the Fourth of July, and I hear that the keel has been laid in one of the Greenpoint shipyards. As the hull only was lost and the machinery is still available, the boat that was lost not having received it, being a mere hull, the feat will not be so difficult. These excursion boats do not need state-rooms and the like fittings, so that the amount of labor is much smaller than would be required on passenger boats on regular lines. The boat, I believe, is to carry something like 2,000 people, and if that is what is permitted by law, it is tolerably safe to double it to get at the actual number carried. At the Poillons yard, in Brooklyn, they have recently launched a

River Steamer,

Which is about 150 feet on the keel. She is also intended for harbor work, and is, I believe, receiving her machinery. The *Massachusetts* is the last great thing in the steamboat line. Last week she was on the sectional dock in the East river. Taken altogether she looks the largest

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MECHANICAL PROGRESS.

Cold-Chisels.

The most indispensable tools, says the *Manufacturer and Builder*, for the practical mechanic are the cold-chisel, hammer and file, and yet very few, even among our best mechanics, know how to use properly the commonest of mechanical implements. There are possibly some, who, after years of practice, may be able to chip a plain surface so smooth as to require but little filing, but such men are the exception and not the general rule.

The first and most important requisite is to have tools properly made and of the right shade and temper, and it is essential that a good workman should know when they answer these requirements. To make a good cold-chisel demands a knowledge, not only of the material of which it should be made, but also of the use to which it is to be put. Blacksmiths are usually not accustomed to dressing tools, and are apt to heat the steel too hot; besides they are generally in two great a hurry to make a good job. For this reason most mechanics prefer to make their own tools.

For a first-class chisel the steel should be heated to a bright cherry-red—no hotter—which is best done in a charcoal fire, though other fuel will answer the purpose. If stone coal is used, care must be taken that no fresh coal is placed upon the fire while working the steel, as the sulphur in the coal is liable to injure the metal. The best form of steel for chisels is the hexagon or octagon bar. In drawing out the blade of the tool it is necessary to hammer the steel as much upon one side as the other, to make it as nearly as possible of a uniform density throughout, and to prevent the springing of the blade when it comes to be tempered. Heat the steel often while forging, but never above a cherry-red heat, which temperature should be maintained as uniformly as possible until the tool is brought to the proper shape; it should then be hammered till quite black, to give it toughness and elasticity. To temper the tool, heat it to a dull red, and dip the blade a short distance into clean, moderately cold water; hold it there several seconds until the part immersed is quite cool, then with a stone or piece of brick scour the point tolerably bright and watch the color as it runs down. For chipping, a dark blue, inclining to purple, will usually give the right temper; but as this depends greatly upon the quality of steel, the precise shade can only be determined by actual experiment. When the blade shows just the right color, the tool should be quickly immersed in water and allowed to remain until perfectly cold.

IRON CROSS-TIES.—The substitution of iron for timber in railroad cross-ties is being made a matter of test by the C. P. R. R., as we have noted formerly. The latest device for accomplishing the end is by M. Potel, C. E., advocating the use of a wrought iron cross-tie, semi-elliptical in shape, resting simply on the ballast. The rail is fastened to the cross-tie by a quite novel and most ingenious, although simple, contrivance, called by the inventor the "jawbone chair," or *cousinnet machoire*. This is formed of two portions which hook into one another, and the shape of which is such that they hold the rail as if in a vice. Half of this chair is firmly fastened to the cross-tie by means of a bolt, and preferably on the outside of the track. The other half hooks into the first beneath the cross-tie, and is movable. An ordinary eye-headed bolt entering through the hole of the tie adapts itself to the end of this movable arm, and by its successive tightening compensates for any downward wear of the rail. The laying of a track of this description, it is claimed, presents no difficulties whatever, being rapid and inexpensive, and confined to the tightening or loosening of a bolt. To the above arrangement M. Potel has added another apparently small, but really important, contrivance, which does away with all necessity for differential punching of the cross-ties (or even, if desired, of such longitudinal sleepers), and which resides in the adaptation of a washer of hexagonal shape placed below the bolt head, but which, instead of being pierced by a central orifice, has the bolt placed eccentrically, so that by rotating this plate after loosening the bolt any one of the sides of the hexagon can be brought to bear on the shoulder of the jaw.

JOINTS FOR STEAM PIPES.—M. Dresel, paper manufacturer at Billefeld, informs us that cellulose is well adapted for making steam-tight joints when the pressure does not exceed 10 atmospheres. The material costs but little and has great durability. Under the influence of water it swells and thereby makes the joints still tighter.—*Revue Industrielle*, viii., 136.

PROGRESS OF THE ST. GOTHARD TUNNEL.—The advancement of work on the tunnel of St. Gothard during the week ending March 20th is reported to have been 20,590 m. at the Goeschenen and 21,300 m. at the Airole end, or together 41,890 m., about 5,590 per day.

STEAM ON ENGLISH STREETS.—The English seem inclined to permit the use of steam power on their street railways. Iron says: "The report of the committee on the use of mechanical power on tramways, which was laid on the table of the House of Commons, contains additional information with regard to the rate of speed. Although the committee decline to pledge themselves as to what legislative measures may be required in the future, they are of opinion that the use of mechanical power should be permitted on tramways; and also that any provision or order, granting the necessary powers should contain clauses embodying the regulations of the Board of Trade with regard to the use of mechanical power for such a purpose. That is to say, it would be necessary that the machinery should be concealed or protected from view; that every engine should be as free as possible from noise of machinery or blast, and should not emit smoke, steam, or any noxious and unpleasant vapor; that sufficient brake power should be applied to stop engine and car in their own length when traveling eight miles an hour; that the engineer shall not travel at a greater speed than a rate of eight miles per hour in town and 12 miles in country, and that the Board should have power to license the trial for a period of three months of any particular engine on a tramway which has complied with the orders. The committee finally recommend that any bills or provisional orders introduced this session should, as far as possible, be placed in the same position as if their progress had not been delayed by the appointment of the committee."

PROPOSED WHOLESALE EMIGRATION OF BRITISH IRON WORKERS.—A representative meeting of the iron workers of the United Kingdom has taken place at Manchester, when the question of the notice given by the North of England ironmasters, with the intention of further reducing wages was considered. It was resolved to bring before the employers the fact that at no period have the men received less than eight shillings per ton for puddling, and that that they can barely subsist with the present eight shillings three per ton, when the greatly increased cost of living is considered. If the employers persist in their intention, and the result of the arbitration should be to lower wages, it is determined that a meeting the men should be held for the purpose of considering the desirability of expending the whole of their funds, amounting to £10,000 for the purpose of assisting the iron workers to emigrate to the colonies, and that, to promote this object, communications be opened up with the governments and others desirous of developing the iron trade in the colonies where raw materials and the facilities for the production of iron exist.

REMOVING SCALE FROM FLUES.—C. Graham writes for the *National Car Builder* as follows: I notice a statement of the method of cleaning boiler flues employed by Mr. S. S. Pilsen, loosening the scale by heating the flues in a furnace, after which they are straightened upon an iron rod. I have for the last eight or ten years used a somewhat similar plan and find it to be very effective. Our furnace not being large enough to heat the whole flue at once, we heat only one end at a time. By putting a little waste in the outer end, the fire is prevented from being drawn through it, and the end is kept sufficiently cool for being handled without using tongs. By the time each flue of a set has been heated in this way, the first ones are cool enough to handle again, when the other ends are treated in the same way. We straighten the flues by simply placing them while hot on a plank, and striking them lightly. The scale is taken off by drawing the flues two or three times between a couple of old files fastened in a block in the form of an X. There is, I think, a manifest advantage in cleaning half the flue at a time, as it is more easily handled and not so apt to bend.

HORSE SHOEING.—Travelers in Europe describe two different ways of shoeing horses in Turkey and Russia, which may seem very awkward compared with the simple method of American smiths. In Turkey and Servia the horse's head is held by one man, another holds the leg on his arms, while the third operates on the foot. In Russia the horse is placed in a square cage made of rough planks of wood, and is strapped around the belly with wide leather straps attached to cross-bars of the framework; his head is also tied safely; the foot is fixed to a stake in the ground and held by an assistant while the smith places the shoe on.

NO STRENGTH IN SURPLUS METAL.—The recent paper by Mr. Macdonald showed that there was more than enough of iron employed in the Ashtabula bridge, but that the faulty application of that material was the cause of the disaster. The London *Engineer* arrives at the same conclusion, and thinks that the lesson deserves attention in Great Britain. It says: "The failure of this bridge affords another proof of the fact that surplus material will not necessarily secure the stability of a structure. At the present moment several large iron structures in this country, although perhaps not liable to the same disaster, yet constitute undoubted examples of a similar waste of material. There is plenty of room at home for judicious economy of iron structures, in the proper distribution of the material, and the scientific management of the various parts." The warning conveyed by the disaster should also be regarded in this country by other iron users beside bridge builders.

SCIENTIFIC PROGRESS.

Experiments with Native Iron.

In its sitting of March 12th a paper was received by the Academy des Sciences, Paris, from M. Damour, descriptive of the specimen of native iron found at Santa Catarina, in the Brazils, and analyzed on the spot by Messrs. Guignet and Osorio. This analysis will be found in the number of the *Comptes Rendus* for November 6th of last year. It gave as the composition of the specimen 64% iron and 36% nickel. The metal is a compact mass, having the color and metallic luster peculiar to forged iron. It does not resist the file. Although malleable, it can be broken with a sharp twist. Its fracture shows a fine grain, and exhibits a sort of stratification in certain places. When polished and treated with an acid on one of its surfaces the peculiar appearances known as Weidmanstätten's figures are brought out. Filings of the metal do not oxidize on exposure to the air after immersion in water. The density, taken from pieces of varying size, gave the following numbers: 7.825, 7.836, 7.747. Messrs. Guignet and Osorio found 7.750. These differences in the density of various specimens go to prove that there is no perfect homogeneity either in the structure or the composition of the metal. A fragment weighing 0.66 gramme, treated cold with nitric acid, diluted with six times its volume of water, dissolved in 48 hours, with a very feeble disengagement of nitrous gas, giving a green liquor. Iron, under the same conditions, gave a brown liquor.

On the same subject M. Boussingault makes the following note: "I wish to draw the attention of the Academy to the fact that the iron from Brazil is not oxidizable under simultaneous contact with air and water. Berzelius has stated in one of his works that meteoric iron resists oxidation. From this it could be deduced that steel could be preserved from rusting by adding nickel to it. I made numerous essays, with this object in view, during my last stay at the Unieux forge, in alloying steel with 5%, 10%, and 15% of nickel. The ingots, after forging and drawing, had a handsome appearance, and took a beautiful polish, but I found that these alloys, either as bars or filings, oxidized perhaps more rapidly than steel bar or filings destitute of nickel. I might, indeed, have spared myself the trouble of making these experiments, for Faraday and Stodart had already found that melting steel with nickel we get an alloy which has a very lively tendency to rust. Since then I have seen two meteoric irons, one from Lenarto, the other from Charcas, containing from 5% to 7% of nickel, filings from which oxidized very promptly under the double influence of air and water.

"Notwithstanding, it is beyond all doubt, that the specimen of Brazilian iron absolutely resists oxidation. This is evidently due to its composition—to the very large proportion of nickel it contains. Melting down a mixture of 62 parts steel and 38 pure nickel, an ingot was obtained in my laboratory, a face of which was smooth-filed and exposed to air and moisture which had no effect on it. Filings remained in tact under immersion, with the exception of two or three grains, which got rusty, which seems to indicate that the alloy which could not be stirred whilst in fusion, did not have an entirely homogeneous constitution."

A Simple "Mechanical Finger."

At a recent meeting of the S. F. Microscopical Society, Prof. H. G. Hanks described a very simple arrangement by which any microscopist, who has a mechanical stage to his instrument, may have the benefits of a "mechanical finger," without the cost of the elaborate mechanism which has been devised for the purpose required. Prof. Hanks said:

Let the microscope be placed in a vertical position and a suitable object-glass screwed on. Fix the parabola in its place in the sub-stage. Let it be pushed as far in as possible so that when elevated by the milled heads it will rise through the opening in the stage, with its upper edge above the surface. As it will not be immediately required it may be depressed, using the milled heads for that purpose. A glass slide, upon which the rough matter is laid from which it is desired to select an individual crystal or other object, may now be placed on the stage. The sliding pieces of the stage must then be separated as widely as possible and the stage forceps fixed in the usual position. If the objects to be picked out are small, such as diatoms, etc., a human hair must be placed in the jaws of the forceps, and so arranged that it will appear in the field and near the surface of the slide. The objects to be selected should be as near the center of the slide as possible. By turning the milled heads of the mechanical movements of the stage, the desired object may be centered, after which the hair must be readjusted without moving the stage. By elevating the sub-stage slightly, the slide will be lifted from the stage, the position of which can be changed by the mechanical movement, while the slide remains stationary.

When the end of the hair is exactly over the object, which is dimly seen out of focus, a turn of the milled head of the sub-stage lifts the slide until the object touches the hair and remains attached to it. When the sub-stage is lowered, the object remains suspended to the end of the

hair. The slide may then be removed and another substituted, to which the object may be transferred by simply elevating the sub-stage, the slide rising to meet the suspended object. If the slide has been gently breathed upon, the object leaves the hair and attaches itself to the glass. This applies only to minute objects. When the object is larger and too heavy to be lifted by a hair, it will be necessary to substitute a bristle and to wet the end of it; when the second slide is placed under it, a few minutes will suffice to evaporate the moisture, and the object will fall into the desired position.

The hair may be used to push away worthless matter which may surround the object desired. It is perfectly easy to push any portion quite out of the field, simply by using the stage movements while the slide rests on the parabola.

If a piece of fine aluminum wire, the end of which has been flattened by a pair of steel rollers, be substituted for the hair, and a low power used, a crystal may be lifted with as much ease as a lump of coal on a shovel. To prevent the object from being pushed before the chisel edge of the wire, a small piece of glass may be placed in the direction of the movement, against which the object is held, while the edge of the flattened wire passes under it.

It will be found difficult to place a hair firmly in the jaws of the stage forceps. This difficulty may be overcome by cementing the hair or bristle between two small pieces of thick paper, which the forceps will hold rigidly.

Nothing can be more simple than this device, and I question if any mechanical finger can be more effective. A few minutes will suffice to make it perfectly understood.

A NEW METHOD OF OBTAINING SKELETONS.—The help of insects is often called in by naturalists to produce skeletons of small vertebrate animals. A common plan is to place the animal whose skeleton is desired over an ant's nest. But these skeletons are generally dirty, and it may be imagined how much better it would be if the operation could be performed under water. Such a process has been discovered by a French naturalist. He finds that tadpoles are not exclusively vegetable feeders, but will eat meat when they can get nothing else. Indeed, a few days will suffice to accustom them to live on flesh without injury to their voracious appetite. They will then clean with marvelous exactness the bodies of small animals given to them. The discoverer of this plan has exhibited excellent skeletons of three kinds of lizard, three kinds of snake, two kinds of triton, and a larva of triton, obtained in two hours, the latter being quite an anatomical *tour de force*, considering the extreme softness of the bones of larvae of batrachians. The operators were a hundred tadpoles of frogs (*Rana fusca* and *agilis*). The number of tadpoles should be proportioned to the task, and the small animals should be given them skinned. The skeletons should be completed in two or three days at the most, so that the water may not destroy the ligaments. It is recommended that the tadpoles should be kept in half darkness and in a warm place.

"FLESH WORMS."—The *Demodex folliculorum* is a worm-shaped minute mite, which lives in the sebaceous and hair follicles of the skin in man and some mammals. M. Megnin has lately published a full account of it. It is said to be viviparous, the female producing small footless contractile larvae, without any mouth organs, which shortly after their birth acquire three pairs of short wart-like feet. After a change of skin a fourth pair of legs appear, as well as traces of a beak. After a second change the perfect demodex is produced, but still without the sexual organs, which appear later. Megnin distinguishes three if not four forms of these parasites, which, however, he prefers to regard for the present as varieties of a single species—*Demodex folliculorum*. The commonest of these appears to be that of the dog (var. *caninus*), which inhabits the hair follicles of all parts of the body of that animal; a smaller variety (*D. cati*) is found almost solely in the sebaceous glands of the ear of the cat; and a larger one (var. *hominis*) in the follicles of the human face. M. Simon also met with similar parasites in the glands of the margin of the eyelids in sheep (var. *ovis*); but no other writer has ever seen them there. In the dog the presence of these parasites, which occur in great numbers together in the hair follicles, produces a regular skin-disease or mange; but this does not appear to be transmissible to the human subject.

AMERICAN HISTORY.—A. S. Barnes & Co., of New York city, have undertaken an enterprise which will delight the hearts of the historical students of the country. It is the publication of the *Magazine of American History*. The purpose of this periodical is to supply to persons engaged in historical study a regular avenue of communication with each other and the general public. Each number will contain an original article on some point of American history from a recognized and authoritative pen; a biographical sketch of some character of historic interest; original documents, diaries and letters; reprints of rare documents, notes and queries in the well-known English form; reports of the proceedings of the New York Historical Society; notices of historical publications. The numbers of the magazine which we have had pleasure in examining, exhibit these valuable features, and we doubt not the publication will prove a success.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 6.	Week Ending May 17.	Week Ending May 24.	Week Ending May 31.
Alpa.	111	62	91	82
Alta.	50c	3c	60c	38c
Andes.	50c	20c	40c	30c
Baltimore Con.	25c	40c	25c	40c
Belcher.	4.90	3i	3	2.45
Belmont.	50c	30c	50c	50c
Bullion Belcher.	10i	1i	2i	13i
Calcedonia.	3.70	1i	3	2.00
California.	3.70	1i	3	2.00
Challenge.	40c	50c	50c	50c
Chloride.	33i	20i	2i	19i
Confidence.	3i	2i	1i	2i
Con Imperial.	90c	40c	50c	35c
Con Virginia.	31i	26i	27	25i
Crown Point.	6	4.20	4.20	2.50
Dayton.				
Eureka Con.	17	15i	15	12i
Exchequer.	2.60	1.60	1.80	1
Geddes & Bertrand.				
Gen Thomas.	15			
Grand Prize.	3.30	2i	4	2.60
Gila.	30c	25c	20c	5c
Globe Con.				
Golden Charter.	3	2i	2.20	3.10
Gould & Curry.	5i	3i	4.70	2.80
Hale & Norcross.	2.05	1i	1.95	1.4
Hussey.				
Julia.	1.05	15c	1i	90c
Kaiser.	6i	2i	10c	1.20
Jackson.	3i	2i	2i	2i
K K Con.				
Kentuck.	3i	2i	2i	3i
Knickerbocker.				
Lady Bryan.	10c			
Lady Wash.				
Leopard.	1.20	90c	1i	1.45
Levithan.	30c	15c	25c	10c
Little Hill.	1.40	35c	70c	30c
Modoc.	3	2i	2.40	3i
Manhattan.	7	5i	6i	8
Mansfield.				
Meadow Valley.				
Mercury.	7	4.80	3.30	4.80
North Con Virginia.	15c	10c	5c	25c
New York.	15c	10c	5c	25c
Niagara.	15c	10c	5c	25c
Northwestern Belle.	4.05	14	14	18
Older Coso.	4.05	34	34	15
Occidental.	40c	25c	40c	30c
Ophir.	13	8i	8i	9i
Overman.	13	7	7i	12
Phil Sheridan.	4i			
Panther.				
Poorman.				
Prospect.	30c	25c	20c	30c
Rock Island.	3i	2i	5	6i
Sage.	3.95	2.60	2i	2i
Sag Belcher.	18	13	15	11i
Sierra Nevada.	2.60	1.25	75c	1.85
South Chariot.	50c	10c		1.30
Sucor.				
Trojan.	45c	40c	50c	37c
Union Con.	3.10	2.50	2.55	3.30
Wells Fargo.	2	3	2.80	9
Woodville.				
Yellow Jacket.	6	3.90	5	4

Sales at S. F. Stock Exchange.

FRIDAY, A. M., MAY 25	50 Manhattan.	180 Mexican.
110 Alpha.	83(26)	230 Modoc.
120 Andes.	40(35C)	230 New Coso.
40 Alta.		230 Northern Belle.
80 Belcher & Belcher.	11(11A)	230 Overman.
115 Belcher.	3(3)	103 Occidental.
115 Bullion.	31(20)	340 Ophir.
200 Cn Imperial.	40(35C)	150 Nevada.
400 Crown Point.	4(24)	50 Savage.
800 Grand Prize.	3(3)	780 Trojan.
925 Cn Virginia.	27(27A)	30 Utah.
115 Chollar.	21(22)	220 Union Con.
100 Confidence.		210 Yellow Jacket.
100 Challenge.	1.70(21.55)	MONDAY, A. M., MAY 26
395 Exchequer.		280 Alpha.
1185 Gould & Curry.	5(25)	2180 Best & Belcher.
640 Hale & Nor.	14(21.80)	175 Bullion.
30 Justice.	4(24)	100 Challenge.
300 Leviathan.	30(1)	2725 Cn Imperial.
85 Mexican.	5(25)	2050 California.
70 Ophir.		2460 Carson.
700 Ophir.	10(10)	231 Chollar.
100 New York.	10(10)	231 Chollar.
500 North Carson.	5(5)	220 Crown Point.
200 Prospect.	5(5)	265 Caledonia.
250 Sierra Nevada.	1.37(1.40)	Confidence.
20 Selch Belcher.	1.18(35)	2460 Gould & Curry.
120 Silver Hill.	1.10	785 Justice.
320 Trojan.	7(7)	1100 Julia.
440 Union Con.	2(2)	105 Occidental.
160 Utah.	8(8)	100 Morrison Star.
555 Yellow Jacket.	4.65(24)	50 Occidental.
AFTERNOON SESSION.		735 Ophir.
1100 Belcher.	11(11)	220 Overman.
685 Bullion.	3(3)	1140 Yellow Jacket.
205 Cn Virginia.	30(28)	2460 Sierra Nevada.
300 California.	27(28)	425 Utah.
10 Crown Point.	3(6)	200 Union Con.
200 Cn Imperial.	4(4)	700 Woodville.
Confidence.		400 Yellow Jacket.
140 Caledonia.	1.55(21.50)	AFTERNOON SESSION.
30 Chollar.	21(21)	50 Alpha.
450 El Dorado S.	1.30(21)	100 Alps.
200 Grand Prize.	3(3)	1275 Best & Belcher.
500 Gould & Curry.	13(23)	170 Bullion.
100 Golden Char.		240 California.
50 Hale & Nor.	1.30	100 Caledonia.
175 Jackson.	4(24.15)	200 California.
200 Leopard.	1.20	95 Chollar.
100 Leeds.	7(5)	135 Crown Point.
575 Modoc.	3(3)	100 DePees.
40 Mexican.	5(5)	150 Empire South.
125 Meadow Valley.	10(8)	645 Exchequer.
120 Northern Belle.	15(16)	1200 Empire I.
300 New Coso.	3(3)	60 Golden Char.
200 Ophir.	3(3)	1070 Grand Prize.
90 Overman.	5(5)	175 Hale & Nor.
80 Raymond & Ely.	5(4)	195 Justice.
150 Savage.	2.40(24.25)	500 Leeds.
50 Union Con.	20(20)	65 Mexican.
5 Yellow Jacket.	4.90	50 New Coso.
SATURDAY, A. M., MAY 26		150 Northern Belle.
170 Alpha.	83(26)	130 Overman.
170 Andes.	40(35C)	400 Panther.
1090 Best & Belcher.	112(123)	25 Savage.
20 Belcher.	3.40(34)	160 Sierra Nevada.
190 Bullion.	3.10(23.15)	200 Union Con.
1000 Crown Point.	3(3)	245 Union Con.
110 Crown Point.	3(3)	900 Yellow Jacket.
1725 Cn Virginia.	26(27)	TUESDAY, A. M., MAY 29
60 Chollar.	21(22)	70 Alpha.
100 Caledonia.	1(1)	50 Alps.
370 Cn Imperial.	3(3)	50 Alta.
100 Confidence.		580 Bullion.
715 Exchequer.	2.30(24.40)	50 Belcher.
350 El Dorado South.	1.12(12)	1725 Best & Belcher.
150 Gould & Curry.	5(5)	470 Cn Virginia.
545 Grand Prize.	3(3)	595 Cn Imperial.
250 Golden Char.	5(5)	190 Caledonia.
600 Hale & Norcross.	14(14.65)	885 California.
100 Jackson.	4.40(44.5)	1100 Challenge.
1185 Justice.		70 Chollar.
110 Jackson.	24(24)	465 Crown Point.
20 Kentucky.	70(70)	1265 Exchequer.
1000 Leviathan.	30(30)	150 Hale & Curry.
100 Leopard.		50 Hale & Nor.

505	Justice.	.5	980	Sierra Nevada.	2.70	22.90
100	Kossuth.	.15c	120	Silver Hill.	1.20	
110	Mexican.	6@63	250	Trojan.	75	70
100	Morning Star.	.24	235	Utah.	114	10
435	Ophir.	10@104	265	Union Con.	3@3.05	
200	Overman.	11@114	100	Woodville.	40	
210	Savage.	2.60	270	Yellow Jacket.	6@5	

SALES OF LAST WEEK AND THIS COMPARED

[illegible]

Pacific Board—Latest Sales.

THURSDAY, M. MAY 31		90	Best & Belcher	162	61		
50	Alpha	3	160 Bullion	3	64		
90	Best & Belcher	35	60 California	10			
50	Alpha	3	170 Crown Point	30	63		
70	Bullion	33	170 Crown Point	4	64		
50	Crown Point	4	15	Con Virginia	29	64	
94	Con Imperial	30	1875	Con Imperial	40	14	
90	Chollar	24	100	Golden Chariot	3	63	
44	California	30	100	Golden Chariot	3	63	
20	Exchequer	20	5	Grand Prize		61	
50	Gold & Curry	61	50	Gold & Curry	7	40	
20	Hale & Nor.	1	120	Hale & Nor.	1	40	
14	Justice	5	120	Justice	5	69	
44	Mexican	71	325	Justice	5	69	
40	Mexican	71	325	Mexican	71	77	
500	North Carson	10	100	Modoc		60	
14	Overman	10	20	Northern Belle		15	
70	Overman	10	100	Overman	11	61	
23	Silver	2	70	Overman	11	62	
100	Silver Hill	1	25	250	Silver	3	62
70	Silver Nevada	3	10	300	Belcher		63
75	Trojan	8	50	150	Silver Nevada	3	60
75	Trojan	8	50	150	Silver Nevada	3	60
40	Union Con.	7	35	300	Trojan		80
470	Yellow Jacket	5	26	10	Utah		12
20	Alpha	3	160	230	Yellow Jacket	6	61

California Board—Latest Sales.

100	MURRAY Ad. M. MAY 31	500	William Penn.	50c
50	Baltimore Con.	45c		
60	Bullion.	30c		
140	Best & Belcher.	15¢(215)		
90	Bullion.	30c		
70	Crown Point.	40c		
110	Con Virginia.	29¢(294)		
875	Con Imperial.	40¢(393)		
110	Exchequer.	2.10		
110	Exchequer.	2.10		
90	Gould & Curry.	.61		
95	Hale & Norcross.	.2		
110	Justice.	.50		
155	Julia.	1.10		
10	Kentuck.	.30		
30	Leviathan.	.30c		
40	Mexico.	.40		
50	North Carson.	.10		
300	Northern Light.	.31		
200	Oregon.	10c		
300	Picout.	.15c		
50	Querman.	2.00		
300	Querman.	2.00		
140	Trenton.	.11		
600	Trojan.	70¢(753)		
120	Union Con.	3.15		
100	William Penn.	50c		
	AFTERNOON SESSION.			
100	Belmont.	30c		
130	Best & Belcher.	15¢(215)		
90	Bullion.	30c		
90	California.	30¢(230)		
30	Crown Point.	.40		
60	Con Virginia.	.49		
110	Caledonia.	1.90		
100	Dardanaelles.	1.10		
220	Exchequer.	2.90(262)		
270	Gould & Curry.	.61		
350	Hale & Nor.	2.12(220)		
60	Justice.	.50		
50	Julia.	.10		
300	Leeds.	3.15		
20	Manhattan.	1.61		
135	Mexican.	.71(714)		
200	Mode.	3.15(31)		
300	Northern Light.	3.15(31)		
500	North Carson.	1.22(121)		
120	Ophir.	1.11(121)		
50	Querman.	2.00		
500	Savanna F.D.	3.40(341)		
240	Sierra Nevada.	3.75(375)		
700	Trojan.	75c(753)		
40	Yellow Jacket.	.51		

GOLD IN ALASKA.—The steamer *California* has arrived in Victoria from Sitka, Alaska. Purser Hughes reports that new gold mines are at Schuch, Alaska Territory, 70 miles up the coast, north of Fort Wrangel. At present about 60 men are at work taking out from \$3 to \$4 a day to the hand. The field is said to be large enough to support 5,000 men and borders on the coast. Canoes can take miners from Wrangel to the diggings in two days. A report says Wilson & Co. have struck ounce diggings. Silvers & Co., are sinking a shaft and have struck blue clay, in appearance like that found on Williams creek.

EMMA MINE.—Judge Barret, in the N. Y. Supreme Court Chambers, has granted an order of publication of summons in the case of James M. Townsend, Jr., against the Emma silver mining company, limited. This suit is brought to recover \$88,301.16, on a judgment obtained by Trenor W. Park against the company, in the Third District of Utah, May 22d, 1876.

MINING SHAREHOLDERS' DIRECTORY.

[Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.]

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
American Flat M Co	Washoe	7	25	May 18	June 20	July 9	C A Sankey	331 Montgomery st
Baltimore Con M Co	Washoe	15	50	Apr 6	May 25	June 15	C A Sankey	331 Montgomery st
Dayton 16	Washoe	7	50	Apr 9	May 15	June 5	W E Dean	419 California st
Dunsmuir M Co	Idaho	7	134	Apr 25	May 31	June 10	W B Holmes	309 Montgomery st
Hussey Con M Co	Nev	3	10	May 3	June 7	July 2	R B Brown	426 California st
Jefferson M Co	Nev	4	50	Apr 13	May 14	June 4	C A Sankey	331 Montgomery st
K K Con M Co	Nev	—	1 00	May 5	June 9	June 13	B B Minor	309 Montgomery st
Knickerbocker M Co	Nev	18	30	May 16	June 21	July 12	J H Sayre	380 Pine st
Leopold M Co	Nev	2	2	May 16	June 18	July 12	R B Holmes	426 California st
North Coon Virginia M Co	Washoe	8	25	Apr 18	May 23	June 12	J Maguire	419 California st
Overman M Co	Washoe	37	30	Apr 16	May 21	June 11	G D Edwards	414 California st
Phil Sheridan M Co	Washoe	7	50	Apr 16	May 18	June 6	W R Townsend	339 Montgomery st
Sierra Nevada M Co	Washoe	48	100	Apr 16	May 24	June 11	W W Stetson	339 Montgomery st
Sterner Hill M Co	Washoe	11	15	Apr 11	May 17	June 7	W E Dean	419 California st
Sugar Hill M Co	Washoe	28	100	May 9	June 29	July 13	R B Holmes	309 Montgomery st
Sucor M & M Co	Washoe	17	50	May 23	July 2	July 23	W H Watson	302 Montgomery st
Utah S M Co	Washoe	16	2 00	Apr 18	May 16	June 4	G C Pratt	309 Montgomery st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

Aureola M Co	New	4	10	Mar	23	May 19	June 11	T S Fitch	240 Montgomery st
Bonanza S M Co	New	1	10	Apr	19	May 29	June 19	Wm Martin	19 First st
Barcelona C M Co	New	2	25	May	2	June 4	June 26	J P Moore	320 Sansome st
Booth G M Co	Cal	2	5	Apr	30	June 4	June 25	G R Spianey	320 California st
Boz, Canza S M Co	New	—	10	Apr	19	May 28	June 19	W Martin	19 First st
Californian Arizona M Co	Arizona	2	10	Mar	13	May 13	June 13	T J Powell	507 Montgomery st
Comanche Ar Co	Cal	1	50	May	24	July 2	July 27	W W Traylor	303 Montgomery st
Doiores Con M Co	New	1	10	Feb	17	Mar 26	June 15	J W Clark	418 California st
Excelsior S M Co	New	1	10	Apr	24	May 25	June 18	W A Kollmyer	306 Post st
El Tesoro M Co	Lower Cal	1	10	Mar	31	May 16	June 13	W Chickering	220 Sansome st
El Boreado Water & Deep Gravel Co	Cal	1	10	Mar	31	May 18	June 13	W Elias	524 California st
Gold Run M Co	Cal	1	25	Apr	5	May 20	June 7	C O Palmer	41 Market st
Jennie A and Black Rock M Co	New	1	20	May	22	July 5	July 31	J W Clark	418 California st
Low Range M Co	Washoe	2	3	May	21	June 25	July 17	F E Lutz	507 Montgomery st
Lucky Rock M Co	Cal	—	2	May	30	July 2	July 21	C S Healy	Merchants' Ex
Mahoe M Co	New	1	50	Mar	15	May 15	June 14	A C Hammond	41 California st
Maryland M Co	Washoe	1	10	May	9	June 10	July 2	C A Sankey	331 Montgomery st
Mitchell G & S M Co	Washoe	2	25	May	22	June 23	July 10	A C Hammond	401 California st
Martin White M Co	New	1	200	May	28	July 9	Aug 4	J J Scoville	309 Montgomery st
New England T & S Co	Cal	4	10	Apr	25	May 31	June 23	A C Hammond	401 California st
Occidental Reduction R & M Co	Cal	3	100	Apr	8	May 19	June 27	A C Hammond	401 California st
Silver King South M Co	Arizona	—	5	May	8	June 9	June 27	H P Ledyard	240 Montgomery st
Silver Sprout M Co	Cal	—	5	May	23	June 25	July 16	T B Wingard	328 Montgomery st
Young America M Co	New	6	15	May	12	June 16	July 12	R H Brown	426 California st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Arizona M Co	Washoe	W Willis	309 Montgomery st	Annual	June 5
Alpha Con M Co	Nev	W Willis	309 Montgomery st	Annual	June 18
Crown Point C & M Co	Washoe	J Newlands	419 California st	Annual	June 4
Hartford M Co	Nev	E F Stone	414 California st	Annual	June 5
Lady Franklin G & S M Co	Nev	F E Luty	507 Montgomery st	Annual	June 6
Mammoth S M Co	Nev	D A Jennings	401 California st	Annual	June 4
Gavance M Co	Cal	F W Eac	26 Battery	Annual	June 5
Silver King M Co	Arizona	W H Boothe	304 California st	Special	June 5

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Black Bear Quartz M Co	Cal	W L O Livers	316 California st	40	Oct 11
California M Co	Washoe	C F Gordon	Nevada Block	2 00	May 16
Consolidated Amador M Co	Cal	F B Latham	426 California st	25	May 16
Virginia M Co	Washoe	A W Havens	Nevada Block	2 00	May 15
Comanche M & M Co	Nev	W W Traylor	Nevada Block	20	Oct 11
Empire G M Co	Cal	Chas Collishon		75	Feb 8
Eureka G M Co	Cal	R Wegener	414 California st	2 00	May 10
22 G M Co	Cal	J G Riley	370 California st	20	Mar 17
Leopard M Co	Nev	B H Brown	426 California st	50	Dec 11
Manhattan S M Co	Nev	J Crockett	419 California st	1 00	Feb 10
Modoc M Co	Cal	P M McLaren	Cor Cal & Mont y st	1 00	Jan 11
23 G M Co	Nev	W Willis	369 Montgomery st	1 00	Apr 12
St Patrick M Co	Cal	D F Verdenal	409 California st	30	Mar 15
West Comstock G & S M Co	Washoe	Oliver G Wood	534 California st	50	Feb 24

The Mining Share Market.

There is nothing of special interest to record of transactions in mining stocks, as the depression still continues in that branch of business. The fluctuations in prices are small, and the volume of sales light. This long-continued dullness in the stock market has a serious effect on all branches of business, as its effects are felt on all sides, and people seem to be waiting for a rise in the market for a revival of trade. The Constock mining interests, however, feel the effects more particularly. The mines continue to shut down and discharge men, so that considerable distress is experienced among the laboring community.

How severe this pressure is may be imagined from the following figures given by the Virginia *Enterprise*: A careful estimate of the amounts disbursed here monthly for work and materials by the American Flat mines which have shut down makes the sum total of \$57,000, and this is but a very small portion of the Comstock. The closing down of these mines has, however, taken that amount of money monthly from our circulation. A further careful estimate of the retrenchment in other mines on the lode where the number of men discharged and the amount of wood and timber used are known to the reporter, makes the total of about \$365,000 per month. It is, therefore, safe to say that \$420,000 less of expenditures are being incurred monthly on the Comstock than usual. In this estimate none of the mines are included which are simply doing work enough yearly to hold their claims. But where the work is being done the outlook is most favorable. From the Utah to the Dayton encouraging prospects are being encountered. Nor have these promising indications been confined to the mines now actively engaged in prospecting. Some of those shut down were compelled to do so at a time when everything was most favorable. Most of them are talking of an early resumption, and this is what is needed, both here and elsewhere, for without prospecting the mining would soon be confined to a few bullion-producing localities, and when the ore bodies now opened up were exhausted would cease altogether.

The following assessments have been levied since our last issue: Savage, \$1 per share; Jennie A. and Black Rock, 20 cents; Lucke Rock, two cents; Succor, 50 cents; Martin White, \$2; Comanche, (Benton, Mono Co.,) 50 cents.

The sales in the San Francisco Board for the week ending May 29th aggregated \$1,000,000.

No sessions of the San Francisco Stock Board were held on Wednesday, Decoration day. The Board also adjourned on Thursday morning.

ing in respect to the memory of Mr. Everett, an old member of the Board.

An advertisement has appeared asking all parties owning Crown Point stock, whether in their own names or otherwise, and who are in favor of reform and a change of management, to call at the office of F. E. Wilke, 429 California street.

THE *Enterprise* of the 27th says: The bonanza mines yesterday made the largest shipment of bullion yet. The shipment last week amounted to \$557,768.44, out of a total of \$568,720.81 shipped at that time. Last evening they shipped 134 bars, valued at \$538,657.32, being \$888.88 more than the week before. This is the return of another week's run, and shows how nearly even is the yield of the Consolidated Virginia and California mines from week to week.

ICE IN THE MINES.—Mr. Boston, head engineer of the Sierra Nevada, gives the information that quite a thick layer of ice is found daily around the exhaust of the Warring compressor used on the 1500-foot level in connection with a Foote blower. He thinks they could manufacture ice in the mine for one and a half cents per pound. In the Caledonia mine they have frequently to thaw out with hot water the drilling machinery which is run by compressed air.

THE Los Angeles *Herald* informs its readers that there was foundation for the rumor that the Southern Pacific Company were negotiating for the purchase of the Los Angeles and Santa Monica Railroad. The bargain has, in fact, been completed, and the transfer is to take place on the 1st of June. The motive of Senator Jones for disposing of the road is supposed to be found in the apathy of the people of Los Angeles county about its extension to Inyo.

THE furnace, assay office, stables and other buildings of the Jersey mine, which were offered for sale yesterday for taxes by the Sheriff were purchased by the County Treasurer for the county, there being no other bidders. The *Silver State* says the mine, without which the furnace is useless, is involved in litigation, hence no outsider cared to invest in the property.

THE Peck mine of Arizona was not sold to San Francisco capitalists because of the inability of the negotiators to raise the purchase money, some \$400,000. The owners of the mine will therefore proceed to push forward active operations, with the intention of extracting \$200,000 per month.

THE Secretary of the Navy has issued orders requiring candidates for the office of Navy Paymaster to enter upon a competitive examination before a board of officers, on whose report the appointment will be made. This has never been done before.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

COVER.—*Amador Ledger*, May 26: The new hoisting works at this prosperous mine are completed, and in active operation. They are among the finest works of the kind in the county, if not in the State, being equal to developing the mine to the depth of 2,000 feet, the reel holding 2,200 feet of rope. The new shaft is down 200 feet. Meanwhile the mine continues to open up splendidly. The ore body in the principal drift is now 22 feet wide, every pound of rock being sent to the mill. A clean-up was made lately from ore taken from this immense vein, and the yield amounted to the handsome sum of \$10 per ton.

LIVE OAK.—This week we paid a visit to this lively looking prospect, which is situated within the town limits of Sutter Creek. A shaft has been sunk to the depth of 30 feet, showing a regular foot wall and hanging wall, about 65 feet apart, between which small strings of quartz and gouge matter are found. A small pile of ribbon rock lay on the surface, in which rich sulphurets are seen, and which also yields a fair prospect in free gold.

BUNKER HILL.—It is pleasing to note that the ore in this mine has shown a decided improvement in quality of late.

BONANZA.—This mining property is looking better than ever. The shaft is 240 feet deep, the vein matter increasing in size and richness as prospecting continues.

GOOD HORN.—The shaft is free from water, and the work of taking out ore is progressing.

BUTTE.

GOSE DOWNS.—*Oroville Mercury*, May 26: For some time past we have heard nothing from the rich mines in and around the old mining town of Forestburg. On inquiring we learn that the mining is being done, and the shafts taking out and crushing the rock. They have good rock and a good mill and we don't understand why they stand still and consent that the moss shall grow over them.

SOLD.—The Armstrong mill and mine was sold last Monday by the Sheriff at auction and bought in by D. L. Brown, who formerly owned the Long's bar ferry, for the sum of \$5,000. It is considered a very cheap piece of property at that price, as it can be worked at all times during the year and yields good pay to the ton of ore crushed.

CALAVERAS.

RICU ROCK.—*Calaveras Chronicle*, May 26: Ore of unexampled richness is now being taken from the 1300-ft. level of the Gwin mine. We have never seen anything equal to it. The "streak" is about two and a half feet wide, and from present appearances will continue throughout the level. It is really the richest thing in the country.

UPPER COUNTRY ITEMS.—The company owning the Summit lead have recently had 100 tons of rock crushed. The amount obtained has been large, for the company intend to erect a new 20-stamp mill. Needhardt & Johnson recently crushed 50 tons of rock, which averaged over \$50 per ton. Golden & Smith have lately struck good rock in their mine at Bummerville. McBeth & Co., owners of a very promising lead, a short distance from West Point, are being well remunerated for their labors. All the mines at Skull Flat have out large quantities of ore. Crushing commenced as soon as the mill at Mosquito is completed, which will be in a few days. Work on the Anderson Flat mine is progressing favorably. Sundermyer & Co., proprietors of the celebrated Eureka mine, have out 250 tons of quartz on the dumps. We learn that the company have rented Clark's mill, and will commence hauling rock the first of next week. Brown & Bardsley, at Sandy Gulch, have recently struck rock in their mine. They will pay \$100 per ton. Potter & Co.'s lead at Mosquito, is undoubtedly one of the richest in the upper country district. Out of a piece of rock weighing a little less than 15 pounds they obtained \$300. Vein, two feet wide. The mining interests generally in the upper country region are flourishing.

EL DORADO.

CENTENNIAL HITES.—*Amador Ledger*, May 26: At Sutter Creek, the other day, we were presented with a curious specimen of gold-bearing pyrites of iron, taken from the Centennial Hites mine, in El Dorado county, just across the Amador line, about seven miles north of Fiddletown. The property is owned by the Hites Bros., who are developing it as rapidly as their means will allow. It is not uncommon to meet with crystals of iron pyrites in the neighborhood of quartz veins, but we have never before heard of a mine composed almost exclusively of them, as is the case with the one now under notice. The vein is some six or seven feet wide, the ore being quite loose. All that is required to be done is to take out lagging and the crystals will run into the shaft, where they are shoveled into the bucket and sent to the surface. One of the owners brought a small parcel of specimens to Sutter Creek. They are undoubtedly very rich in gold, the precious metal being visible in lots of the pieces, while the dust in the bag, produced by friction, fairly glittered with gold. Fifteen tons of this ore have been sent to the Bonanza mill, at Drytown, to be crushed.

INYO.

MICHIGAN MINZ.—*Coso Mining News*, May 26: This mine is between the Lucky Jim and Christmas Gift mines of the New Coso company, an excellent locality. The work done upon it consists of a shaft sunk upon the ledge to a depth of 60 feet and a tunnel run in upon the ledge from the east, 100 feet, connecting with the shaft. The tunnel was run by the Bastian Bros., and enough ore was taken therefrom to pay for the entire work. The ledge at the point of connection with the bottom of the shaft is six feet wide, there being a solid vein of 16 inches of excellent ore.

PANAMINT MINES.—A short time ago orders were received by Captain Messec, Superintendent of the Surprise Valley mill and water company, at Panamint, to suspend all operations upon the mines. On the day the orders were received, a strike of considerable importance was made in the Wyoming mine, at the depth of over 600 feet, of some two feet of the rich black metal found near the surface in that mine, and which produced considerable bullion worth \$14 the run, the mill being shut down for a thorough clean-up and some few repairs. A shipment of eight bars of fine bullion will have preceded this issue of our paper to San Francisco. These, in addition to the four bars shipped a short time ago, make a total shipment in value of \$14,500. This, for a new 10-stamp mill just commencing operations, we consider pretty fair work, particularly as the ore was put through just as taken from the mine and without any repairs. The shipment of the ores will be assured and only those put through that pay most now, while the balance will be kept back to be worked hereafter when freights, supplies, etc., are cheapened.

MINNETTA BELLS.—We found Mr. R. C. Jacobs, the Superintendent, busily engaged in retorting the amalgam collected after a 24 hr. run, the mill being shut down for a thorough clean-up and some few repairs. A shipment of eight bars of fine bullion will have preceded this issue of our paper to San Francisco. These, in addition to the four bars shipped a short time ago, make a total shipment in value of \$14,500. This, for a new 10-stamp mill just commencing operations, we consider pretty fair work, particularly as the ore was put through just as taken from the mine and without any repairs. The shipment of the ores will be assured and only those put through that pay most now, while the balance will be kept back to be worked hereafter when freights, supplies, etc., are cheapened.

These are some excellent mines between Grant's camp and the Minnetta, and an Eastern company has been or-

ganized to erect a five-stamp mill in Snow's canyon, so as to work the ores and test their extent and richness. These ores are free milling, being principally silver, but carrying 30% to 40% gold. We have seen two assays which go from \$700 to \$1,300 per ton. One of the ledges at the bottom of the shaft 30 feet deep is solid ore two and a half feet wide.

MONO.

BENTON MINES.—*Cor. Inyo Independent*, May 26: Mining at the Comanche has had a set back in consequence of the large amount of water; last Saturday all of the men were discharged excepting four, but the delay is only temporary. As soon as a pump can be rigged operations will be commenced. The Kerrick is furnishing a good supply of rich ore. There has been a rich strike in the Mojave, owned by Messrs. Leeper and Albright. The strike is about three feet wide and of a character that will net \$500 to the ton. The Diana is looking splendid. The Laura, Fryburgh, Alps, Eureka and other mines are looking excellent. Milling is at a standstill, as neither of the two mills here are running, through local causes. Both mills are expected to start up in a few days.

NEVADA.

BIG BLAST.—*Nevada Transcript*, May 26: We understand that the North Bloomfield gravel mining company put off a blast of 9,000 pounds of Judson powder in their claims at North Bloomfield on Monday evening last. It did splendid execution, and threw up the ground a long distance from the powder line. Where the blast was put in two drifts, was 65 feet long and the T's 96 feet in length. 9. W. White, agent of the plant, and Judson powder companies, fired off the blast by electricity.

A COMPANY of five men, all miners, not caring to work for wages any longer, banded together last week, and are now out prospecting for quartz ledges. They are determined men, and we feel confident they will soon strike something good. If more of the same kind would do likewise, we know we should have many valuable ledges added to those which are paying.

STRUCTURE.—*San Juan Times*, May 26: Evan D. Evans, Wm. W. Williams and James H. Reader, the owners of the Shady Creek mine, on Shady creek, near Hoyt's old crossing, have struck a rich piece of gravel which pays from 25 cents to \$5 to the panful of earth. This gravel claim covers about 50 acres of ground, with a creek front of about 3,000 feet in length. The gravel face is about four feet in depth to bedrock. It is covered with loam to about the same depth. Last summer the company ran a bedrock cut from the creek into their claims, but not of sufficient depth to reach bedrock at all points, consequently it is their present intention to make their cuts deep enough for all practical purposes. This work they will perform this season. They will place sluices in the cuts, and when completed they will own the best placer mine in the county, taking all their advantages of free water, good fall and easy mode of working their ground into consideration.

GRIZZLY BEAR MINZ.—*Grass Valley Union*, May 21: This mine is on Deer creek, below the Kentucky Ridge, and not far from the Forlorn Hope. We saw, yesterday, some very rich ore which had just been taken out of the bottom of the shaft. The ore shows free gold and very heavy sulphurets. The shaft is now down 50 feet and the ledge in the bottom is fully four feet wide. The ledge is enclosed in smooth, perfect walls. The Grizzly Bear is so situated that it can be worked through tunnels for a great many years, and there is plenty of water power available for machinery purposes. Ore there can be mined and milled for five dollars a ton.

WORKS STARTED UP.—The new sulphurets works, at Canada Hill, erected by Mitchell & Crosby, were put to work on Tuesday. The mining works will all be completed. How the Grizzly Bear put in a shaft by the gentleman named, will result in saving gold remains to be seen. They contend that their works are not of the nature of an experiment, but that they have completely demonstrated that they can work rebellious ore at little cost. We hope that their works will be a success. Meantime the firm of Mitchell & Crosby has been dissolved, or rather it has been merged into an incorporated company called the Pioneer Consolidated Company of California.

MURCHIE.—*Nevada Gazette*, May 26: The incline at the Murchie mine was nearly down to the bottom of the old works on Tuesday last, and it will be clear and everything ready for commencing the drifts to-day. It will not be long before this mine will be employing a large number of men. The present company propose to work it for all is worth. It has proved itself a valuable mine years ago.

TAUZ GOLD TUNNEL.—Some time back a title under the weather, so to speak, for several months and talk was at one time had of shutting it down, but the Superintendent has stuck to it, and we learn on Wednesday night a chute of ore was struck on the 740-foot level at a point never before worked. The indications are now looking favorable for a better state of affairs.

BULL-DOGS are getting about as common in our country as they used to be in some of the Southern States. One out near Newton has recently sent out thirty-one loads which yielded \$4,000, or \$150 to the load. Another is located in the village of Eureka South, and judging from specimens of the rock taken out five feet below the surface it will eclipse its southern neighbor. The ledge at the point reached is four feet in width, and the pieces from it which we saw were literally speckled with gold. The sulphurets in the ore are decomposed, and in their places free gold is stuck in chunks.

THE ROCK coming out at the New England continues to be rich. It is thought it will go in the neighborhood of one hundred dollars per ton. The ledge is large, and work is going on satisfactory there.

MONNIE'S works at the Providence are running like a top. The long furnace runs with the regularity of clock work, and does its work in a perfect manner. The success of the process is no longer uncertain. Bullion will be the outcome of the operation.

CROSBY & MITCHELL'S works are complete now. Steam was raised and the whistle blown on Tuesday last. Every thing is ready for work as soon as material can be obtained.

KITT'S mill, at Willow valley, is kept constantly running on custom rock, and most of it comes from new ledges which are being opened all over that section. It would surprise residents of town to see the number who are prospecting all over the district.

PLACER.

WORKING.—*Dutch Flat Forum*, May 24: Since our last issue we have been favored with rain and cool weather, which is favorable for our water supply. All the claims here and at Gold Run are being worked with vigor. The Moore Hill mine exploded a blast on Saturday, and is now under full headway again. The Polar Star continues washing constantly. The Southern Cross met with a little bad luck last week by having its incline and the upper end of its tunnel badly plugged. The Franklin is on again washing the gravel loosened by its large blast. The Baker is now under full headway, using water nine hours per day, and is removing the hard material which it is compacted with its normal rock. This claim is now working gravel that has never been drifted, and the result is looked for with considerable interest. The Star and Union continues washing. The Pacific is off cleaning up. At Gold Run the Cedar claim has cleaned up and is on again. The Bonanza, North Star and Illinois claims continue washing. The various ditches are conveying their full capacity of water, and it is believed that they will continue to do so for some time to come.

BLUE CANYON RAVINE MINES.—The Roaring Blunder mine is situated on the north bank of Blue Canyon ravine, being one and a half miles southeast of Shady Run, and contains a large strip of ground, which embraces an old channel or river bed. Prospecting was instituted by running cuts into the gravel found on top of the rim rock. By so doing, the mineral rock was found to suddenly dip to the hill's dip was followed a short distance, and although none of the gravel taken therefrom has yet been washed, it has nevertheless proven to be very rich, by the finding of a large number of specimens, two of which are worth \$100. A tunnel is now being constructed which will tap the bottom of the channel, and as it will be over

100 feet higher than the stream of Blue Canyon, a chute is also being constructed to convey the dirt where it can be washed.

ANOTHER STRIKE.—*Mountain Messenger*, May 26: Another rich strike has been made in a mining claim a few miles east of Forest City and just above the Mammoth Springs claim. A few pans of the first gravel taken out yielded enormously. We do not know the name of the claim, but its location is near the old Cornish ranch.

BORING FOR GRAVEL.—Pioche gold mining company, composed of wealthy men of San Francisco, is the first company in this State, we think, to resort to the process of boring to prospect a mine. Should this experiment prove a success, of which there seems to be no reasonable doubt, it will enable parties to prospect ground at greatly reduced expenses and be an immense saving in time. The running of costly tunnels or the sinking of expensive shafts, to ascertain if there be gravel, will be avoided. Holes of any size up to 10 inches may be bored. This process will also prove of great value in ventilating mines, etc. In fact, the uses to which it may be put in proving and developing the mining resources of the country are innumerable, and will doubtless prove of inestimable value. The possibility of boring for mines has been talked of these many years, but this, we believe, is the first company to practically test its efficacy.

OUR BONANZA.—The fabulously rich quartz ledge in the North Fork claim, at Forest City, has not petered as predicted it would. We feel compelled to announce that the ledge has every appearance of a "true fissure vein," and is still yielding almost fabulous amounts daily. On Tuesday last between \$4,000 and \$5,000 was taken from three double boxes full of rock. Work upon the ledge is being prosecuted with vigor; at the same time the company is pushing ahead for the gravel, which they will reach about the first of July.

TUOLUMNE.

CHAPARRAL.—*Tuolumne Independent*, May 26: In this mine, owned by Messrs. Schulz, Trout, Wagner & London, they have struck the shute, in the lower tunnel, for which they have been running about two and a half years. They are down 170 feet from the surface, and the pay rock is about two feet in width. The gold is very evenly distributed in the ore, and rock in which there is none visible to the naked eye will mill several hundred dollars to the ton. The point where the tunnel, the ledge is being struck is very rich, full of free gold and will go away up into the thousands.

OPENING OUT.—The north extension of the Louisiana mine, at Arastaville, known as the Virginia, promises to be property of great value. The vein is 14 inches and enlarging, pays for milling from \$23 to \$50 per ton, containing largely galena sulphurets, which assay from \$300 to \$500 per ton. In sinker mouth, strike work is being clear \$23; now going north towards the old shaft and value of ore increasing.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, May 30: The daily yield of ore has been increased to 500 tons of ore per day, which is being crushed by the mill as fast as extracted. The ore breasts and slopes on the 1650-ft level never looked better or yielded richer ore than at this time. The double winze sinking below the 1650-ft level to connect with the west drift from the C. & C. shaft on the 1750-ft level is down 12 feet, the bottom in very rich ore. The ore slopes on the 1150 and 1400-ft levels continue to yield their usual quotas of rich ore. The winze below the 1550-ft level has been connected with the upraise from the 1650-ft level, which greatly assists the ventilation of the lower levels of the mine. An east winze is about to be started on the east side of the ledge in the southeast portion of the mine. The west drift on the 1750-ft level from the C. & C. shaft is making fair progress. There is a strong and steady flow of water from the face of this drift—a much stronger flow than is now had in the bottom of the C. & C. shaft. Notwithstanding the loss of 30 stamps in the Consolidated mill for the month, the yield of bullion is amply sufficient to secure the payment of the regular dividend of \$2 per share.

JULIA.—Everything at the mine is running finely, both above and below ground. A personal examination of the ore vein on the 1300-ft level, made yesterday, showed the ledge to be not only large and well defined, but of an excellent character. The vein is over 300 feet in width, and has been penetrated to a distance of 100 feet, for a distance of 600 feet or more. The quartz is very solid, is of a lively, healthy, mineral-bearing description, large bodies of which would deceive a critical expert in a superficial examination, so closely does it resemble a portion of the pay ore of others of the Comstock mines. Four cross-cuts have been run from this lateral drift—two east and two west.

YELLOW JACKET.—Both drifts, east and south, at the 2200-ft level are 44 feet from the station. Water does not interfere. The syphon to carry the water from the pump station at the 1740-ft level across through a drift to the 1850-ft level of the Crowl Point and Belcher pump shaft did not prove a success; consequently the heavy main pump of the shaft has to be depended upon to raise the water to the surface. The large new working shaft of the mine, to the eastward, is now doing good service, and the water work is being done preparing for the new and powerful machinery which will soon arrive. This will be a double steam winch of sufficient power to sink the shaft a distance of 2,500 feet. The stone masonry foundation wall for the south side of the main building was commenced last Friday.

CALIFORNIA.—Daily yield, 500 tons. The ore slopes on the 1600, 1550 and 1500-ft levels are all yielding rich ore and showing no signs of exhaustion. The north drift on the 1650-ft level, the 1650-ft level, is steadily advancing, the face in hard blasting ore of a very rich character. Winzes Nos. 6 and 4, below the 1600-ft level, are each being pressed downward with all possible speed, the bottom of each in rich ore. Laying the heavy stone foundations for the large new air compressor at the C. & C. shaft is being pushed vigorously ahead. The yield of bullion is ample to secure the payment for the month of May of the regular dividend of \$2 per share.

SILVER HILL.—Work in the face of the north drift on the 650-ft level, which was suspended last week on account of the strong flow of water encountered, was resumed yesterday. The upraise from the 444-ft level is making good headway, the face in ore of a fair character.

GOULD & CURRY.—Work on the new pumps and bob at the base of the main incline is making good progress. The huge bob for the pumps at that station has not yet arrived, but will probably be on the ground ready to insert inside of four or five days more.

OHRE.—Daily yield, 40 tons of ore, keeping the Winfield mill steadily crushing. The station timbers are in at the 1900-ft level, and opening the station is making the best of headway. The south winze below the 1700-ft level is down 10 feet, and the west wall of the ore vein, and cutting some fine quartz in its descent.

BEST & BELCHER.—Cross-cut No. 1 on the 1700-ft level is steadily advancing to the eastward, the face in fine vein matter. Cross-cut No. 3 east is also making the best of headway.

SERRA NEVADA.—The south drift on the 1700-ft level is being pushed vigorously forward, the face still in very favorable ledge matter. The east and west cross-cuts from the main south drift on the 1500-ft level are showing some fine quartz and low grade ore.

UTAH.—The cross drift to the south and east on the 1100-ft level has penetrated the ledge a distance of 98 feet. The ledge, so far as developed, is solid quartz of the finest character. The vein is much better developed, and presents a vastly more permanent character than it did on the levels above.

MEXICAN.—The upraise from the 1465-ft level still continues in low grade ore. The north drift on the same level, following the east clay wall of the vein, is making good progress, and is cutting occasional bunches of good ore.

OVERMAN.—The north drift on the 1400-ft level, running in contact with the south drift from the Belcher, on the 1600-ft level, is making steady headway, the face in fine ledge material. The face of the south drift on the 300-ft level is in very favorable quartz and ore.

HOMESTRAD.—The surface work, which is a preparation for increased facilities for driving the shaft downward at a much faster rate of progress than heretofore, is rapidly approaching completion.

JUSTICE.—Daily yield, 450 tons of ore, keeping the mills all crushing to their full capacities. The ore slopes are looking well and yielding good milling ore at all points. The ore at the bottom of the winze below the 800-ft level continues of a fine character. The face of the main south drift on the 1000-ft level is still in ore of a good description, showing an improvement as the drift advances.

LEVATHAS.—A decided improvement is found in the south drift at the 400-ft level, one-half the face of the drift being now in fair milling ore.

SAVAGE.—The pumps are running smoothly and on a slow stroke, handling the water with perfect ease and holding it steadily at the depth required for the Hale & Norcross to work while repairing the cave in their main incline.

BELCHER.—Daily yield, 70 tons of ore, which is being crushed at the Santiago mill as fast as it is extracted. Sinking the main incline going steadily forward.

UNION CON.—The north drift on the 1300-ft level is showing some little improvement as it penetrates further and further northward. The quartz is coming in much stronger.

SUTRO TUNNEL.—Face of header in easy working material, consisting of ledge porphyry, with streaks of quartz and clay, giving some little increase of water. Careful and substantial timbering is called into requisition in passing through this matter. Total length of tunnel from mouth to face of header, last evening, 16,913 feet.

VALLETONA.—Sinking the shaft is making the best of progress, the bottom still in a fine character of ledge material.

IMPERIAL CON.—The north drift on the 2135-ft level is showing some very favorable quartz.

MORNING STAR.—Sinking the shaft is again being advanced at a very favorable rate of speed.

CHOLLAR-POTOSI.—Daily yield, 110 tons of ore, the assay value of which is \$24.60 per ton.

PROSPECT.—Face of main west drift at the 400-ft level in hard blasting rock, rendering progress somewhat slower at present.

NEW YORK.—The enlargement of the shaft is about completed. The finishing of the third compartment will make the shaft one of the finest on the Comstock.

BELMONT DISTRICT.

STRIKE IN EL DORADO SOUTH.—Belmont *Courier*, May 26: While some miners were engaged in timbering the new winze in the El Dorado South mine, last Thursday, they discovered a ledge that is very rich in silver ore. The place where this ledge was struck is about eighty feet from the lower level. The Superintendent has not yet ascertained the width of this ledge, as the air is bad and work there-fore necessarily slow, but this drawback will soon be obviated and the work of developing this new find will be pushed ahead at a lively rate. This is, of course, very encouraging, and the management feel confident that they have at last struck a bonanza. The machinery works splendidly, and everything in and around the mine going on smoothly.

CHARGE TAKEN.—A large body of rich ore has been struck in the El Dorado mine in raising the winze for air, which will be worked as soon as the connection is made. The Belmont also shows a decided improvement. Jefferson, Jet, and other districts in our vicinity are being prospected with energy, and in many cases show good results. Chlorides around Belmont seem to be doing well. We notice rich rock from various mines, and we feel satisfied that the "winter of our discontent" is passing away.

ELY DISTRICT.—The ore body in this mine still continues to improve and a large amount of ore is being extracted from every level on which there is being any work done, and is hoisting from the 1st, 3d, 4th, 6th, 7th, 10th and 11th levels. From some of these levels only a small quantity is hoisted, but in the majority of them the yield has been satisfactory. A large amount of ore is now on the dump awaiting shipment, and is being hauled to the mill as rapidly as possible. The prospects of the mine are very encouraging, every one having great faith in the present strike being permanent and that the future looks brilliant.

ALPS S. M. Co.—The usual force of men are at work; prospecting will be commenced on the lowest level next week. The Concord mill is running night and day on custom ore; two trains were dispatched this week over the Nevada Central to that mill, and to-day, Sunday, Monday and Tuesday, trains will be sent loaded with as much as can be carried. The Alps mill will shortly start on Washington & Creole and Mazepa ore, the necessary arrangements having been made for water to run that mill 14 hours daily.

ONE PURCHASE.—Mr. Theo. Hale received a dispatch yesterday evening from A. J. Blair, Superintendent of the Alps mine, from San Francisco, to the effect that the Alps company had closed the negotiations that have been pending for the Washington & Creole and Mazepa ground, and ordering them to take immediate possession and place a force of men at work. This is most acceptable news to our camp, as it will give employment to 40 or 50 additional men. It is known that there are thousands of tons of good milling ore in sight in the first five levels of the Washington & Creole, which has remained intact owing to the fact that the parties owning this ground owned no mill in which to work said ore, and the ore being of low grade (assaying \$40 to \$80), can only be made profitable by the parties who run the mills owning the property.

LEWIS DISTRICT.—Prospects.—*Cor. Tuscarora Times*, May 14: Your correspondent visited Lewis district last week, and was welcomed by the genial Superintendent, Sam Groves, of the Dunsany and Logan Con. M. Co., who conducted us through the mine. The new incline is down about 130 feet in good ore all the way. Sam says at the bottom of the incline he cannot tell how wide the ledge is, and it is all ore and no hanging wall in sight. The company intend to ship about thirty tons of ore to San Francisco for reduction previous to erecting a mill.

Work will be started on Monday, 7th inst., on the Deffiance mine, owned by Blossom, Middleton, Friley and Nealand, about 400 feet north of the Dunsany, where the boys intend sinking a shaft to catch the ore-shute now being worked in the Dunsany and Logan mine, and we hope they will strike it rich, as they deserve it. We had a long talk with Mr. Fitchett, who is interested in Lewis, and he says that Lewis is bound to come out all right, and is willing to take his chances out there.

OSCEOLA DISTRICT.

GOLD.—*Pioche Record*, May 26: We are informed by Mr. Smith, who arrived yesterday at J. N. Curtis's corral, that gold has been found in a gulch at Osceola district, which yields a bit to the pan. The gulch is just below a claim owned by Jim Mattson. The party is near Jeff Davis peak. Bonal forms of Pioche was the party who made the discovery, and 18 men are now at work there. The claim owned by Jim Mattson had always considerable gold quartz in it. Osceola district is in the immediate neighborhood of Shoshone.

WASHINGTON DISTRICT.—RE-PROSPECTING OLD DROUGHTS.—*Reese River Reveille*, May 5: Noah Wardle, a chlorider, has recently been re-prospecting the abandoned claims in the old Washington district, with encouraging results. Last week he brought in samples of rock from a ledge in that district, which

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boat I have ever seen; larger in fact than either the *Bristol* or the *Providence*. Many of the readers when at the Centennial saw part of her crank; it was exhibited by John Roach & Sons, near the American locomotives in Machinery hall. The engine is enormous, and has a 14-foot stroke. The boat is said to be in many respects the sister of the *Rhode Island*, now one of the fastest boats on the sound, easily able to walk away from almost anything going east of Hell Gate. She is in fact counted considerably better than a "20 mile per hour" boat. The *Massachusetts* is said to be capable of making 20 miles per hour; whether she can do it remains to be seen. Her model is not striking, while her upper works are something perfectly enormous. If she makes time, it will be because of her immense power. She has made one or two trips already, but the engine has hardly settled down yet in its bearings. I hear that she had to stop her engine for an hour off Point Judith one night this week, probably to cool the bearings. Last week the boat was open for the inspection of the press.

She is 340 feet long and 80 feet wide over the guards. The cylinder is 90 inches in diameter. The steam pressure is to be 40 pounds, which is 15 more than is carried by the *Bristol* or *Providence*. The wheels are 40 feet in diameter and 12 feet 6 inch face. Dip of buckets, four feet. Her interior finish and decorations are elegant. Her boilers are enormous in size, her stroke hole seeming large enough to hold bodily a 40-foot barn. The strap, on the lower end of the connecting rod weighs a ton, which gives a fair idea of her great size.

The Hunter's Point ferry have just on

A New Iron Ferry Boat,

Called the *Flushing*. She has inclined engine of the same pattern as those used both on that ferry and on the Fulton ferry. The other boats of this company have double decks, an upper and lower cabin; this boat, however, has but one deck, she seems to be very fast, and as ferry boats go, is good looking, though to use an old country expression, "she will never be hung for her beauty." The engineers on the river say "she turns a pretty wheel."

I suppose most of your readers are somewhat interested in the

Brooklyn Bridge,

And are wondering how it is progressing. Well, so far as the outside world can see it is standing still. Now and then we get a glimpse of a workman sedately crossing the airy foot bridge, or tying a knot in a rope, or some other similar operation, and now and then there are a party of gentleman and ladies crossing, and that is all. The work of making the wire is going on, both steadily and successfully. The material, I hear from the best authority, is proving much better than was expected, and is considerably above what the contract called for. The breaking strain of wire now turned out rarely falling to 3,600 pounds, while the contract calls for but for 3,400, a gain of 200 pounds in the strength of each wire.

A new bridge is now talked of, to extend across the river over Blackwell's island. The matter has at last taken definite shape, and plans, etc., have been presented. What its value is to be one can hardly imagine, since it is in a place where no one wishes to cross.

Probably many of the readers of the SCIENTIFIC PRESS have heard how last summer at one of our regattas,

A Catamaran—A Double Hulled Yacht,

Sailed by and around everything that was afloat that day, whether sail or steam. I think it was the *Meteor*; and how at another race in the sound another catamaran, the *Amoryllis*, did the same thing over again.

There are, I think, four or five of these boats now in the harbor. They are designed on the plan of the flying proas of the South Sea islanders. They are all alike in having double hulls, but differ in other respects.

Within a day or two I saw Herrishof's new boat, on this plan, show a sample of what she could do. Really it seemed more like a feather blown before a gale than anything afloat. When the wind struck her, she would flash away before it like an ice boat. As one of the fastest steamers on the river came alongside, the catamaran started away from her as though the boat had been at anchor. No steamer in the harbor could keep up with her, not even the *Mary Powell*, which with her new boilers, is said to have just beaten her best time of 25 miles an hour. I may at a future time have something further to say about these wonderful boats.

W. E. PARTRIDGE.

A Big Steal.

A few weeks ago a steam engine belonging to one of the smaller mines near Virginia City was removed by some parties unknown to the owners, who, upon learning the facts, telegraphed from San Francisco to Deputy Sheriff Treasurer at this place, to keep an eye open for any freight in that line which might pass through here. Nothing in the engine line was seen to pass through here, but somehow or other Mr. Treasurer concluded to go to Nevada City and investigate, but everybody was talking about Watson's new paper and he could get very little satisfaction, so he concluded to read the new paper awhile until the excitement subsided a little, so that people would talk about something else. About the first item he read was the following: "The Little Deer Creek gravel mining company, whose ground is situated at Unionville,

near the old Banner mine, have erected their hoisting works and commenced sinking an incline to prospect the gravel channel supposed to run through that section. The company is composed principally of Virginia City capitalists. Jacob Tonnor is Superintendent. We shall, from time to time, report the progress of the enterprise."

In company with the Sheriff of Nevada county, Mr. Treasurer visited the mine indicated, and found the engine in use to be the one wanted. A demand was made for the engine but possession was refused because the parties in possession claimed to have bought it. The matter will be adjusted in the courts.—*Colfax Enterprise*.

Mineral Wealth of Morocco.

In a paper read at the Society of Arts, Mr. A. Leared said the mining industry, which is at present systematically discouraged, might be prosecuted to great advantage in Morocco. The southern provinces are especially rich in minerals. The mountains which separate Sus from Draa abound in iron, and 50 or 60 miles southwest of Teradant iron of a very superior quality, used for making gun barrels, is found. In the same ridge of the Atlas mountains are several mines of copper combined with gold, and also rich silver mines. Lead, sulphur and saltpetre are found to the east of Teradant. Antimony and lead are also found in Sus. This does not exhaust the list of mines of which the Atlas is so productive. Possibly in the districts near the seats of power mining might be carried on by European capital and skill, by special permission of the Sultan. But in Sus and the southern districts the attempt would be hopeless until life and property become secure. During the discussion Mr. Rochusson said the main point of interest, he thought, was the mineral resources, which were not yet thoroughly worked, for between Cape Juby and Mogador there were great deposits of malachite and copper, and also what was known as the "Iron mountain," where there were deposits of iron such as were not dreamed of in England, and only about 35 or 40 miles from Mogador, the country between being almost flat. The state of the iron trade in Europe at present was not such as to encourage the investment of capital, but the ores on the northern slopes of the Atlas range were turned to account on a great scale by the steelmakers of Barrow, by Krupp in Prussia, and by the great French ironmasters, such as Schneider of Creuzot, and they would certainly find a better supply on the southern range. Undoubtedly its copper, iron, silver and nickel were sources of wealth which had been hitherto entirely overlooked. The Chairman asked how he would provide for working the iron. Mr. Rochusson said he proposed to export the ore, not to work the iron there. There was a great deal of copper working in Morocco, the whole of the copper coinage being made of native copper. The ironstone was also worked in the same way as the so-called Roman or Spanish Catalan furnace, which was again similar to the process employed in Bengal. Mr. Grace, having resided in Magador for the greatest part of the last 20 years, said he had noticed considerable improvement in the country during that time, but certainly its mineral resources deserved more attention. There were copper mines within 30 miles of Magador, some of which yielded 40 per cent. of metal, and he had sent home several parcels which had yielded 29 per cent. There were thousands and thousands of tons, but though they had applied several times to the Sultan, and had offered him \$1,000,000 a year for permission to work, or to form a company to work the mines on his account, his answer was always the same—that his fathers had never worked the mines and he would not. Lead ore they had been allowed to export under the name of antimony, for they dare not call it by its right name, and it yielded 80 per cent. of metal of very good quality, but owing to the great expense of transport it did not pay.—*London Mining Journal*.

THE WHITLACH-UNION.—Some day during the present week the work of constructing hoisting works on the old Whitchlach-Union, in Marshall canyon, will be commenced, preparatory to resuming work in the mine. In days gone past, the Whitchlach-Union was one of the banner mines of this district, containing a large ledge of rich ore, but the vein broke and was lost. The break was followed for 1,100 feet without regaining the vein; but, as Lander hill mining has demonstrated that a break perseveringly followed will lead to the vein, the Manhattan company are going to make another trial for the Whitchlach-Union. There is a shaft down on the mine a depth of 200 feet, but no work has been prosecuted therein for four years. The old hoisting works were removed to one of the Manhattan company's mines on Lander hill some time ago, and entirely new works will be erected. The construction of these and the prospecting of the mine involves the expenditure of a large sum of money, but the Superintendent has confidence that the money will be well spent and that the outlay will be returned with heavy interest by the product of the mine itself.—*Reese River Reville*.

TRANSPLANTING SKIN.—It is said that a celebrated American surgeon has recently successfully performed an operation which several eminent European surgeons had declined to attempt—that of removing an unsightly birthmark from the face of a wealthy Gothamite, and transplanting white skin from the arm of another person to take its place.

The Cheapening of Sewing Machines.

It is a matter for general congratulation that the future price of sewing machines will be but half of that which has been their cost hitherto. This will place these useful implements in the hands of hundreds who could not afford to purchase them at the old prices. The *Call* says: No event of the year has occasioned such general rejoicing as the expiration of the last patent on sewing machines. There is not a well-regulated family in the land where the machine is not a welcome visitor, and but few families, with the means at their disposal to make a purchase, that are not provided with one. But then, again, there are thousands of poor women in the land to whom the machine was a forbidden luxury so long as it sold at a price so high as to place it beyond the possibility of their reach. To this class \$40, \$60, \$80 and \$150 is a small fortune. Only the poorest machines could be obtained for the first-named figure—that is, of the kind of machine needed for general work—but it was as impossible to attain to the minimum as the maximum sum, and the fingers were compelled to perform, by the slow process of hours, labor which the machine manipulated in a few minutes. Now, it is asserted by those familiar with the subject, that machines of the finest finish can be manufactured and sold at a profit for \$25 and \$30. This will bring the machines of plainer construction down to \$10 and \$15, and render it possible for many a poor woman to own one.

But if the great masses of the people are rejoiced at the prospective reduction in prices, not so the former patent-holders and manufacturers. There are two establishments in the country that have been turning out the machines on a large scale, in one of which it is said \$12,000,000 are invested, and in the other \$8,000,000. These factories had their agents, who employed traveling solicitors, and between the two from \$20 to \$50 were divided in commissions, according to the quality of the article sold. From statistics on file in the Patent Office, it appears that during the single year, 1874, there were 410,000 sewing machines manufactured and sold by the five principal companies in the business in this country, besides about 120,000 more produced by ten other and smaller concerns. Of one kind of machine, nearly 1,000,000 have been sold, and of another 276,000 were sold last year alone.

The gains have been so vast to the manufacturers that they were enabled to pool a million of dollars with which to operate upon Congress to procure an extension of patent; but there was a powerful opposing sentiment, and they were defeated. Those who have accumulated large fortunes from the monopoly can afford to stand back, after twelve years of rich pickings, and let the public at large have a chance to enjoy the benefits of the invention. The loss to manufacturers will be more apparent than real. The bulk of profit was made by middlemen after the machines left the shops. A new scale will be adjusted, and if the manufacturer gets less for his machines than formerly, he will be enabled to make up a portion of the difference in the increase of his sales.

The Ore Buying Business in Colorado.

When the miners of Colorado began silver mining they were surrounded with many difficulties—chief of which was a dense ignorance of the entire subject. It can be truly said that hardly a man in the whole country knew what a piece of silver ore looked like.

When it became generally known in 1865-66 that we were surrounded by true silver-bearing veins of great richness, the natural impulse was to turn to Nevada for information on the subject of extracting the precious metal from the ore. The wonderful success of the Nevada mines excited our people and suggested the wildest and most extravagant dreams of wealth; but when the practical application of the Nevada formula was applied to Colorado ores, there was too often a hitch, which either resulted in total failure or made the production of silver very expensive. The fact at last became patent that Colorado ores were totally different from those of Nevada and required different treatment. Roasting and amalgamation were successfully accomplished but at heavy expense, and the progress made was exceedingly slow.

In 1872, Mr. J. O. Stewart was extracting silver from the ore, using the reverberatory furnace for roasting and pans for amalgamating. Palmer & Nicholls were performing the same operation with the Bruckner cylinder for roasting and barrels for amalgamating. They were paying \$1.05 for every ounce of silver contained in the ore after deducting 35 ounces for mill charges. This gave the miner \$995 currency for 1,000 ounces of ore, and at that time greenbacks were from 15% to 20% discount.

At this time General Marshall made an arrangement with Wells, Fargo & Co. which enabled him to purchase and pay for all the ore in sight at a better price than the miner had yet received. He formed a partnership with Mr. Charles A. Martine, (a man whose acquaintance with Colorado ores began with the beginning, and whose education made it worth something), and the ore buying business began. The ore was crushed, sampled and assayed, and shipped by the car-load to Europe. The time required to complete the transaction sometimes reached

90 days. They paid 85% of the value of the silver contained in the ore, and of course compelled the mills to change their prices, and even then got the cream of the product of the mines. While the concern did not own a jaw crusher, or have a place to put a pound of ore, they were able, with Mr. Martine's certificate attached to a car-load of ore, to make a sight draft for its full value. Their drafts were always "gilt edged." Mr. Bement, then running a Krom concentrator at the old Washington mill, did their crushing for a time, as a matter of accommodation. Afterwards they formed a partnership with Mr. G. W. Hall, who was at that time in the lumber business at the old Georgetown Smelting Company's mill, and had a crusher which he run for the accommodation of the miners. The concern has been moving smoothly and quietly along ever since and makes as little disturbance now as it did the first week of its existence. The miners of this neighborhood have taken \$2,000,000 out of their little office, and, as a general thing, have gone away believing that they had a square deal.

The business of ore buying is now a monopoly. The "honest miner" with a shirt-tail full of ore has eight different places to go and get the money for it, and if he has struck a bonanza and can bring a hundred tons a day, worth a thousand ounces per ton, he would find an ore buyer in every quarter of the town pleased to see him and ready to pay him a good price for every ounce of silver in it.

This is not intended for a puff for any one. We speak of this business because we recognize the fact that the present plan of shipping ore to distant markets has done more for the district and State than anything else. It dispelled at once the distracting doubts about reduction. It gave us, by the correctness of our assays, a standing and respectability abroad which enables us to command all the money necessary to pay for all the ore which we can take out. We think that the parties above named are entitled to that kind of credit which the world cheerfully awards to those men who suggest and lay the foundation of great things. It is with honest pride that we say that a Colorado assayer's certificate attached to a car-load of ore will command the cash in any place in America, England or Germany.—*Colorado Miner*.

Eberhardt and Aurora.

The report of Capt. Frank Drake, on the Eberhardt and Aurora property, White Pine, Nev., circulated among the shareholders, says the *London Mining Journal*, states that the past year has been to the company one of continued prosperity, and few mining companies have so promising a future. The ore extracted during 1876 was 9,328 tons of 13 cwt., and the total cost was \$113,409, or about \$12½ per ton. The ore seam or body extending from the Baxter chamber, the discovery of which was cabled you on January 3d, lies between the first and second levels, and passes on east near the central shaft. They have drifted upon it 50 feet, and still are following it eastward. At times it has looked very promising, but at present it is quite narrow, and not of so good a quality as that passed through a week since. Consequently, with this section of ground so little developed, what they may properly call reserves of ore in the mines at the present time are very limited. The air-compressing machinery and rock-drill ordered of Mr. J. G. Cranstan, Newcastle-on-Tyne, did not arrive on the ground till October 2d. The erection of the machinery occupied some two weeks, and the drills not fairly running before October 20th. After a little practice by the men in working the drills a good degree of progress was attained. The general character of the ground through which they have passed is firm, hard, lime rock, but it generally blazes well and only on occasional set of timbers is required. The size of the tunnel excavation is seven by nine feet; the length of the tunnel completed December 31st was 525 feet; February 27th, 808 feet. Cost of running the 525 feet, \$15,446, or per foot, \$29½. In conclusion he states that no mine was ever opened and its hidden treasures made available without, on the part of the owners, a good degree of faith. His belief in the future wealth of these mines is now certainly in a promising line of promotion to a demonstrated reality. He alludes to these common facts in the business of mining as a stimulus to the patience of all interested, while the deep explorations are progressing, and till their strong hopes are fully realized.

PEELSTICK HILL is a prominent mining point along toward the southern extremity of the great Eureka lode. The name is an old one and it is not the greatest share of the present population of Eureka who know how it came to be thus christened. In the winter of '59-'60, there was an inveterate prospector here by the name of Ben Virgin. Ben's name figures all through the early mining records of this district, and he probably located more claims than any other one man who ever lived in the camp. It was characteristic of him to blaze the trees, marking the boundaries of every new find, and he having made an unusually large number of locations and indulged his propensity for scarifying the trees in a greater degree than usual on the hill under notice, the boys as a take-off on him named it Peelsstick hill, and by that name it has since been known, both in history and law. One of the grandest properties in the district, the Hamburg, is situated on Peelsstick hill.—*Eureka Sentinel*.

Making Money Mining.

Nearly every one recognizes the fact that everything here in a business way depends on mining. While this is so obviously true, we regret to say that we have some among us who seem to lack faith in the business. Years ago we had old prospectors who were afraid of "digging the bottom out of their mines." If they made a sale they acted like one obtaining money under false pretences. Their heaven seemed to be a home in the States, and they looked forward to the time of their departure like a convict in the penitentiary.

Before the stable character of our mines was so thoroughly understood—before deep mining had developed the fact that there is no "play out" to a true fissure mineral vein, there was some excuse for croaking and lack of faith. While it may be true that there is a feverish uncertainty about the business—sudden and unexpected success too often making men loose their balance and act foolishly, still the business will bear the test of severe scrutiny by the coolest head. Compare it with any other calling—even farming, which we like to think of as the foundation of all things—and the miner has no reason to hesitate. We have men who wear themselves out, pinching and starving as they go, and we have the happy-go-lucky restless character who squanders the money when he finds it; but we have another man who coolly and quietly pursues the even tenor of his way with as much confidence as the Granger in his market garden.

The business is all right, but it will not do to try to make it successful by trusting to luck. Good judgment is necessary, and there is a good deal of hard work about it. But we honestly believe that the coal mining towns of Pennsylvania are not built on a better foundation than Georgetown. This fact we are glad to notice is gaining recognition not only at home, where citizens are settling down for life, but among Eastern capitalists, who are making judicious, and therefore remunerative investments in our mines.—*Colorado Miner.*

Tunnel Talk.

This country must have gold and plenty of it. One of the important resources for that important article in Grass Valley mining district. That district will be, some of these days, put in a shape that gold can be mined out cheaply, and at greater depths than are now dreamed of by our most sanguine mining men. A great tunnel will do this business, and in time such a tunnel will be constructed. In the course of a few years a company will be formed which will have for its object the running of a tunnel from somewhere below Forest springs, on Wolf creek, up as far as the neighborhood of the Eureka ledge, a distance of some three or four miles. Such a tunnel would drain an immense area of most valuable gold bearing quartz ledges, and would make it profitable to work what is now considered low grade ores. The immense expenses of pumping, growing greater every year as fuel grows scarce and as the mines increase in depth, would become comparatively trifling through that tunnel. The work of running such a tunnel will not be a work of such magnitude that plucky men need hesitate to undertake it. The improved rock drills of the day would make quick work of it, and for the most of the year water power could be used to drive air concentrators which would drive the drills. Just now we have no idea as to how the drainage tunnel company would get any pay for the work, and doubtless the necessities of the case will, in time, suggest something upon which arrangements for "pay" can be made. This tunnel could have lateral branches under Osburn hill and under North Star and other hills. The number of mines the tunnel would keep at constant work, and profitable work, is up in the thousands. Some practical man, with a long and level head on him, who can get the necessary capital to back him, will inaugurate the needed and valuable work we have suggested.—*Grass Valley Union.*

LIXIVIATION A SUCCESS.—From Mr. Holdredge, an attaché of the Ural company's mill, at Lone, who was in town yesterday, we learn that the leaching process has proven a success in the works with which he is connected. The works now reduce five and a half tons of ore per day, which give an average daily yield of \$500. The capacity for leaching is not equal to the crushing capacity of the mill, and on this account the stamps are only run 12 hours a day, while the leaching works are run the entire 24. It is the intention to increase the capacity of the entire works to 12 tons per day, to which end force pumps have been ordered from the East. The object of these pumps is to force the leaching liquor up through the pulp in the leaching tanks, and thus obtain a more rapid and thorough lixiviation. The ores from the mines of the Ural company contain a considerable percentage of gold, and to save this, the pulp is amalgamated on shaking tables after the silver is taken from it. Mr. Holdredge also informed us that Col. Raymond is energetically working his mines at Lodi. These are base-metal mines, and the ore is sacked and shipped to San Francisco, via Wadsworth. Ten tons is the average daily shipment, and the ore ranges in value from \$150 to \$400 per ton.—*Reese River Reville.*

USEFUL INFORMATION.

Portland Cement.

A writer in the *Polytechnic Review*, in the course of an essay on cements and artificial stone, has the following: "The English Portland cement, which has acquired a world-wide celebrity, is an artificial production, the special features of the manufacture of which are the following: Chalk and clay are ground together in water; the fine particles are floated away to other vessels and allowed to settle as a paste, which is thereupon collected, molded, dried, burnt, and finally ground. Again, there are certain porous, earthy, disintegrated rocks, which are found to be capable of cementing with lime in the natural state; that is to say, they do not require any preliminary preparation by burning as do the ordinary clays, it being simply necessary that they should be finely ground, in order that a thorough incorporation with the lime may be effected. These natural cements are generally of volcanic origin. The so-called pozzuolana and the trass are the best known of these deposits, both of which have been used from very ancient times. The pozzuolana, occurring on the coasts of the bay of Bayal and Naples—a species of volcanic conglomerate or tufa—was known on account of its cementing properties to the Romans, and by them largely employed. Vitruvius and Pliny both describe it, and state that it was mixed with an equal quantity of burnt lime for building under water. The same substance is very largely employed in the same manner at the present time. Trass is the technical name applied to the immense deposits of volcanic ashes, or tufa, occurring in the valley of Broll, not far from Bonn, on the Rhine, and almost identical with the other deposits of quite equal magnitude occurring at other places throughout the once active volcanic district on the left bank of this river, known collectively as the Eifel. The material was first utilized by the Romans upon their first conquest of Germany, and is still quarried upon an immense scale. It is ground in stamping mills, of which there is a number in the immediate neighborhood of the openings, and is brought into market in the form of fine powder. When required for use it is mixed with lime, to which sand is generally added. When the materials are all of good quality, equal measures of the powdered trass, lime, and sand make an excellent hydraulic mortar."

A New Process in Sugar Making.

It is stated that a new process for clarifying cane juice without the use of lime has been successfully tried by Mr. Eastes, the inventor, at the mill of Mr. Dart, of Indorocopy, in Queensland. The principles of the process have not yet been divulged. The canes are, however, ground in the usual manner, and the juice allowed to run in the clarifiers; here Mr. Eastes' operations commence, the invention consisting in the treatment of the cane juice with certain chemicals which materially alter the color and viscosity of the liquor, the increase in the quantity of molasses attendant upon the use of lime being avoided. At the trials the freedom of the liquor from glutinous matter was particularly noticed, the liquor feeling quite warm to the hand. When the liquor ran from the clarifying box to the cleaning battery, it boiled with a clear white foam upon it, and scarcely any skimming took place. Less steam was needed for boiling in the vacuum pan. In a report given by the *Queenslander* it is stated that a perfect crystal of large size was formed, and that had there been sufficient liquor to fill the pan the crystals would have been of an unusually large size. The curing was soon disposed of, the liquor—not molasses—running away to the tank after leaving a basket of 1,788 pounds of beautiful clear white sugar perfectly dry in three minutes. It is also stated that the green tinge of the sugar as ordinarily made from the same cane is entirely removed. The density of the liquor was 10° Beaume. It has been suggested that the clarifying agent is hypochlorite of sulphur, but Mr. Eastes asserts it to be perfectly innocuous, and that it might be partaken of in the form in which it is employed; it is also stated that there is no probability of the sugar deliquescing. One of the most important points is that the liquor running from the vacuum pans as a vehicle for the sugar is not molasses, but purely crystallizable liquor, which requires no further clarification, and can be returned, after heating, to the pan, where it is entirely converted into sugar equal to the first, and not, according to the *Queenslander*, a particle of molasses made. If the reports upon this process are true—and at present we have no reason to doubt them—Mr. Eastes' invention is one which will largely revolutionize the manufacture of sugar.

PATENT RIGHT NOTES.—A rather important decision was made in the United States District Court at Cincinnati, a few days ago, says the *Scientific American*, involving the standing of notes given for patent rights. Pennsylvania was, we believe, among the first States to enact a law requiring that such notes should bear upon their face the words, "given for a patent right," further providing that notes so distinguished shall, in the hands of any third parties, remain subject to all the equities between the original parties. The same law was subsequently enacted in Ohio and other Western

States for the purpose of stopping the frauds which have been from time to time committed by patent right dealers upon innocent and unsuspecting farmers. In the case heard before Judge Swing, at Cincinnati, the defendant offered to prove that he had been defrauded, and insisted that he was not bound to pay the note, and claimed that the present owner of the note, who bought it before due, was bound, under the Ohio law, to permit such a defence to be made. Judge Swing, however, took a different view, and pronounced the Ohio law unconstitutional, saying in substance that the insertion of the words, "given for a patent right" is no protection to the maker, and of no force whatever. He decided this upon the principle that such a law impaired the value of patent right property, a species of property created by the Constitution and laws of Congress, and as such entitled to all the protection given to any other property, and not properly the subject of individual discrimination. The Indiana courts have decided the same way.

MATERIAL FOR SHIPBUILDING.—The existing troubles between Russia and Turkey and the unsettled condition of other European powers growing out of these hostilities have already created a demand upon this country for timber suitable for shipbuilding, and the agents of several foreign powers are in New York for the purpose of purchasing such timber. The *Iron Age*, says: Two cargoes were recently shipped to France, and it is said that more has been purchased for Great Britain. But little live oak timber is in the market, the Government having nearly all of this timber stored at the various navy yards, amounting in the aggregate to about 1,200,000 cubic feet, though much of it is decaying for want of suitable places in which to preserve it. The usual method of preserving this timber is by submerging it in wet docks, and we have not a sufficient number of such docks to contain it; therefore the timber has to remain in the open air, and, in many instances, not even a shed covers it. Vast quantities of other timber, such as white oak, walnut, pine, etc., also lay exposed to the weather at several navy yards, and much of it is already unfit for use on account of being so exposed. Live oak timber, which is most used in shipbuilding, is cut in the winter, but does not become seasoned for a year or two.

INVISIBLE INK FOR POSTAL CARDS.—The *Deutsche Illustrirte Gewerbezeitung* proposes the general use of what may be called "postal card ink," for messages which are sent on such cards, or otherwise unsealed. A solution of nitrate or chloride of cobalt, or chloride of copper, mixed with a little gum or sugar, produces a "magic ink," which is made visible by warming, either by holding against the stove or over a burning match. Potassium ferrocyanide in solution may also be used; but this requires a developer, for which either copper or iron sulphate may be employed. With the former the writing will appear in brown, and with the latter in blue color.

TO PRESERVE THE NATURAL COLORS OF DRIED PLANTS.—The following method of doing this is given in a German pharmaceutical journal, and will interest botanists and others: Dissolve one part of salicylic acid in 600 parts of alcohol, heat the solution to boiling in an evaporating dish, and draw the whole plant slowly through it—prolonged exposure discolors violet flowers; shake off any excess of liquid, dry between blotting paper, and press in the usual manner. A frequent renewal of dry blotting pads, particularly at first, is desirable. Thus treated, plants are said to dry rapidly, furnishing beautiful specimens which retain their natural colors in greater perfection than by any other process.

GOOD HEALTH.

Comfort in Workshops.

The *Iron Age* takes up the subject of health conditions in our manufacturing establishments. The following quotation contains good hints: "In the summer time the greatest discomforts are the heat and too much sunlight. Awnings, shades, screens, curtains and other things of the sort that tend to the comfort of the workmen also greatly tend to the production of better work, and are of themselves quite inexpensive. Fans and blowers, where power is obtainable, pay their cost many times over. A workman cannot do his best, in a hot and stagnant atmosphere, and it is useless to expect it. A blower like Root's, or any of the positive displacement blowers, takes but little power and is much better on many accounts, than the centrifugal fans which are too often arranged merely to churn the air over and over again. Fresh air blown into the room is a great advantage, and in many instances this can be done at no great expense. Workshops are often made very uncomfortable on account of low ceilings, or low roofs upon which the sun beats down, converting the room beneath into a furnace. Sometimes this can be remedied by roof tanks, sometimes by a false roof on top, or, in other cases, by a space between the roof and the ceiling of the room below. In mills where there are furnaces, water screens are a great advantage, and should not be omitted. These are among the more important, and things that come to mind, and those which appeal directly to the workmen. There are many other things which do not make

as much show, nor appeal to the workman as strongly, but which tend to health and comfort, and which should by no means be omitted. Clean floors and clean walls are very important as affecting health, and should be looked after more generally. In many kinds of manufacturing much dirt is necessarily made, walls and ceilings are soon blackened, and, unfortunately, are allowed to remain so in most cases. We call to mind some workshops of this character where the whitewash brush is used frequently and the walls kept white and clean. The result is that everything about the place seems to be fresh and cheerful, work goes on more easily, cleanliness of the rooms seems to induce cleanliness of person, and there is a greater self-respect among the workmen in consequence, while the advantages to health are by no means inconsiderable.

Exercise for the Teeth.

M. L. Holbrook, M. D., in the *Herald of Health*, says: "There is very little doubt but that the human teeth have become through successive ages of civilization more fragile and liable to decay than is either pleasant or profitable. Just how much of this is due to lack of care and cleanliness, and just how much more to food, no one can tell; but it is evident these causes are among the chief, and it would seem reasonable that man in civilization should do something to prevent it. Now in barbarous tribes of men the teeth are generally sound, and yet a toothbrush and soap is never used, and this may be because their teeth are exercised more by hard food, and cleaned by the abundant flow of saliva which would naturally come from hard food. Man cannot, however, go back to a savage life, so he must contrive means for keeping his teeth so that they shall not decay. That one of these means is the toothbrush and tooth-soap is certain; but is this sufficient? We think not, and believe that exercise is an additional means of toughening the teeth and making them strong. But how are they to be exercised? Surely it cannot be done on soft bread and such food as is too often found on our tables. It may be that the eating of raw wheat would give the proper exercise, and we suggest that it be tried in this way: Each day let the teeth be exercised on a teaspoonful of clean, dry, uncooked wheat. Children become fond of it, and if chewed fine it is very sweet, and promotes the rapid flow of much saliva. Unless swallowed whole it cannot do harm. It must not be supposed that any effect, however, to prevent entirely the decay of the teeth weakened by ages of bad dietetic habits, can in one generation be effected, and so the dentist must for the present be called in to our aid.

"Speaking of dentists, let me remark that a good New York dentist told me the other day that the teeth of boys brought up in New York were much worse than those of country boys. The jaws are smaller, the teeth softer, and not always covered over with enamel. If this is so, it is a great misfortune to be born in a city. But the dentist admitted that if the boys and girls were to chew a handful of raw wheat every day, it would cure the defect, so let us try it. We exercise our horses, why not our teeth?"

Treatment for Cuts.

D. McAlpin writes to the *Builder* as follows: "Take a fine needle and a double thread, (No. 60 to 80), knot it, and sew up the wound immediately after it is cut; do not go deeper than the skin. If anyone can be induced to try this, they will never do anything else for a cut. It requires no wrapping up—just keep it clean. I saw it practiced in the workshop by one of the workmen 40 years ago, and was recommended to try it. I tried it a short time ago and it was quite satisfactory. By exposure to the air, the matter that oozes sets and hardens in a short time."

The editor of the *Builder* notes the above writer is partially correct, but not entirely, for the reason that he overlooks circumstances with which only surgical practitioners, by their large experience, can become familiar. When by a deep cut a small artery has been wounded, the closing up of the skin will not stop internal bleeding, and a swelling, inflammation and supuration may result, which may necessitate the opening of the cut again; therefore, when there is much bleeding, it is better to introduce into the wound at first some lint or its equivalent, and when the bleeding has subsided, then it may be sewn up. We ourselves, during our practice in former years, have had more than one case where a druggist had sewn up a cut, when, after a week of much swelling and throbbing pain, the re-opening of the wound, which had been healed on the surface but not from the bottom, became necessary. Wounds must heal from the inside outward, and as long as the inside is not healed, it is not only useless but a positive harm to close the skin. When, on the contrary, the wound is shallow and only skin-deep, or slightly more, the remedy of our correspondent is correct, and it is much better to sew up the wound with a few stitches than to cover it with a plaster and shut off the access of air, which is decidedly injurious. It is a most hurtful idea that it is good to shut off the air; on the contrary, the access of air must not be shut off; the skin is made to be in contact with the air and it will heal much better without covering, if dirt and dust is only kept out of it.



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Dewey & Co., Publishers.

SAN FRANCISCO:

Saturday Morning, June 2, 1877.

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Cleaning Iron-Amalgam.

In working certain classes of ores it frequently occurs that, under certain not well understood conditions, the iron enters the amalgam when amalgamated in iron pans, making cleaning in the usual way impossible. It seems that the iron does not come from the ore but from the shoes and dies of the pan; otherwise it could not be explained why no iron-amalgam is obtained from the barrel amalgamation, at least never to such an extent as to form iron lumps in the crucible when the retorted amalgam is subjected to melting. This iron-amalgam seems only found in the case of roasted silver ores and raw gold ores. It is very magnetic, and the iron only loosely combined with the quicksilver, so that simple mechanical treatment, such as rubbing or grinding, is enough to separate the iron from the quicksilver, but this is too slow for practical work.

In answer to an inquiry it may be stated that there are several different ways of treating this iron-amalgam, but that described by Mr. G. Kustel is quick, cheap and perfect, and is as follows: A flat-bottomed pan like Knox's is put in motion without any water in it, and a bucketful of sifted ashes introduced. The well strained amalgam is then thrown in gradually, piece by piece, in proportion as it turns into powder. If the mixture assumes a dark color, or if the pulverization commences to go slow, another bucketful of ashes is added, and so on, until about 300 pounds are pulverized, which is effected in about half an hour. The gray, heavy powder is then taken out and another lot of 300 pounds of amalgam managed in the same way, and so on. In case the ashes are moist, a reaction in the mass is observed by the increase of temperature to a considerable degree. After the mixture is finished the powder is allowed to lay for an hour undisturbed, then some water admitted into the pan so as to cover the bottom about an inch deep. While the miller is in motion the amalgam powder is introduced by means of a scoop until about 800 pounds are charged. Water is added, if necessary, but not too much. Quicksilver is generally not required unless the amalgam was strained very hard. After a while the amalgam becomes more liquid by losing the iron, which blackens the water. After an hour's grinding some amalgam is taken out and examined, and if not quite clean another hour will do. A quarter of an hour before the discharge, more water and quicksilver is added—the quicksilver only for the purpose of easier discharge. It is not exactly necessary to work with charges of 300 pounds. If the supposition is correct that the iron comes from the shoes and dies of the pan, then if a certain kind of ore is inclined to form iron amalgam, this could be prevented by omitting the grinding, and in treating raw gold ore the grinding is indispensable, and in this case, if iron amalgam is formed, an addition of ashes to the ore would probably keep the iron from entering the amalgam, as the ashes are the means of separating it. Treating silver ores, this last remedy could not be used for the same purpose, as too much of it would injure the amalgamation.

The Gravel Mining Season.

The recent rain and cold weather in the mountains has been favorable to the gravel miners, tending materially to prolong the water season. The gravel miners will not make so poor a season's work as many persons suppose they will, for although the light fall of snow has made the runs of the large mines comparatively short, they have been under no expense in keeping their ditches open. The ditches supplying water have been running free for the whole winter, and no men have had to be employed to shovel out snow as is usually the case. There have been no heavy slides to carry away ditches or flumes to cause expense, so that although the season is shorter expenses are less than usual this year. The Grass Valley Union says, however, that the open winter has been rather hard on a very large number of the population of Nevada county by depriving them of work in repairing and keeping flumes and ditches in running order. It is said that up on the heads of our big canals the people are pretty hard up for coin just now, having been unable to obtain work during the winter. However, compensation is likely again to come into that population in the way of summer work. It is very probable that more than one of the great companies owning gravel mines and water ditches will soon begin to construct more reservoirs to be used in saving water. That will employ the men who live in high mountains, they being experienced in such work.

In some parts of the State the season has been so short that the miners have had to stop work, but in the districts where heavy operations are going on most of the claims are still washing. The open winter has led a good many miners to turn their attention to river mining, the low stage of the water allowing them to wing-dam in places where it has been impracticable for many years. As to the quartz miners, the season has been favorable for them in the State, as they had little or no surface water to contend with, and the mildness of the winter has allowed many mines to be worked continuously which ordinarily suspend work part of the time in winter. Altogether the outlook for California mining interests is very favorable.

Day Laborers.

The hard times in the East are driving many people from there to this coast who are in hopes of bettering their condition by the change. The emigrant trains are coming in every day and it is becoming a difficult question what to do with all this extra population. The majority of them are almost destitute when they arrive and must find employment immediately. Unfortunately these people are coming at a bad time for us and themselves. We are passing through a season of business depression—not so bad perhaps as elsewhere, but pretty bad for this part of the world—and the dry year, combined with the depression in mining affairs, makes it bad for the laboring people who are in need of employment. A good many of the immigrants coming without any means must become a burden to the community. California, and in fact the whole coast, is overrun with laborers out of employment, and unless they have a little money to make their labor productive those intending to come had better stay where they are for the present.

The truth of the matter is that just now there are more laborers here than we know what to do with. People with small capital to go into farming, fruit raising, mining or any other business are all very well, and the more of this class who come the better; but laborers who come in hopes of getting employment will find it pretty hard times. Over in Nevada there is a large class out of employment who find it impossible to get anything to do; and in California it is much the same. In this city, where most of the people come, there is more distress from lack of employment than most persons imagine, and the increase of population seeking work of course makes matters worse. Fortunes are not to be made here in a day any more than in any other part of the world, though many think the contrary; and capital is just as necessary to get into business as it is anywhere else. Our climate is better for poor people than the East, as the winters are not so severe, but employment is scarce just now, and it is no place for people to come without means at present. Those who intend to settle in agricultural pursuits will find plenty of opportunity, provided they have some means, but farms are not given away here any more than anywhere else, and it takes labor to make them pay. What we want most is capital to develop our resources; labor is now more abundant than is desirable.

The Suto Tunnel.

Considerable interest is now being taken in the progress of the Suto tunnel, as it is advancing quite rapidly towards the Comstock, and is only 2,800 feet east of the workings of the Savage mine. At the date of the last measurement the total length of the tunnel was 16,913 feet. The Enterprise is authority for the statement that the tunnel has, during its progress thus far, cut twelve separate and distinct ledges, yielding assays from \$2 to \$20. One of them was 112 feet in width; yet not a foot of prospecting has been done in either side of the tunnel. These statements are of interest as showing the immense lateral extent of the Comstock deposits. Other ledges may yet be struck by the tunnel in its course, any or all of which may be worked on the completion of the tunnel when they have time to turn their attention to mining.

At present, of course, the whole energies of the company are directed to putting the header along as fast as possible, so as to get at the Comstock. There is not so much opposition to the project as formerly among the mine owners and property owners of Virginia and Gold Hill, and it is conceded that the tunnel will save great expense in draining the mines. Still they object to the two dollars per ton royalty on ores; but if it is proved that the tunnel will drain and ventilate the mines, they can afford easily to pay that sum without grumbling. The projectors of the enterprise have shown indomitable pluck and energy in carrying out the plan amid so many difficulties, and even if the tunnel is not constructed as it should be, as some aver, there will be plenty of opportunity to enlarge, strengthen and improve it, when the Comstock is reached and funds are more plentiful.

MECHANICS' INSTITUTE ELECTION.—The regular ticket for this election, which takes place June 4th, 1877, is as follows: H. L. Hutchinson, scale maker (of Fairbanks & Hutchinson); George F. Allard, civil engineer; L. L. Blake, blacksmith, (of Baker & Hamilton); Columbus Waterhouse, wheelwright (of Waterhouse & Lester); James Duffy, manufacturer white lead and paints (of Whittier, Fuller & Co.); P. B. Cornwall, President Black Diamond Coal Mining Company; Henry S. Smith, machinist (Aetna Foundry). Polls open at the rooms of the society from 12 M. to 6 P. M., and from 7 P. M. to 9 P. M.

THE PIONEER MINING Co. are prospecting the ground in the old Galloway ranch, Sierra Co., by boring to strike the channel, instead of sinking a shaft. The machinery now on the way will bore an eight-inch hole. When everything is favorable a shaft will be sunk. If the boring machinery is economical, this is a good way to prospect such ground.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

The incline station at the 1900-foot level of the Ophir is completed.

Preparations are being made for cross-cutting on the 1700-foot level of the Bullion.

They are laying the foundation of the hoisting works in the Watt mine.

The last clean-up of the Eureka (G. V.) was 175 ounces of amalgam.

A letter from the Empire (Idaho) says: Mine is improving daily. As soon as I can get the mine open, which will take 30 or 40 days, it will produce large results. I will, in the meantime be able to pay more than current expenses out of ore taken from the drifts.

Chollar turned out 637 tons of ore last week, averaging \$24.20 per ton.

From the Manhattan word came that during the last 14 days, ending Saturday night, May 19th, the mill reduced 267 tons, the assay value of which is \$44,667.76. At the Curtis shaft the stope on the 474-foot level has increased its yield of ore considerably, and nearly all the ore being worked at the mill comes from this stope.

The Superintendent of Con. Virginia in his weekly letter says: The ore breasts on the 1400-foot level are looking exceedingly favorable. On the 1500 level the drift south from the shaft has been reopened 40 feet. We expect to reach and ventilate the south ore body on the level below by the end of the coming week. On the 1550 level the ore breasts continue to look favorable. The work of enlarging the south drift and main air passage is being continued. We are now engaged in running a new drift from the south drift at the southern point of our ore body. Its course is south and east of our present ore stopes. A well-defined east wall has now been reached in this locality. A winze will be sunk from this drift to ventilate the east side of the ore body on the level below. Connection was made to-day with the winze connecting this level with the 1650-foot level. On the 1350-foot level the ore breasts are opening out very favorably.

The Golden Chariot mine is sending to mill 40 tons of ore per day, assaying \$86 per ton.

They are getting out high grade ore from the Paymaster lode of the Martin White company; an assessment was levied this week.

The 1000-foot level, south drift of the Justice, continues very promising and yielding a very fair class of milling ore. The full width of the ore body is yet unknown, as there is ore on either side of lateral drift. In due course of time a drift will be started to explore the full width.

Gold Saving Apparatus.

Mr. D. Beaumont, of Sacramento, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency, an improved apparatus for saving the fine particles of gold, silver, mercury and sulphurets, which are contained in tailings and loose earth. The improvement consists in combining with a mining sluice or flume, two branch sluice-ways, each of which leads to a vertical penstock, the lower end of which terminates in a tank of quicksilver. The branch sluices are arranged so that either one can be closed so as to direct the material which is passing down the sluice or flume, alternately into one or the other, for the purpose of cleaning up. A tank for containing clean water is mounted above the branch sluices, so that clean water can run through the closed sluice for washing and cleaning the accumulated material. The lower end of each penstock terminates in a box or cavity which is partially filled with mercury, so that when the material which enters the penstock has accumulated to a sufficient height, it will be gradually forced down into and through the mercury so as to rise in the box outside of the penstock, and be carried away down the extension or lower sluice which leads from the box. During its passage through the mercury, the fine particles of gold, mercury and amalgam, contained in the tailings and earth, will be brought into intimate contact with the mercury and amalgamated, while the lighter portion will be carried away down the overflow sluice. The sulphurets being heavier than the water or earth will also accumulate in the box upon the mercury.

In operation the boxes or receptacles will be partially filled with quicksilver and the tailings directed into one of the branches by closing the entrance to the opposite one; the tailings will then be conducted into the penstock, where the column of water will force them down under the mercury so that they will pass through the openings below the penstock and rise to the surface of the mercury in the box outside. During the passage of the tailings through the mercury the fine particles of gold, etc. will be amalgamated and be retained in the bottom of the box, the sulphurets will collect on the surface of the mercury, and the worthless material will pass off down the tail-race.—As before stated, one box can be kept at work while the other is being cleaned up.

The trial of John Paul on a charge of stealing bullion from the California mine was concluded at Virginia last week. He was acquitted of grand larceny.

The Ball Steam Stamp.

During the past 20 years many attempts have been made to improve the crushing machinery for working the ores found so extensively in this country, and the application of steam to accelerate the velocity of stamp batteries, has received a large part of the attention given to the various modes of improvement. In most cases where steam has been applied to operate the stamp, the stamp stem has been arranged to pass into the steam cylinder and form the piston-rod, the valve for admitting steam to the cylinder being operated by a cam or other arrangement connected with the stamp stem and almost without an exception the batteries so arranged have proved a failure. Stamps of from 200 to 400 pounds weight, with from two to four heads in a battery, has been the size generally adopted in these experiments.

The Ball steam stamp herewith illustrated, was first introduced into the gold mines of North Carolina, where they worked successfully until the mines were exhausted. More than 20 years ago, two heads of the Ball steam stamps were erected for crushing copper ore at the mines of the Copper Falls mining company, Michigan, and they have been successfully operated to the present day. Many improvements have since been made in the Ball stamps, increasing their efficiency and durability.

A stamp of the smallest size and latest pattern was in Annex No. 3, Machinery hall, at the Centennial Exposition, where it was shown in operation occasionally during each day, its capacity being 15 to 20 tons of ore, when using the finest screens. In the accompanying figures, Fig. 1 (see page 337) is a perspective view of the No. 5 or smallest size stamp, and Figs. 2 and 3 are front and side views of the No. 1, or largest stamp.

The permanent foundation is composed of several courses of timbers, the top course being shown at A A. The course below this are made up of similar timbers, each row alternating in direction. Spaces are left between the timbers which are filled with concrete, making the foundation more solid and protecting the timbers from decay. B B are two cast iron sills, having broad bases which rest on the top of the foundation and support the whole of the upper part of the stamp. The sills are secured in position by bolts which pass from them down through to the bottom course of the foundation timbers. C C are two wooden sills on which rest the wooden sills, E E, which carry the two vertical posts, F F, to which the principal part of the machinery is bolted. The bed plate, G, and mortar, H, are carried on the spring timbers, I I, which are independent of the sills, C C, and E E, and which are elastic to a certain degree.

Upon the center of the bed-plate, G, stands the mortar, H, which is held in position by guides which work in the ways a a; these permit a vertical motion to the mortar when the timbers, D D, spring back after each blow of the stamp. The lower portion of the mortar, H, is circular in form, the upper portion being oblong, with a flat top and vertical sides; on the front and back sides are inclined openings for receiving the screens. The mortar is cast in one piece, and is lined throughout with hard iron linings made of a mixture of the hard irons. I I are two feed hoppers bolted to the top of the mortar and through which the ore is fed. J is the water urn through which the water is admitted to the mortar. K K represent the screens, which are secured in the inclined openings in the front and back sides of the mortar. L L are hoppers for the discharge of the crushed ore and water. M is a pipe for conveying water to the mortar. N is an iron frame bolted to the posts, F F, and having two boxes, O O, through which the stamp shaft, P, works. A revolving clamp and pulley, Q, having feathers which work in splines in the shaft, P, is turned by a belt giving a rotary motion to the stamp, both during its ascent and descent.

The stamp-shaft, P, is round, and, in the small machine shown, is four inches in diameter, the other four sizes having shafts five, six, seven and eight inches diameter. The shaft is made of wrought-iron and is finished all over; it works in the boxes, O O, and passes downward through the water-urn, J, into the mortar. The lower end of the shaft is enlarged to form a head, to which the stamp-shoe is keyed. The stamp-shoe is made of the same mixture of iron as is used in the linings of the mortar. They vary from six to seven inches in thickness, and, instead of being made cylindrical, have two flat, parallel sides. The width of these, for the several sizes, varies from six and a half to 14 inches, and the length from 10 to 22 inches. The die is a frustrum of a cone, from six to seven inches thick, and the upper surface is always a little larger than the largest diameter of the shoe. The upper end of the shaft has a circular flange, to which the bonnet, R, is bolted. The steam-cylinder, S, is bolted to the check-pieces, T T. The piston-rod, U, passes downward through the bunter-beam, V, into the bonnet, R, where it is held between rubber springs, which prevent any shock to the piston-rod or piston when the stamp strikes the ore in the mortar. A rubber spring in the bunter-beam, V, arrests the upward motion of the stamp and piston when too much steam is admitted into the cylinder. By this arrange-

ment, the danger of knocking out the upper cylinder head is avoided. The steam-chest, W, contains a common slide-valve, which admits the steam to the cylinder. In order to produce a quick downward movement of the stamp-shaft, the eccentric, e, by the intervention of the elliptical gear-wheels, e e, is given an increased velocity in that part of its revolution when the steam is admitted to the upper end of the cylinder, admitting the steam at full pressure and forcing the stamp down much quicker than it would fall of its own weight. The lower end of the cylinder is counter-bored, so that if the workmen neglect to feed the ore in sufficient quantity and allow the shoe to come too close to the die, the motion of the piston is arrested before it goes so low as to knock the lower cylinder-head out, and before it can again be started, the piston-rod and stamp-shafts have to be lifted to their proper positions. The valve is operated independently of the motion of the stamp by a belt on the pulley, e,

arranged as to always have a quantity of ore on the die, and as the shoe and die wear out the depth of ore on the die increases. The piston and piston rod are further protected from the concussive action by the use of a cushioned connection between the piston rod and stamp shaft, and also by the mechanical construction of the steam cylinder, which does not permit the stamp to continue in operation unless sufficient material is kept in the mortar to prevent the shoe from coming in contact with the die, or the piston going so low as to strike the cylinder head.

With the exception of the power necessary to drive the slide valve and rotate the stamp shaft, the machine is self-acting, the steam cylinder, which is a part of the machine, serving to do the stamping.

In the machines now in use this power is supplied by the machinery adjacent to the stamps, the auxiliary engine being driven by the exhaust steam from the stamp.

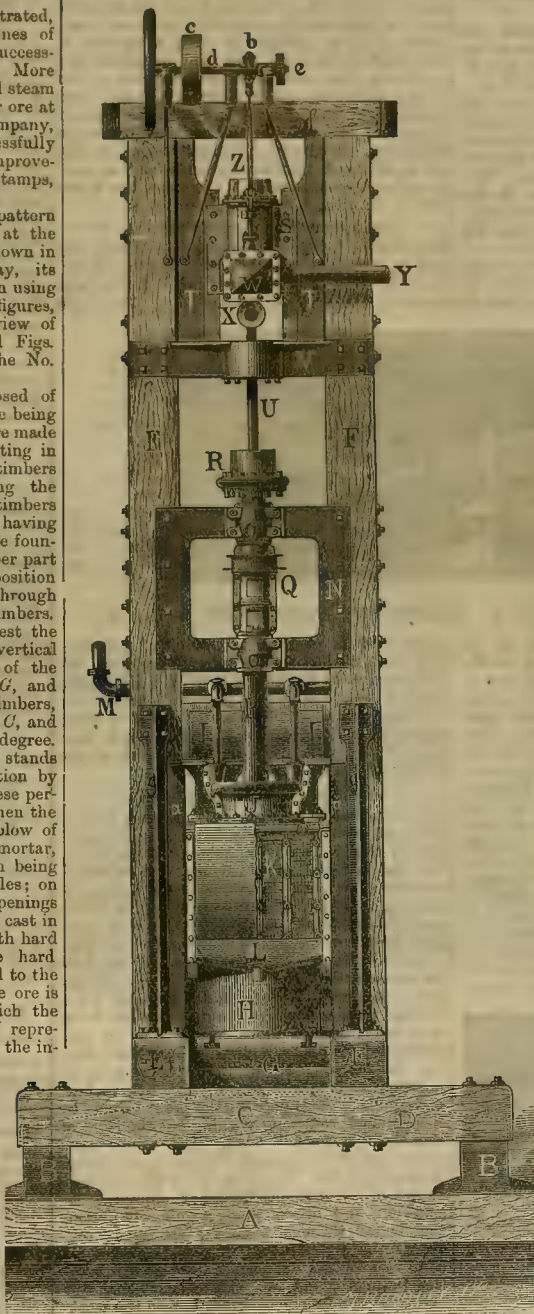


FIG. 2. FRONT VIEW OF BALL STEAM STAMP.

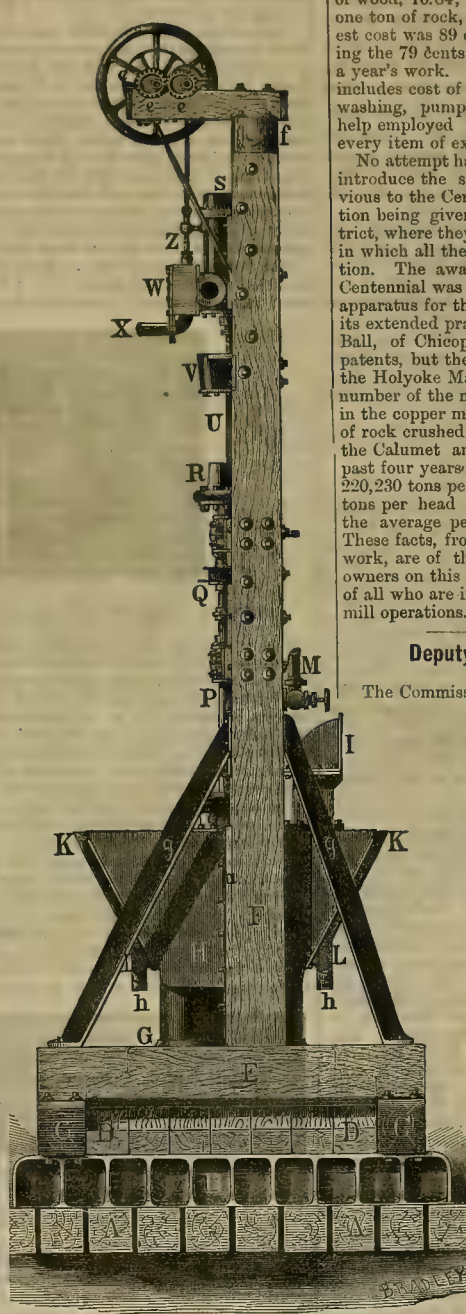


FIG. 3. SIDE SECTION OF BALL STEAM STAMP.

necessitating a small amount of power from an auxiliary engine. Power from the same source is also necessary to turn the stamp shaft by means of a belt on the pulley, Q. The diameter of the steam cylinder in the small machine shown is six inches, and having an extreme lift of 18 inches. Steam at a pressure of 70 pounds per square inch is sufficient to drive it 120 strokes per minute, the power necessary being about eight-horse to crush from 15 to 20 tons of copper ore per day to coarse sand, or the same amount of gold or silver ore to the required fineness.

The largest or No. 1 size, has a steam cylinder 12 inches in diameter, and 28 inches extreme stroke. The stamp shaft and shoe weigh 4,500 pounds, and when run at the rate of 90 strokes per minute will, it is claimed, crush an average amount of 120 tons per day of 24 hours.

In the construction of the machine a great deal of attention has been given to the important point of rendering the working parts as free as possible from the shock due to the concussion of the stamp, and has been provided for by placing the mortar on spring timbers, which are disconnected from the frame carrying the cylinder and other parts. To prevent the crystallization of the stamp shaft, the machine is so

The small space occupied by the machine, in proportion to the amount of work done, is a point very much in its favor. Two of the large size stamps, having a combined capacity of 240 tons a day, occupy a room only 20x40 feet, while drop stamps, having the same crushing capacity, require from two to three times as much room, and also require many more cubic feet of foundations.

A very important consideration in the working of all stamps, is that relating to the wear of the stamp shoes and dies. We are told that the practical use of the Ball stamp has demonstrated that in this respect they show a marked superiority over the ordinary drop-stamp when working upon similar ores.

All parts of the machine show careful workmanship in their construction, and where extraordinary wear is likely to take place, special materials have been used to withstand it.

These stamps are used very extensively in the copper region of Lake Superior, for crushing the copper ores found there, and of the many mines using them, the most prominent is the Calumet and Hecla mining company, which runs six heads of the Ball stamps, and crushes 800 tons of ore per day. When sending these stamps to localities with which there is no com-

munication during the winter months, it is customary to send with them a duplicate set of piston rings and sometimes an extra piston rod.

Boys are generally employed to run the stamps and men to feed the ore. When all of the conditions have been the same, the inventor informs us that the cost of stamping with the Ball stamps has been about thirty per cent. less than that of other stamps.

As a matter of interest to those who desire to know something of the details of the work done by this machine, we condense from a tabular statement, extending through the year ending December 31st, 1875, the cost of working three heads of these stamps at the Pewabic mine, Lake Superior. Number of cords of wood used in the year, 5,332½; tons of coal used, 70; cost of wood, \$20,044.47; cost of coal, \$420; cost of supplies—oil, packing, belting, etc., \$3,772.06; cost of foundry bills, \$2,021.68; cost in wages, \$19,950.37; number of days running, 281½; tons of rock crushed, 58,942; tons crushed per cord of wood, 10.84; cost of stamping and crushing one ton of rock, average, 79 cents. The highest cost was 89 cents and lowest 68 cents, leaving the 79 cents as average. These figures cover a year's work. The cost of stamping as given includes cost of fuel, lighting mills, all repairs, washing, pumping, water, used in operations, help employed in stamping and washing, and every item of expense connected with the mill.

No attempt has been made by the owners to introduce the stamp battery on this coast previous to the Centennial exhibition, their attention being given to the Michigan copper district, where they have built very extensive mills, in which all the machinery was of their invention. The award given this machine at the Centennial was "excellence of machinery and apparatus for the purpose intended; permitting its extended practical application." Mr. E. P. Ball, of Chicopee, Mass., is proprietor of the patents, but the machines are manufactured by the Holyoke Machine Co., Holyoke, Mass. A number of the machines have been long at work in the copper mines in Michigan. The amount of rock crushed by six heads of the stamps of the Calumet and Hecla company alone for the past four years was 880,920 tons, an average of 220,230 tons per year; 734.1 per day, or 122.35 tons per head per day. For the year 1874-5, the average per head per day was 133 tons. These facts, from actual experience and daily work, are of the greatest interest to our mine owners on this coast, and worthy the attention of all who are interested in economy in mine or mill operations.

Deputy Mineral Surveyors.

The Commissioner of the General Land Office has issued instructions to Surveyors General, calling their attention to the fact that Section 2,324 of the Revised Statutes of the United States authorizes the appointment only of competent surveyors. The Surveyors General are instructed that when in the discharge of their duties they become convinced that a deputy who has received an appointment is incompetent or careless in the discharge of his duties, they will promptly revoke his appointment. They must require each deputy mineral surveyor to enter into bonds, with two or more sureties, in the sum of \$10,000, for the faithful performance of his duties in the survey of mining claims under the mining statutes.

The fact of these "instructions" having been issued, would naturally lead one to suppose that the Commissioner had reason to believe that deputy surveyors who were incompetent or careless had received appointments. The order puts a "flea in the ear" of the Surveyors General, and is a mild hint for them to be more careful in their selections of deputies for the future. It is no more than right, however, that the Commissioner of the Land Office should do all he could to insure the appointment of efficient deputies, as to these deputies is given the actual practical work on which a great deal depends. If they are incompetent or careless, they can make a great deal of trouble for the future, as their surveys, when incorrect, can involve companies in litigation. Great care should be exercised in the appointment of deputy mineral land surveyors for these reasons. The authorities of the Land Office, before whom many disputes, as to boundaries, etc., come, no doubt have seen more of the evil effects of having incompetent deputies than any other persons, hence these instructions, which one would have supposed to have been well enough understood beforehand by Surveyors General. As they themselves may have been careless in their appointments, however, they are now reminded of their duties and, perhaps, delinquencies in this direction.

A HINT.—Old worn-out blankets covered with calico make very good comforters.

New Mexico.

[Written for the Press by F. M. F. CAZIN, M. E., Bernardino, New Mexico.]

Its Climate, Population, Trade, Mineral Resources, Etc.

The new State of Colorado is with its import trade dependent on the Eastern States, with the single exception of fresh fruits, which are imported from California. Its export, with no exception, goes east. In Utah Territory an inclination towards the west is visible, but can hardly be called effective. Thus the "ne plus ultra" line is reached there for San Francisco trade. Further south circumstances are more favorable to an extension of this trade further east, and the next coming years will decide whether the Rio Grande valley will trade in future times predominantly east or west. Arizona may, by the opening of the Southern Pacific railroad to the Colorado valley be considered as conquered for San Francisco, and the extension of this road to the Rio Grande before, from the north, either the Denver-Rio Grande (narrow-gauge), or the Kansas Pacific, or the Atchison, Topeka, Santa Fe would come in, would accomplish the same for New Mexico. The sympathies of the native population go all south and west, and those of the immigrant element go where their interests are best fostered. By all natural elements San Francisco and California are as able to become the place of import and manufacture for the Western half of this continent as New England is for the Eastern half, unless the anti-Chinese policy prevents the adoption of any cheap labor. But even with such policy, cheap labor may be secured in cultivating a close relation with the Mexican population of this Territory, offering a first-class element for cheap and good labor.

It remains then to be seen whether the Territory of New Mexico also deserves by its natural resources the attention of the

San Francisco Trade

And of Western railroad men. After traveling over and staying in this Territory now for 17 months, I decidedly answer the question with "yes," and the reasons therefor are: New Mexico is favored by a climate superior to any as yet known for salubrity, stock raising and agriculture, the latter in part with assistance of irrigation, which is feasible. It possesses a native population of 120,000, offering cheap labor in a natural and incontestable way. The geological formation of what part is mountainous is favorable to the production of fine and base metal, and the plains to a large area of coal. All of these minerals have been discovered to great extent in area and in quantity, but have as yet not been developed, with a very few exceptions, to any extent.

As to Climate.

The fact is well known that the elevation of the whole Territory above sea level is from 5,000 to 6,000 feet in the plains. The air is dry, curing meat in the sunlight, and mummifying bodies exposed without burial. Putrefaction is nearly impossible under the influence of air, wind and evaporation. It therefore is but natural that tubercular diseases are causing a lower rate of deaths in New Mexico (8%) than in any other State or Territory of this continent, it being 5% to 6% in the Southern States, 14% in Minnesota and 25% in New England. I may further quote an expression of R. W. Raymond with regard to the climate of New Mexico, who certainly could not be easily prejudiced, having seen so much of both the East and West of this continent. He says: "The climate of New Mexico is mild and healthy, the sky is clear as that of Italy, and the air transparent and pure. In fact the very act of breathing in this country makes existence in it a pleasure." (Report for 1871.) If for any thing as yet New Mexico is appreciated, it is its stock-raising facilities, equaling those of Southern California, so I may dispense with specifying them.

Agricultural Resources.

In this journal it may not be appropriate to enter into the details of agriculture and horticulture, but it may be stated that wheat, barley, oats and corn yield, under irrigation, as well as on the mountain slopes without irrigation, very large crops. To the better initiated it may be remarked that the Mexican corn has eighteen rows of grains to the ear, and that on land not irrigated. I measured them fifteen and sixteen inches long on an average. Underground vegetables grow to marvelous sizes in general. In the production of grapes and wine the Rio Grande valley could compete with the Los Angeles district in California, if there was not a narrow limit as yet for the sale of both. The naturalized grapes produce a heavy and aromatic wine, but as yet its manufacture is in its earliest childhood.

The Native Population.

Though comparatively numerous, is to-day (to judge by the nearly innumerable ruins of villages and towns met with wherever there is space for the plow and water for irrigation) but a small fraction of what it once was. As causes for the decrease, must be designated, first, the tyrannical treatment by the Spaniards of the Pueblo Indians; the only tribe of the red race which built towns, tilled the soil, manufactured cloth and lived in permanent communities and under statute government and law. A war of

extirpation was fought between the two races, the Spaniards and Pueblos, in the second half of the seventeenth century. A common stratagem of the Indians, favored by the natural quality of the ground, consisted in conducting the water of their springs so as to make it sink and disappear and then to cover the spring, so as to keep the Spaniards from repopulating the towns they, the Indians, had to leave. Then came, as the second cause, the immigration of Indian races of a worse class and their continual uninterrupted depredations on the inhabitants, not as yet fully exterminated, but now lessened and restricted to remote parts. As a third cause of diminution of population or of non-increase, must further be quoted the concentration of ownership of desirable lands in the hands of a small number of families—a state of things fostered considerably by the Mexican system of land grants. The "landed aristocracy" exercised a despotism over the plurality—considered as their peons—more atrocious than slavery, and only lost its worst feature during the civil war.

Up to date, the lower class has derived but little advantage from the free institutions of this country; because, for lack of knowledge, by habit, by blind devotion to the Catholic clergy, they exercise their right of voting, as they are bid to do, and if they disobey, "returning boards," on a small scale, have settled the matter ever since New Mexico became a part of the United States of North America. This brings us to the last and fourth cause of this country's stagnancy, which consists in the quality of the federal officials who have had the government of New Mexico since 1847.

The last Mexican governor, Manuel Armija, boasted openly, after Louis XIV, "L'état c'est moi" (it is me who is state and law); but in

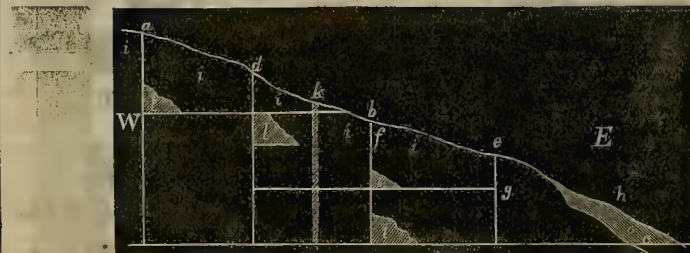


FIG. 2. VERTICAL SECTION OF MONTEZUMA MINE, NEW MEXICO.

practice the Federal officials have put up the same rule. To judge by the numerous details told and asserted by respectable parties, and by what good evidence can be found in public records, in no country was there ever such general pilfering on the public property; such open-faced robbery on hitherto undisputed private property; such audacious perversion of right and laws; such a general whitewashing of criminals for money; such a temerity in persecuting and killing the opposition element; such a wholesale perversion of public lands into private property by falsification of records and documents—in no country but in this has such misgovernment existed with such impunity. This has only been possible, of course, by the connivance of a corrupt official element, and the former "aristocracy," mostly indifferent to the interest of the population in general; ambitious of official recognition and, with a few honorable excep-



FIG. 1. "FAULT" IN THE MONTEZUMA MINE.

tions, as corrupt in money matters as the carpet bag element.

The Approach of Railroads

Has, within the last five years, brought in white immigration, and independent of the official element and this new element is the opposition party. This white element is getting stronger every year, and the departments in Washington will soon be forced to no longer ignore the acts of officials in this far remote Territory.

But, notwithstanding this diminution, a native population of 120,000 affords all the common labor which there may be need of at \$1 per day of 10 hours, and this labor is of a good average quality. The

The Rocky Mountains Cross this Territory From north to south—the north, Colorado, and on the south Chihuahua. The San Juan country on the north, the richest of the whole (not part of Colorado alone, but with its richest parts stretching into New Mexico), and the buried wealth of Chihuahua on the south, making it hardly probable that what is between the two rich ends is alone poor. It is not poor by any means. Wherever attempts at prospecting have been made rich discoveries have resulted. I know villages which, for all that is known, for centuries lived on the gold that was washed within the limits of the village with the water of a spring not filling a one-inch pipe, or with the melted snow in winter time. But there are also large areas showing gold, but not worked at any time yet, of which, at the present moment, the Tierrillo

district is attracting attention and immigration; and others again, where the immigration element has taken hold with greater energy, but which, in order to arrive at the stage of development and production require this element to be strengthened by outside assistance. As one, and I may say the most prominent case of this kind, I may be permitted to describe the most northern but real new Mexican mining district, called the

Bald Mountain Gold Mines.

And its most prominent, because best developed mine, the Montezuma gold and silver mine. Leaving the Union Pacific Railroad at Cheyenne, and following the railroad southward by Denver and Pueblo, the last station is reached at El Moro, and four miles drive brings you to Trinidad, the most southern town of Colorado, situated on the northern edge of the New Mexican coal field, producing a bituminous coal and manufacturing coke. From Trinidad, driving through Batton pass, on the divide of which an old pioneer, Ben Wooden, keeps the tollgate, and now enjoys an idle way of life, (with a wife and pretty children, altogether with a number of stout and sturdy elder sons and daughters) we arrive on the east slope of that part of the Rocky mountains called "Spanish Range," and within sixty miles we will reach the town of Cimarron, the last one south showing Anglo Saxon, or, I might say, civilized origin, because all what lays further south consist of "adobe" (mud brick) construction. Cimarron has a history of its own, because it is the

Center of the Maxwell Grant,

Begotten in fraud and baptized in fraud, and now in consequence of this, all at the same time, honestly recognized by the United States, and honestly in a state of bankruptcy. There are

over the divide to Elizabethtown and the Moreno gold diggings on the west slope of Bald mountain. For four miles up Ute creek then we meet gulch diggings in full activity, but in small claims and without organization, and in constant war for the use of the water of Ute creek. At the head of the gulch is the

Montezuma Mine.

As above mentioned this mine has quite a history, and had it fallen into the hands of American moneyed men instead of being worked by English and Dutch adventurers on a pretended title, this mine would to-day be one of the most prominent producing gold and silver mines on the North American continent. The title of the mine extends over 1,500 feet, of which only the western part, about 500 feet, have been opened. The other 1,000 feet stretch down the mountain slope and can be worked by tunnel as well as the upper part.

A vertical section on the plane of the lode, given herewith, shows the exploration work done on the mine, but gives only an imperfect idea of the successive development. The adit level was run on a parallel spur for a distance of 310 feet, although the lode had been discovered and laid open by the discovery shaft, and the lode has then been followed by level to the surface, 253 feet from the joining point.

At a distance of 401 feet from the mouth of adit level there is a fault five feet wide, throwing the lode 42 feet off its course towards the north, after which the lode continues its true course, which is nearly east and west (8½° north of east by true meridian, or 21½° by magnetic meridian). The slate at the mouth of the tunnel is a large fault (slip) in the granite itself, visible even by the surface contour of the mountain, and has been verified by the Aztec mine sinking into the slate, and as yet not penetrating, as shown in Fig. 1. Fig. 2 is the vertical section of the mine. In this a shows the discovery shaft; b, mouth of tunnel No. 1; c, mouth of tunnel No. 2; d and e, shafts; f, winze; g, drift; h, slate; i, granite walls; r, fault through the lode, 42 feet out of course; l, slopes.

The crevice is on the average two feet wide in the workings, but shows widening out in stretch and depth at numerous places. The average assay will not prove, in all probability, above \$75, but not less, (although soon after the first discovery the Commissioner of the General Land Office, by his report for 1868, received from this mine a specimen showing fibers of pure gold more than two inches long, and assaying \$19,000 to the ton,) although the ore at present worked in arastras paid higher average assays. At the lower edge of the property a permanent creek flows, and the mine has a special water right and mill site; also a privilege for timber and fuel on a large forest. It is timbered and preserved in a splendid way, and will not occasion any considerable outlay to start operations on a large scale; in fact the mine is waiting simply for somebody to take hold of it, and only a portion of the previous outlay on it by the English is asked as purchase price.

Although New Mexico has no mines as yet in the same state of development as the Montezuma, it has many discoveries deserving the attention of men experienced in mining and reduction, and provided with means to see an enterprise through to success. The owners of the Montezuma, as well as of all other discoveries in New Mexico, have no such experience and no such means.

BLOWING UP A MONITOR.—The following details are received of the destruction of a Turkish monitor by torpedoes: "Two young Russian engineer officers attempted to reach the monitor early in the evening with torpedoes, but were discovered and driven back by a heavy fire. At three o'clock in the morning they returned in two skiffs, carrying a chain of small torpedoes filled with dynamite. No lookout being kept aboard the monitor, they securely lodged the chain across her bows. On their return they discharged the whole series of torpedoes by means of an electric battery, and the vessel immediately disappeared." Another account says: "It was one of the most daring deeds ever recorded. Small detachments of Russian soldiers left the northern shore of the Danube in a number of small boats. The night being very dark, they managed to surround the monitor before being discovered. When finally observed by sentinels on board, they were challenged. The Major replied, in Turkish, 'friends.' Not satisfied, they commenced firing in the direction of Matchin, not knowing where the boats came from. During the fight several Russian soldiers plunged into the water, swam silently to the vessel and placed a torpedo in close contact with her bottom. After it had been securely fastened the men returned to the neighboring shore. The monitor was blown into the air and all on board perished."

A WOMAN'S GENEROSITY.—The stream of Mrs. A. T. Stewart's benefactions, says the *Church Union*, instead of ceasing to flow, goes onward, and with increasing volume. She has made donations to fifty-two of our local charities, ranging from \$500 to \$2,500, and making an aggregate of \$74,500, and the intimation comes from Judge Hilton that other charitable institutions, if found deserving, will be made the recipients of her bounty. Since the death of her husband Mrs. Stewart's donations—those of which the public have been informed—have reached an aggregate of about \$400,000.

The road from the town of Cimarron leads to the Bald Mountain gold mines, west, up Ute Creek

Excavating Machinery.

About a month ago we gave an illustration of an excavating machine which we saw at work in Oakland. We pursue the subject on this page by presenting a side view of another form of excavator, in which the earth is emptied from the buckets of the elevating wheel upon a draper running transversely, instead of being discharged into an earth-box, as in the one shown a month ago.

The machine is one that was built for an irrigation company in the interior, and is provided with draper attachments that will enable it to cut a canal from nine to 24 feet in width, and any depth from three inches up to six feet. By working the earth twice over, it will cut a canal 48 feet wide; and by working it three times, it would make a canal 72 feet wide; though for canals of that width a larger machine would be more economical. The machine requires four horses and one man to operate it. A plow 10 inches wide and running from two to three inches deep is used. The following is a concise and accurate description of the excavator, and if read with reference to the cut will be easily understood. The elevating wheel and the other hind wheel are each six feet in diameter. The forward or caster wheel is two feet six inches in diameter. The tire of the elevating wheel is of steel, five-sixteenths of an inch thick by 12 inches wide. Bolted to each of the spokes is a blade of iron eight by 12 inches, which form a series of buckets completely around the wheel on the inside of the tire. The spokes of the wheel are set even with one side of the tire, so that a draper can be projected far enough under the buckets to receive their contents. The buckets, it will be observed, are set obliquely across the tire, so that they will hold the earth till it gets near the top of the wheel. A segmental shield also assists in preventing the discharge of the dirt till it arrives at the apron, or draper.

The plow which throws the earth into the elevating wheel is directly in line behind the "rear" horse, and is so located that it will plow close up to a vertical wall, thus enabling the machine, when used for canals, to make the banks perpendicular, if required, or slope them at any angle. The plow can be set to run at any desired depth, and is easily raised by the handle seen at the left of the driver.

The side-pieces of the carrier frame are iron pipes, the outer half sliding into the other portion like a telescope; there are also screws at the outer end by which the route carrier roller

can be moved out and in, to compensate for the expansion or contraction of the draper. The draper is 30 inches wide and is made of 12-0 duck, the same as that used for making hydraulic hose. It is almost one-eighth of an inch thick. A bevel wheel 24 inches in diameter is keyed on the hub of the elevating wheel, and turns a short shaft leading to the inner draper roller, which being thus caused to revolve, gives motion to the draper or carrier. The draper runs once and a quarter as fast as the horses walk. The picture shows the machine as seen from behind. It is represented to be making a cut or canal through the top of a hill to show the form of the embankments, etc.

The draper is shown carrying the earth somewhat up hill, but it can be lowered in a moment so that the dirt runs down hill, thus assisting to run the draper instead of being carried by it. It will seldom be necessary to raise the draper higher than to a horizontal position, unless for loading carts or wagons.

The driver has little more to do than to drive his team. A little lever is touched, and the plow drops down to its work, requiring no further attention. When it is necessary to stop earth from going into the wheel, raise the plow, and the thing goes along as quietly as a wagon.

Any ordinary man that can drive a reaper will have no trouble with it, for it has no more machinery than the simplest mower. The duties of the operator consist of oiling the bearings, seeing that the draper is kept at the required tension, and that his plow is sharp.

The weight of this machine is nearly 2,500 pounds, depending somewhat on the length of draper used, as it is necessary to carry a little weight on one side of the machine to counter-balance the weight of the draper, and, of course, the longer the draper the greater the weight required. The two hind wheels are four feet six inches apart from center to center.

This machine, like the one we illustrated before, is manufactured at San Leandro, Alameda

county, and the city agency is at the headquarters of the Price Press Company, with Baker & Hamilton, No. 17 Front street.

New Section of Central Pacific Railroad.

The new section of the Central Pacific Railroad, now in course of construction from Oakland by way of the straits of Carquinez to a point between Ellis and Bantas, will be of vast importance in facilitating and reducing the expenses of operation. Practical experience in railroading has demonstrated that it is cheaper, time and cost considered, for a locomotive and train to run three or four miles around than to go half a mile over a grade in excess of 20 feet to the mile. For such reason the great Southern Continental and Mexican railroad traffic which will come and go through the San Joaquin valley, in addition to that of the local section, is to be taken around on the tide water grade line, thereby avoiding the numerous sharp curves and heavy grades of the Livermore hills. The new line, says the Contra Costa Gazette, is slightly longer than that over the Livermore hills, but will be an hour or more shorter in time of travel and not half so expensive in cost of motive power and wear of rolling stock and rails. For the same reason that the traffic of the south is to be provided with a tide water grade line on this side, that of the Sacramento valley and Oregon is to be saved the climb of 90 feet grades of the Suscol hills, over which the Vallejo road is laid. This line will strike the Straits of Carquinez at Benicia, and cross the water on powerful train ferry boats, and between Martinez and Oakland the road on this side will be laid with a double track of the heaviest steel rails, calculated to carry the combined traffic of the North and South that will converge on it,

Supreme Court Decision on the Tax on Mines.

The Supreme Court of the United States has rendered a decision in the case of Charles Forbes, appellant, vs. Thomas Gracey, Consolidated Virginia mining company, J. W. Mackay and J. G. Fair. This was an appeal from the Circuit Court of the United States for the district of Nevada. Mr. Justice Miller delivered the opinion of the Court; Justice Field being disqualified, took no part in the discussion. The statement of the case is that this was a suit brought by appellant to enjoin the collector of taxes for Storey county, Nevada, from collecting a tax imposed by the law of that State upon the property of the Consolidated Virginia mining company, the appellant being a stockholder in the company and an alien subject of the Queen of Great Britain. The tax is by the State statute imposed upon the proceeds of the mine worked by the corporation, and is resisted on the ground that title to the land from which the mineral is taken is in the United States, and is not for that reason liable to State taxation.

Following is the synopsis: Congress has, by statutes and tacit consent, permitted individuals and corporations to dig out and convert to their own use the ores containing the precious metals found in the lands belonging to the Government, without exacting any compensation for those ores, and without requiring the miner to buy or pay for the land. It has gone further, and recognized the possessory rights of these miners as ascertained among themselves by the rules which have become the laws of the mining districts as regards mining claims. But in doing this it has not parted with the title to

plow and work the mine under existing laws and regulations.

In the former case, the United States has no interest to be protected, and the State is at liberty to declare and enforce such a lien for her taxes. In the latter, also, such right as the mining laws allow and as Congress concedes to develop and work the mines, is property in the miner and property of great value. That it is so is shown most clearly by the conduct of the mining corporation in whose interest this suit is brought, which for the purpose of evading this tax, permits its investment in this mine, said to be worth from fifty to a hundred millions of dollars, to rest on this claim, this mere possessory right, when it could, at a ridiculously small sum, compared to the value of the mines, obtain the Government's title to the entire land, soil, mineral and all. These claims are the subject of bargain and sale, and constitute very largely the wealth of the Pacific coast States. They are property in the fullest sense of the word, and their ownership, transfer, and use are governed by laws and are recognized by the States and Federal Government. This claim may be sold, transferred mortgaged, inherited, without infringing the title of the United States. Why may it not also be made subject to a lien for taxes, and be sold to enforce the lien? We see nothing in principle or in any interest which the United States has in the land to prevent it.

Decree of the Circuit Court dismissing the bill of appellant is affirmed.

Soldiers Additional Homestead Entries.

The Commissioner of the General Land Office has prepared, and will issue as soon as they can be printed, an important circular of instructions regarding soldiers' additional homesteads. These instructions will give effect to Secretary Chandler's decisions of March last permitting entries to be made in the following cases:

First.—those presented prior to the order of March 20th, 1876, suspending all entries, and rejected for reasons insufficient in law to bar their reception, but kept alive by appeal, which by such rejection were postponed beyond the date of the order, and so lost. These may be admitted without further formality when again presented at the district office, after the settlement of the question upon which they were originally refused; but the right of the applicant to make entry to be fully inquired into in the final adjudication in Washington.

Second.—Those actually in the hands of agents or attorneys on May 22d, 1876, and still remaining in their hands, but these claims must be forwarded here for consideration, and shall not be accepted by Registers and Receivers for location until returned to the agent with the Department's certificate of entire validity and sufficiency.

The third and last class that will hereafter be recognized, embraces those rights yet remaining in the hands of parties originally interested, which have never been presented for satisfaction, or made the subject of transfer or agency.

Commissioner Williamson requires to secure these rights that a full recital of military service shall be presented to the General Land Office, with the proof of identity of the party making the claim, and detailed reference to his original homestead entry, with name of local land office, date and number of entry, and description of land. He must also file a sworn statement setting forth the facts indicative of his right to take the entry, and declaring that he has not in any manner exercised his right, either by previous entry or application, or by sale, transfer or power of attorney, but that the same remains in him unimpaired. He must also declare under oath that he has fully complied with the homestead law regarding residence upon and cultivation and improvement of his original homestead entry; and he should further recite whether or not he has proved up his claim and received a patent. When these papers are filed and examined, they will, if found satisfactory, be returned with a certificate attached, recognizing the right of the party to make an additional entry under the law, and when properly presented at any land office, either by the party himself, or his agent or attorney, will be accepted by the Register or Receiver and forwarded with the entry papers to Washington in the usual manner.

It is confidently anticipated that these instructions will have the effect of calling in all outstanding rights, and speedily closing up this whole business of additional homestead entries, without leaving room for further frauds or serious trouble.



THE PRICE EXCAVATOR WITH DRAPER.

making it the grand trunk of the entire continental and State system of the Central Pacific company, and a section on which in the not very remote future there will be more traffic than on any other in America.

There are some 2,000 men employed on the construction work of the road, and the number is to be largely increased soon, it being the announced purpose of the company to have its trains running over it in August next. From the junction at the eastern end, to Antioch, the grade is already completed, and the track is being laid on it at the rate of about a mile a day. The grading from Antioch to Martinez involves but little heavy work, but from Martinez to Point Conchal it is heavy cutting and filling all the way, besides the work of driving the two tunnels at the foot of the straits, one of which is 700 and the other 400 feet in length. These tunnels are to be 28 feet wide and 32 in height. The longer of the two, near the residence of Mr. Patrick Torney, is nearly completed, in quite firm rock; the other, through the point of a hill about three-quarters of a mile east of the first, will require timbering all the way through, it is thought, as the formation cannot be trusted for self-support. Most of the grading force is now employed on the tunnels and the points along the Pinole shore, the grade for single track having been already completed through Conchal ridge and the rails so far laid from Oakland. The grading for double track is done as the work proceeds where the material to be moved is sufficient and is to be placed near by; but most of the double track grading, where the earth is to be moved any considerable distance, is left to be done when the single track is laid.

It is said that several large grading parties will be put on along the shore of the straits, between the tunnels and Martinez, this week and next; but the track coming from the San Joaquin will probably reach Martinez before the grading below is ready for it.

the land, except in cases where the land has been sold. If the tax of the State is levied on this property right of the United States, we are bound to hold that it is void. If it is levied on property of the miner, and may be collected without embarrassing the title of the United States to its property, then there is no ground for interference in its collection.

2. It is the ore after it has been separated from the bed in which it is found, and its proceeds and products, which are taxed, and not the ore or mineral in the earth. When this ore becomes detached from the soil in which it is imbedded it becomes personal property, the ownership of which is in the man whose labor, capital and skill has discovered and developed the mine and extracted the ore. It is then free from any lien, claim, or title of the United States, and is rightfully subject to taxation by the State as any other personal property is.

3. In regard to the taxing of this personal property, and the mode of collecting it by sale, it does not appear that the United States has any interest in the tax, or in the sale of the property taxed. The law of Nevada which makes this tax "a lien on the mines or mining claims from which the ores or minerals bearing gold or silver are extracted for reduction," does not interfere with the right of property of the Government in the lands in which the mineral remains are extracted.

4. The words "mines or mining claims" distinguish between the cases in which the miner is the owner of the soil and therefore has perfect title to the mine, and those in which the miner does not have title to the soil, but works the mine under what is well known in the mining districts and what is recognized by the act of Congress as a mining claim. In the first case, the statute makes the tax a lien on the mine, because the title to the mine is in the person who owes and should pay the tax. In the other, the tax is a lien only on the claim of the miner; that is on his possessory right to ex-

An English Straw-Burning Engine.

As the threshing is near at hand, notes of threshing machinery are timely. We have formerly given illustrations of engines made by Pacific coast and other American inventors, and to make information on the subject of threshing engines more complete, we present on this page an engraving showing an English machine, which has been introduced on this coast, and thus demands attention. The illustration gives a good idea of the engine, and it is plain that its general characteristics are strength and symmetry of form and design. It is from the manufactory of Ransomes, Sims & Head, of Ipswich, England, and this firm is represented on this coast by Mr. E. L. Ransome, 10 Bush street, San Francisco.

To describe the engine which our illustration shows, we shall quote from an address which Mr. John Head, C. E., read before the British Associated Institute of Civil Engineers. Mr. Head is one of the inventors of the engine, and his claims for it may thus be learned:

"The expansion engine here illustrated are manufactured from six to ten-horse power with single cylinders, and from ten to 30-horse power with double cylinders. The proportion of the steam generating power of the boiler to the cubic quantity of steam required in the cylinder to develop the maximum power at the normal speed has been carefully considered; and from a variety of experiments it has been found that the consumption of fuel in these boilers does not exceed more than about four pounds of coal per effective horse power per hour.

In designing the boilers the main object has been to obtain the greatest amount of evaporation from a boiler of moderate dimensions, and about eight pounds of water may be reckoned as the average evaporation by one pound of coal in the boiler illustrated on this page. The usual proportion of heating surface is, 15 square feet of tube surface, .60 to .75 of grate surface and 2.75 to three square feet of fire-box heating surface, per nominal horse power. These boilers are manufactured of the best brands of English plates, and the riveting is almost entirely performed by hydraulic machinery, which does not destroy the fiber of the iron in the rivets so much as hand riveting. The average working pressure of steam in these boilers is from 80 to 90 pounds per square inch, and they are tested with hydraulic pressure up to 160 pounds per square inch. Both the barrel and the outer fire-box are covered with felt lagging through out, which prevents radiation and tends greatly to economize fuel when the engine is at work in the open air during cold or damp weather.

The engine proper is placed on the top of the boiler. The cylinder is jacketed throughout, and the valve chest is accessible for repairs, not only from the front but from the top, which enables the slide face to be filed and scraped when worn without taking the cylinder off the boiler.

The crank shaft is carried on two cast iron brackets, firmly bolted on to the cylindrical part of the boiler.

These brackets are stayed to the cylinder by means of two strong wrought iron stays, one end of which is bolted to the top of each bracket, which is elongated so as to make it the same height as the cylinder, and the other ends are attached to strong lugs cast on the cylinder. These stay rods—which are screwed up when the boiler is hot, so as to compensate for the expansion—bind the whole of the working parts of the engine most firmly together, and prevent any of the vibration which is so often felt in portable engines when they are doing the maximum amount of duty.

In the general arrangement, the principle of moderately high piston speed, with a medium diameter of fly-wheel, has been preferred to a long stroke and slow speed with a larger fly-wheel. The reason why this system is adopted is, that the motion of the engine at a high speed is more uniform and is not liable to be so easily affected by the sudden shocks to which all small engines are exposed. The average piston speed is from 280 to 300 feet per minute; the number of the revolutions of the fly-wheel from 140 to 150 per minute; and the speed of the periphery of the fly-wheel varies from about 2,000 to 2,500 feet per minute, according to the size of the engine. All the bearings of the crank shaft, connecting rod and piston rods, are large and of great length, thereby distributing the strain over a larger surface than is theoretically required.

The apparatus for feeding the straw, reeds and other fuel into the fire-box, as shown in the cut, consists of two toothed rollers placed at a minimum distance of about one-fourth of an inch apart, and capable of rising so that the distance between them can be increased to one and one-fourth inches. The under roller is set in motion by means of a strap from the crank shaft of the engine, and makes about 45 revolutions per minute. The upper roller moves at the same speed, and is connected with the under one by means of long-toothed wheels. The rollers are

carried on a cast iron frame, to the front of which is attached a trough for holding the supply of vegetable fuel to be fed into the furnace. The rectangular space between the rollers, which serves as a passage for the fuel into the boiler, is placed from four to five inches above the fire bars, this distance having been found by experience to give the best results, as by injecting the fuel at this point the fresh substance forces its way into the center of the burning mass inside the fire-box, and ignites more quickly than when it falls on to the top of the fire. The theory of the invention is, that by means of a continuous mechanical feed, the fuel can be forced into the furnace in a thin stream in the form of a fan, and the fresh fuel is practically held in suspension for a short time, allowing the separate stalks to become immersed in the flames, and the long pieces of straw, reeds or brushwood to have the effect of stirring up the half-burnt material in the furnace, thus keeping the whole in motion.

Reception of the Microscopical Society.

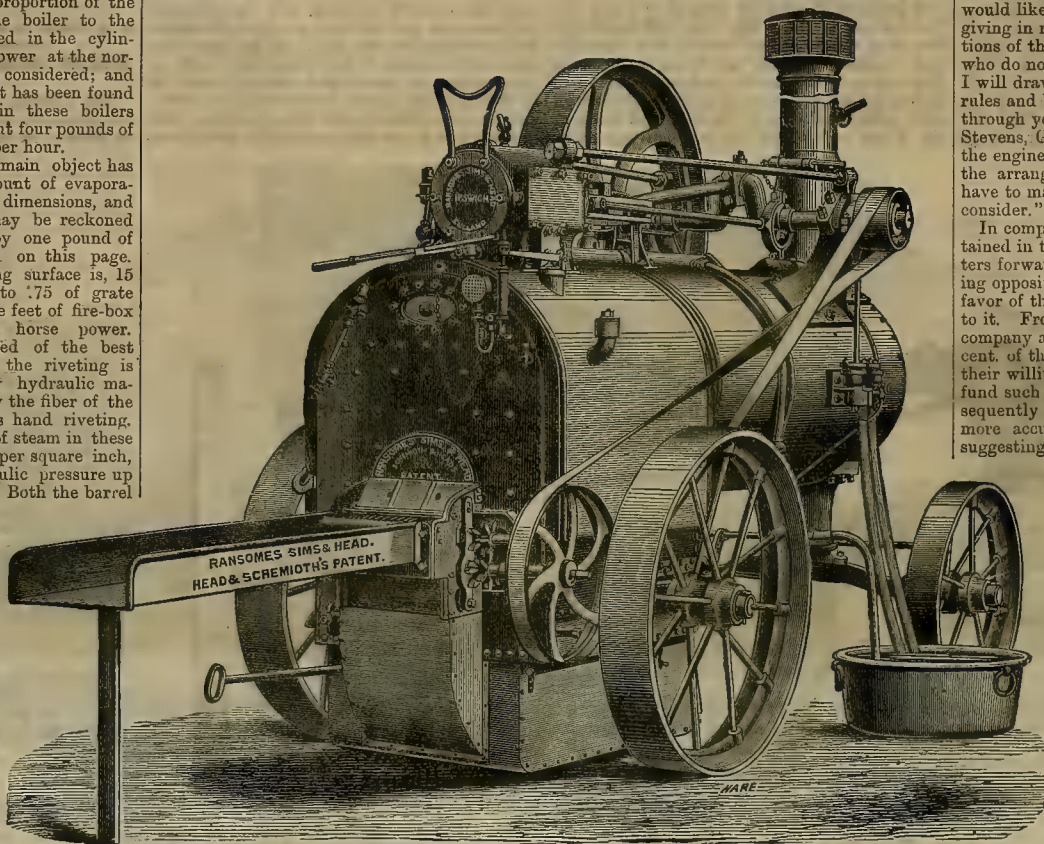
The fifth annual reception of the San Francisco Microscopical Society was held on Thursday evening, May 24th, at Mercantile Library Hall, and was well attended by the invited guests of the members. A programme was arranged of those objects for each of the exhib-

from his marine aquarium as *Parypha crocea*, *Laomedea amphora* and *Laguncular repens*.

Mr. H. K. Moore favored those present with some of the most interesting forms of diatoms, and also spicules of gorgonia, displayed on a dark field.

Mr. C. Mason Kinne selected for his exhibit the respiratory organs of insects, plants and shell-fish, for the purpose of comparing the methods in which different orders managed to breathe.

Mr. W. F. Meyers displayed several whole insects, the one attracting the most personal interest being a flea. Mr. G. H. Williams exhibited mounted proboscis of blow-fly, and other parts of the same insect. Dr. S. M. Mouser, in his exhibition of the circulation of blood in the mesentery of a frog, united with the natural showing of the red and white corpuscles, attracted his share of attention. Dr. S. W. Dennis, in the sulci of several human teeth, showed plainly the normal condition, and incipient and advanced caries of those organs. Dr. E. H. Woolsey gave an idea of the structure of the human skin, and also how the fungus of a skin disease played havoc with the tissues. Dr. J. W. Winter had something to say of odontology, with interglobular spaces, sulci and secondary dentine shown in sections of teeth prepared by himself. Rev. J. H. Wythe, M. D., indulged in a fine showing of minute anatomy, and drew upon the brain, spinal cord and nerves for sub-



ENGLISH PORTABLE STRAW BURNING THRESHING ENGINE.

itors to present, most of the slides being selected from specialties cultivated by the members. Twenty-two fine microscopes were placed on the tables about the room, most of them first-class instruments, and as the guests moved about from one table to the other the gentlemen in charge explained the objects exhibited.

The President of the Society, Prof. Wm. Ashburner, was at the first table, with vegetable structure, of which, perhaps, the most interesting was a leaf of the insectivorous plant known as *Drosera rotundifolia*, with its tentacles and other parts. Darwin's exhaustive researches into the habits of this plant have made it world-wide, and it was a fitting introduction to the vegetable tissues shown by Mr. C. W. Banks, which had been double stained for the purpose of better defining their structure. Other objects of a similar nature were exhibited by this gentleman, as opportunity offered, though most of the members found that their three objects well explained, were all they could get through with to advantage.

Vegetable tissues—polarized, formed a beautiful series of objects, shown by Mr. X. Y. Clark, and the starch grains, redwood bark and raphides took a new interest in the minds of all, as the polariscope added its efforts to the natural beauty of the most useful kingdom in nature, the vegetable. Mr. E. J. Wickson continued in vegetable structures, showing the relative position of the exogens and endogens, and supplemented by the anatomy of a leaf. The pollen of rose and hairs of *Deutzia scabra*, by Mr. G. L. Murdock, and varieties of the cryptogamia, in the way of ferns, fungi and algae, by Mr. J. Z. Davis, brought us in natural sequence to some of the lower living forms, which were finely shown by Henry C. Hyde, Esq. The protococcus and diatoms, which were motile, were almost animal in their popular characteristics of locomotion.

Mr. J. A. Langstroth also favored the audience with living objects, in the way of such animals

jects. Mr. John Hewston, Jr. had, perhaps, the most beautiful exhibit of the evening, though not tending so much toward the general diffusion of knowledge as some of the others. Polarized light, when applied to such chemicals as salicine, resucine and platino-cyanide of magnesium, cannot fail to draw out the enconiums of all lovers of the beautiful. Mr. Melville Attwood, not being able to attend, Mr. W. H. Lent exhibited Mr. Attwood's slides of rock sections from the Comstock lode, as well as his own marine objects. Mr. J. R. Scupham, in minerals, had some crystals of native gold and silver, as well as copper. Dr. A. Mead Edwards told something about the formation of coal, and showed a series of objects from carboniferous deposits, embracing Newcastle coals, fossil pines, and recent pine wood.

NO UNDERGROUND GAS.—A dispatch from Washington says: An official letter just received from a high Government officer on the Pacific coast asserts unreservedly and earnestly that constantly accumulating deleterious gases in the Comstock mines generated from the hot water found at present at the great depths of working, bid fair soon to compel the abandonment of work on the lode, unless relieved by a speedy connection with the Sutro tunnel. This statement was so impressive that Mint Director Linderman sought an interview with J. W. Mackay on the subject, but failed to meet him, as Mackay had already left for Europe, remaining only one night here. Another dispatch referring to the above says: The reported letter from a Government official on the Pacific coast about the existence of dangerous gases in the Comstock mines has no foundation in fact. W. H. Patton, Assistant Superintendent of the bonanza mines, says there are no gases of any description generated by the hot water in the mines; the present system of ventilation by means of drifts and winzes works satisfactorily.

An Accident Fund for Railroad Hands.

On the 7th of March last the following circular, addressed to the Division Masters of the Central Pacific Railroad Company, and signed by A. N. Towne, General Superintendent, was issued from the main office of the Central Pacific Railroad Company in this city:

"I have given the subject of a Mutual Aid Society much thought and consideration, and I am satisfied that great benefits would grow out of a society of this kind. Through our assistance it could be formed by all classes of train, engine and yard men in the service. I would suggest that each member should contribute a given amount—say one dollar—to the family, or nearest relative, in case of the decease of any member by injury while in the discharge of his duty. The same amount to be contributed to the person directly when, in case of accident, it may become necessary to amputate a limb—say an arm, leg, hand or foot. The collection of contributions and the disbursements could be made through the officers of the company, thereby saving the members any expense that would naturally attend an individual organization with salaried officers, rent, etc. I am so much impressed with the advantages the unfortunate would derive from such a plan as this, that I desire you to confer by letter, or, preferably, in person, with all the train and yard men in your division upon the subject, noting any suggestions or objections they may have to offer. I would like you to send me a list of all your men, giving in ruled columns the names and occupations of those who favor such a plan and those who do not. Should it meet with general favor, I will draw up a plan for an organization with rules and by-laws, and submit it to you and through you to the men. I will write A. J. Stevens, G. M. M., and ask him to ascertain if the engine men would not be glad to come into the arrangement. Any suggestions you may have to make I will be pleased to receive and consider."

In compliance with the request or order contained in the above circular, the Division Masters forwarded the list of men under them, noting opposite their names whether they were in favor of the proposed organization or opposed to it. From the General Superintendent of the company a reporter learned that fully 95 per cent. of the train and yard hands had signified their willingness to contribute to a mutual aid fund such as designated in the circular. Subsequently another circular was issued defining more accurately the scope of the society and suggesting the mode of collecting dues, which was to be accomplished through the intervention of the company's paymaster. In this second circular the company agreed to pay from its treasury, in each and every instance in which an employee was entitled to the benefits of the society as set forth in the circular, the sum of \$100.

It was asserted after the issuance of this second circular that the C. P. R. Co. had an ulterior object in view in starting the Mutual Aid Society, and that through its workings they expected to escape the necessity of paying damages in case of injury to, or the loss of life of an employee while in their service. The proposition or agreement of the company to pay \$100 in all cases in which members of the society would be entitled, to its benefits, it is claimed by some,

would by the statutes of this State annul the right of a disabled man to sue in the court for damages, and would debar his family from going into court to recover anything in case of his being killed. It was also stated that employees of the company had been advised to sign the roll under penalty of dismissal in case of refusal. The officials of the company deny that there was any coercion used, or that any is contemplated, and Mr. Towne, with whom the proposition originated, states that if the men have any fear of the gift of \$100 from the company affecting their legal rights, the obnoxious offer will be withdrawn, as it was simply made as a benevolent offer. If the society were formed and all the train and yard men joined it, the sum to be paid to any one entitled to its benefits would be nearly \$2,000. The proposed society is not an original idea, there being several other railroads whose train employees have organized for mutual benefit, being prompted thereto in a great measure by the fact that all insurance companies regard all risks of that nature as extra hazardous.

HARD times in Russia. In St. Petersburg and vicinity, 90,000 artisans are destitute; at Moscow, 40,000. The distress among the lower classes is increasing, apparently. The commercial crisis, numerous failures of banks and mercantile houses, the closing of factories, the discharge of a multitude of clerks, and a recent inundation, which destroyed whole villages, have done the work.

THE engineers on the Lehigh Valley railroad held a large meeting on the 27th ult. at Phillipsburg. The proceedings were not public, but it is apparent that there will be a strike, if one has not already been determined upon. It is understood that the company, anticipating trouble, are making arrangements to meet it and to prevent interference with the running of trains.

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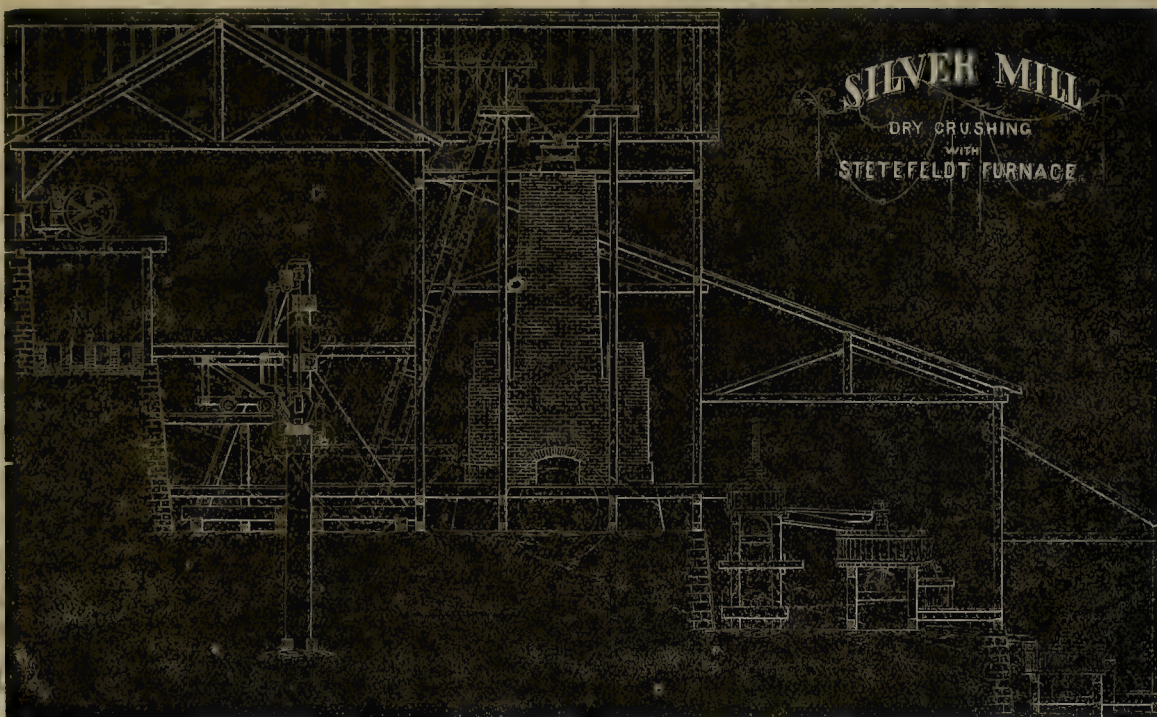
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Pumping—Pumping Engines, Single or Double Geared, Direct Acting, either Horizontal, Inclined or Vertical, Compound and Condensing with Variable Cut-off, or Davy's differential Valve Motion of all sizes, from 18 in. diameter of Cylinder up to 120 in. diameter of Cylinder.



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Compressors—In use at Utah, Sierra Nevada, Consolidated Virginia, California, Gould & Curry, Savage, Hale & Norcross, Imperial, Justice, Baltimore Consolidated, Virginia Water Works, Grass Valley, Soulsby's Mine.

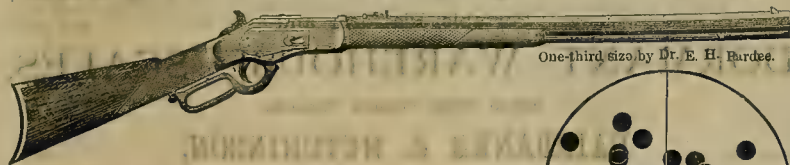
Hoisting Engines—In use at Sierra Nevada, Ophir, Consolidated Virginia, California, Gould & Curry, Savage, Hale & Norcross, Raymond & Ely, Belcher, Caledonia, Meadow Valley, Justice, Baltimore Consolidated, Rock Island, Florida, Grand Prize, New Coso.

Pumping Engines—In use at Utah, Raymond & Ely, California, Florida, Gould & Curry, Hale & Norcross, Overman, Lady Washington, Baltimore Consolidated, Rock Island, Combination Shaft.

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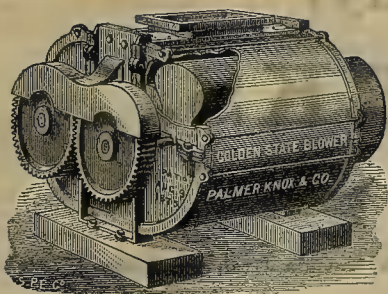
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DATES OF PATENTS:

September 14th, 1869, October 5th, 1869, October 4th, 1870, May 9th, 1871.

WARNING TO INFRINGERS:

The U. S. and Foreign Salamander Felting Company hereby notifies, cautions and warns the public—and particularly engineers and proprietors of Steam Machinery—that their patents for “ASBESTOS BOILER COVERING,” having been fully sustained by Repeated Decisions in the U. S. Courts, all infringers will be duly prosecuted.

Some of the more important of the above mentioned decisions were against the “ASBESTOS FELTING COMPANY, of New York,” and parties USING THEIR MATERIAL. Pamphlets containing full accounts of these and other cases will be furnished on application. It must be remembered that those USING an infringement are as liable to prosecution as those manufacturing and vending it.

All parties on this Coast, having used the

“ASBESTOS FEETING,” (of New York,) and MERRILL’S SO-CALLED “STEATITE FELTING,” (Which analysis shows to infringe in nearly every case), or any other infringing material, are hereby notified that they will in time be called upon for ROYALTY and DAMAGES; but are at the same time CAUTIONED against paying such royalty or damage to any but the authorized agents of the

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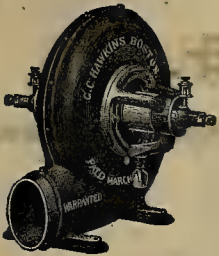
Mr. A. S. Halliday.....	San Francisco, Cal.	Dredging Pump, Morey &	Rising Sun M. Co.....	Colfax, Cal.	Empire State Mill.....	Virginia City, Nev.
New U. S. Mint.....	do	Dennison.....	Capt. J. Parker.....	Randolph, Oregon.	Winfield Mill.....	do
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Palace Hotel.....	do	Steam-yacht Elaine, S.	Revenue Cutter, Resguardo,		Nevada Mill.....	do
Occidental Hotel.....	do	Menzies.....	Mexican Government.		Parkes's Mill.....	do
Lick House.....	do	Steam-yacht, John Eckley,	New Almaden Q. S M Co...Cal.		Railroad Mill.....	do
Electric Power Co.....	do	proprietor.....	Golden Chariot M. Co.....	Idaho.	Overman S. M. Co.....	Gold Hill, Nevada.
D. A. MacDonald & Co.'s	do	Steam-tug, Jos. H. Redmond	Sperry's Flour Mills.....	Stockton, Cal.	Belcher M. Co.....	do
Mill.....	do	do	Providence M. Co.....	Nevada City, Cal.	New York M Co.....	do
Pacific Rolling Mills.....	do	do	W. H. Patten, construct-		Caledonia S. M. Co.....	do
Mr. B. P. Bruner.....	do	do	ing engineer.....	Virginia City, Nev.	Crown Point G. & S. M.	do
Royer's Belt Factory.....	do	do	Con. Virginia G. & M. Co.,		Co.....	do
Marden & Co., Bernard &	do	do	Jas. G. Fair, Supt.....	do	Lady Washington S. M.	do
Co., Spice Mills.....	do	do	Ophir S. M. Co., S. T. Cur-	do	Co.....	do
Chas. C. Bemis, Supervis-	do	do	tis, Supt.....	do	Kossuth M. Co.....	do
ing Insp. Steam Vessels..	do	do	C. & C. Joint Shaft.....	do	Dayton M. Co.....	do
Golden City Chemical Wks.	do	do	Julia Con. G. & S. M. Co..	do	Belcher & Crown Point	do
Bush & Milne, plumbers..	do	do	Chollar-Potosi S. M. Co...	do	Pump Shaft.....	do
Marcus O. Hawley & Co....	do	do	Ward M. Co., F. M. Thayer,	do	Justice M. Co.....	do
Kimball Agr'l Man'g Co...	do	do	Supt.....	do	Succor M. & M. Co.....	do
Phelps Manufacturing Co...	do	do	N. Con. Virginia M. Co....	do	Trench Mill.....	do
South Point Planing Mills,	do	do	I. F. Thompson, construct-	do	Petaluma Mill.....	do
C. A. Hooper & Co.....	do	do	ing engineer.....	do	Pacific Mill.....	do
Planing Mill, H. F. Williams	do	do	Combination Shaft.....	do	Douglas Mill.....	do
Evening Post, newspaper..	do	do	Imperial M. Co.....	do	Pioneer Mill.....	do
Kimball Manufacturing Co.	do	do	Sierra Nevada M. Co.....	do	Honolulu Iron Works....	Honolulu, H. I.
National Brewery.....	do	do	Savage M. Co.....	do	Ice Works.....	do
The "Hamman".....	do	do	Bullion M. Co.....	do	Sam. G. Wilder.....	do
Cubery & Co., printers....	do	do	Pacific M. & M. Co.....	do	T. H. Davies.....	do
Wheat's Flour Mill.....	do	do	Territorial Enterprise.....	do	A. W. Pierce & Co.....	do
Mr. Millen Griffith.....	do	do	California Stamp Mill.....	do	Castle & Cook.....	do
McNally & Hawkins.....	do	do	California Pan Mill.....	do	Kaalaee Plantation.....	Oahu, H. I.
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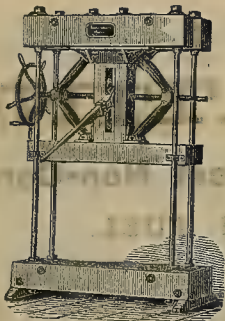
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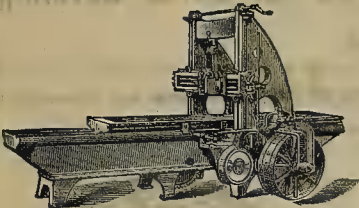
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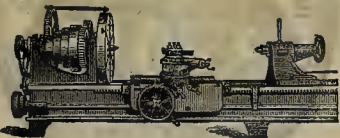
Hawkins' Blowers and Exhaust Fans.



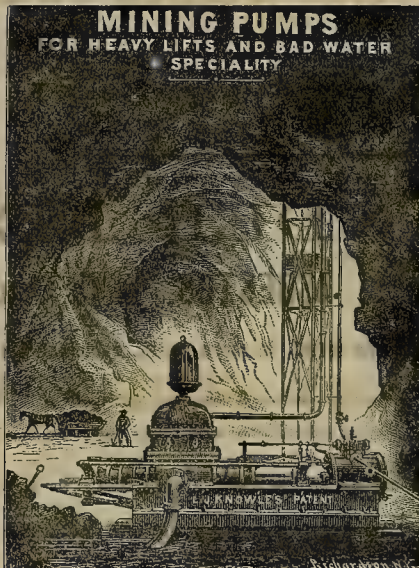
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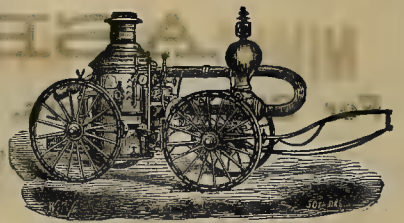
Ferris & Miles' Steam Hammers.



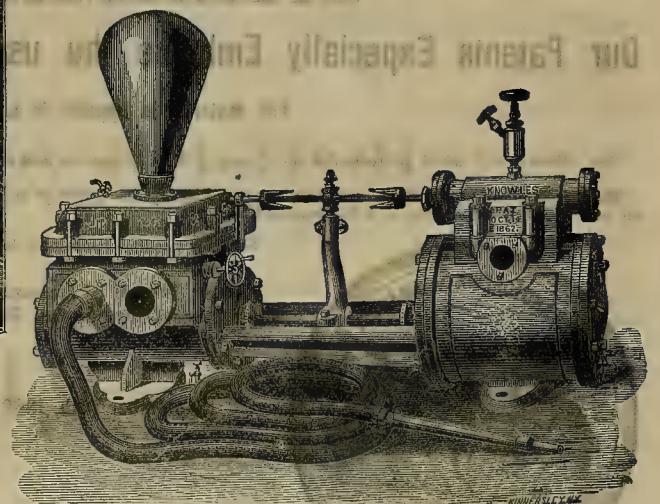
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A. L. Fish & Co., Agents for Knowles' Patent Steam Pump,

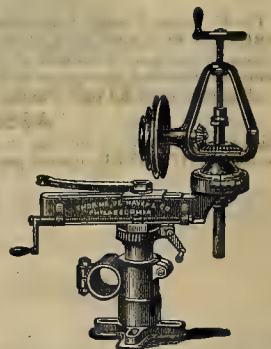
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A. Caldwell, Superintendent.

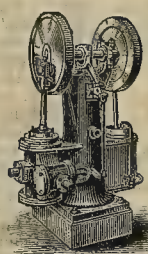
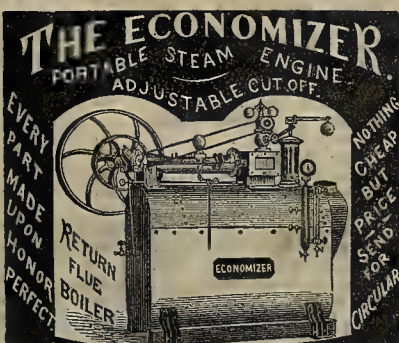


Union Rock Drill.

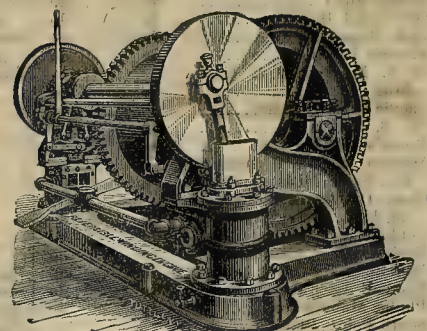
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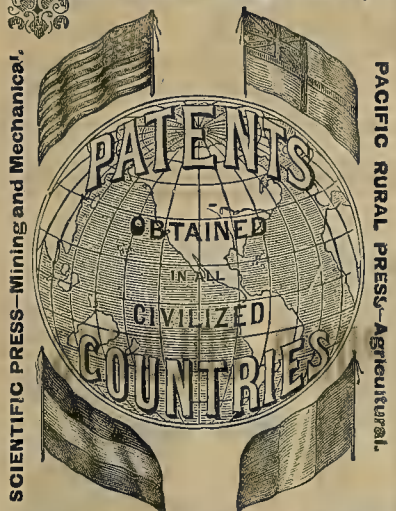
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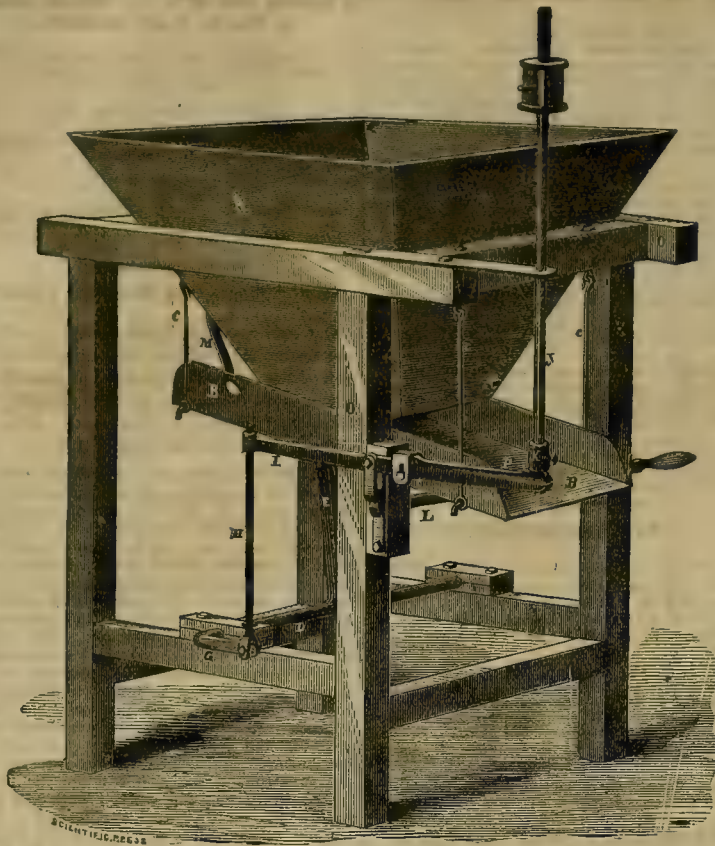
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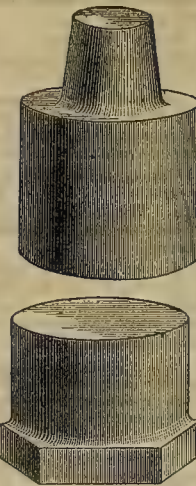
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L. P. McCARTY, Publisher, 423 Washington St., S. F.

PASO ROBLES, CAL., October 18th, 1875.

DEWEY & CO.—Gents:—The letters patent for the Tiro Upsetter have come to hand. For the prompt manner with which you have brought the matter to a successful issue, please accept my thanks. Yours respectfully,
JOHN H. MERTZ.

THE MINING AND SCIENTIFIC PRESS is the leading journal in America. New processes and mechanical inventions are illustrated and discussed in its weekly issues. It is a 16-page sheet, handsomely printed, for \$4 per year. Dewey & Co., publishers, San Francisco.—*Mt. Lincoln News, Atina, Colorado.*

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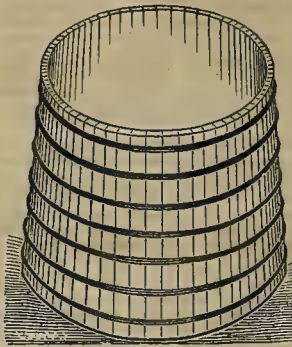
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ces according to the times.**

Continued from page 341.

were assayed and gave results as follows: No. 1, \$260.75; No. 2, \$188; No. 3, \$91.10. This ledge from which the rock was taken is from three to seven feet in width, and is sufficiently opened to admit of the extraction of it without much trouble. It was Wardle's intention to start out to-day with tools and supplies for the purpose of mining on this vein and taking out an amount of ore sufficient for a test by mill process.

MANHATTAN DISTRICT.

DISCOVERIES.—Belmont *Courier*, May 26: Mr. J. H. Sanders, one of the oldest residents of this county, who has always gone his pile on Nye, was in town this week. He reports rich discoveries in Manhattan mining district, situated about 15 miles southwest of Belmont. It has been known for years that this district is rich in minerals, but until recently no one thought enough of it to prospect it. Messrs. Sanders and Aldrich & Sturtevant resolved to give this district a thorough prospecting. They have located several claims, the principal of which are the North America, South America, Prince of Wales and Blue Ledge. They were rewarded last week for their past labors by the discovery of a rich ledge, the croppings of which can be traced for several miles. The rock from this ledge assays all the way from \$15 to \$70 per ton in value. In the Blue Ledge the assays show that the ore from that claim goes high in copper—90% copper, 5% silver and the balance lead, etc. These gentlemen intend to get to work immediately in these mines. Wood and water are plentiful in this district.

Arizona.

THE MINES.—*Arizona Citizen*, May 19: At no time within years, if ever, have the people hereaway been so elated and interested in mining matters. The extraordinary developments of the Rusk mine, by the Pima company, the wonderful reports from the Aztec district, the highly satisfactory results obtained from the San Xavier, and reports generally altogether, have created this great interest. People are also surprised to find large veins in the mountains everywhere examined, and locations are daily made by men of all occupations. New mining districts are being formed and increased development is going forward on all sides. The Pima mining company are pushing work on the 804 ft cross-cut, under the direction of Mr. Simonds. Col. Fred Drew took to San Francisco, on last Wednesday, samples of all the classes of ore from the mine. The bodies of ore now in sight are variously estimated at from 18,000 to 26,000 tons, which is said will all average over \$60 per ton. Capt. Voisard was in from Arivaca district, this week, and says the mines are developing satisfactorily, some of the ore being very rich indeed. We understand from Prof. Davis and Mr. Magee that active operations will soon commence in the Aztec mining district.

SILVER KING.—*Arizona Enterprise*, May 23: On the north and south extensions of the Silver King, the work is being pushed as rapidly as possible, and, in the course of a week drifting will be commenced from the bottom of the shaft on both mines. The shaft on the south extension is down 107 feet, and that on the north extension 130 feet. The Silver King proper is continuing to take out very rich ore. The news that the King is incorporated will tend to enliven the camp.

There are a large number of ledges both north and south of this place, which would pay some man with capital. The whole country is taken up, but, as a general thing, the owners are men who have no capital to work on. In fact, capital is the great desideratum in this section, and as soon as some which is time it must do, Pinal county will be one of the best counties in Arizona Territory.

The foundation for the mill at the Picket Post is progressing, and that place looks lively. Our town will eventually be there, for the Picket Post creek will furnish plenty of water for mills, families and the traffic of the Silver King and Globe district.

PECK.—From Mr. Peck, who arrived in town, yesterday, from the Peck district, we learn that the mining in that region are looking better than ever before. Upon the Silver Prince, Messrs. Houghton & Curtin have a large quantity of high-grade ore, which they are now sacking. Upon the San Francisco, Mr. Rice is busily at work developing the mine, and has out some very fine ore. This ledge is improving in appearance every day, and the work is showing it to be a good mine. The Black Warrior is mining and showing. Some very fine native silver ore is being taken out, and the mine looks better than ever. Several parties are at work upon extensions of the Peck and Occident, and find good ore all along the line.

FROM TURKEY CREEK DISTRICT. We learn that Pat Hamilton and Chas. Hall are busily at work with a force of men on the Turkey Creek bonanza, the Trinity, and are down to a depth of 40 feet. They have some very rich ore and the whole of the vein is high grade.

HUMBOLDT.—From Mr. Riggs, who arrived in town, yesterday, from Humboldt district, we learn that the work on the Tip-Top mine is suspended for the present, with the exception of the sacking of about 14 tons of high-grade ore, which is to be shipped to San Francisco.

Idaho.

GOLDEN CHARIOT.—Owyhee *Avalanche*, May 26: The operations at the Golden Chariot continue to go forward satisfactorily. The ninth cross drift is in nearly 200 feet. On the Crane and Driggs ledge the south drift is progressing favorably. The ore is steadily improving and promises the best results. At the 13th level all the indications are of the most promising character. The vein, at a distance of 340 feet from the shaft, is five feet in width and looking much better than at any previous stage of the work. The existence of rich ore in the immediate vicinity is regarded as certain. The progress made in this section of the mine, thus far, shows a passage over five distinct veins, all tending towards a great ledge that must sooner or later come to light. The hope of the country is centered in this work, and the vigilance and energy which have characterized the operations of the Superintendent during the past few months did fair to meet with ample returns in due season. The point now reached is at a greater depth than has hitherto been penetrated in the War Eagle mountain, and the prospects at every stage of the work is most cheering.

EMPIRE.—We are gratified at being able to state on information received from the most authoritative sources that the Empire is looming up in magnificent proportions. There is a force of nearly twenty men at work in the mine, and the developments of the past week are unusually promising and satisfactory. The rock which has been taken out for the past few days is liberally streaked with gold, and some of it assays away up in the thousands. None of it will crush less than \$100 to the ton, and the average will undoubtedly be considerably over \$200.

BELLE PECK.—At the Belle Peck the flow of water still continues to be a hindrance to active operations. The rich ledge in the Fotasi is beginning to attract much attention. Workmen are busily engaged in taking out good rock.

Nearly 100 tons of rock from the Lepley mine were crushed at the Golden Chariot mill recently. The entire bullion yield was \$2,450. It is believed that if the ore had been reduced by the roasting process the amount of bullion would have been nearly double.

SAN BUENOS.—A crushing finished on Wednesday of this week level was commenced by Col. O'Bannon some short time prior to his leaving us, as it was impossible to hoist by the incline the ore that was necessary to keep

Montana.

WORK RESUMED.—Cor. Butte *Miner*, May 28: At last we have a glimmering of light. The arrival a few days since of Mr. I. I. Lewis has been the cause of this break in our partial eclipse. Mr. Lewis has commenced work upon the Hope mine with a small crew of men. We hear that the level from No. 2 shaft is to be pushed through to the incline for the purpose of facilitating the hoisting of ore. This shaft level was commenced by Col. O'Bannon some short time prior to his leaving us, as it was impossible to hoist by the incline the ore that was necessary to keep

the mill at work steadily. The Speckled Trout mine cleared their shaft of water some days since and have employed a few miners and commenced work once more, much to the satisfaction of the denizens of this quiet town. Whether the new company (or the old company with the new name) the "Northwestern," intend putting their stamps in motion, we have not learned. If they conclude to do so, it will be for the purpose of reducing custom work, as at the present time they have but little if any ore of their own on the dump.

The Dexter mill started up yesterday. On coming to overhaul the machinery, which repairs were found necessary that was supposed, which accounts for the long stoppage. The mill is now in splendid repair again and there will be no protracted stoppage hereafter, Mr. Clark having ordered several sets of plates and dies, millers, etc., which can be put in without loss of time in case of breakages occurring.

All the mining ditches are flowing bank full and some water going to waste; the placers are now about all running, and this branch of the mining industry looks very bright and promising for the season. We are informed by parties recently at the head of the ditches that the snow is abundant, and with what has fallen in the past few days, there is little apprehension that the supply of water will be short for many months. In fact everything points to as lively a season as was had last year in the placers.

Messrs. Sloss & Barker furnish us the following in relation to their operations at Silver Lake: They have been working their mines during the winter, but had to suspend operations a few days ago on account of water, the melting snow sending down large quantities, some of which found its way into the mines and rendered work disagreeable. The ore in the Silver Lake mines seems to occur in shales or pockets, the veins in places pinching up and carrying no quartz. They have found a good body of ore, however, some of it very rich, assaying as high as \$5,000 per ton in silver. The consequent loss of time in cutting through the "hoss" makes their dump pile a little small for the season's work, but the mine is in condition now for hoisting plenty of high grade ore.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

EXCELSIOR S. M. Co.—May 28th.—Location: Arizona. Capital stock, \$10,000,000. Directors—R. H. Smith, R. A. Grant, J. M. Martin, W. S. Pettigrew and B. W. Reagan.

ARIZONA SMELTING CO.—May 29th. Object: To do a general smelting business in Arizona Territory. Directors—A. A. Webber, Joshua Hendy, J. H. Conway, J. F. Place and W. F. Hughes. Capital stock, \$100,000. **YAVAPAI CO. & M. Co.**—Location: Cerro Colorado district, Pima county, Arizona. Capital stock, \$10,000,000. Directors—J. P. Arcey, B. L. Tiffany, E. Sniffen, Caleb T. Fay, J. F. Cummings, H. P. Luby and S. F. Sniffen.

PACIFIC METALLURGICAL CO.—May 29th. Object: To work all precious and base metals, ores and tailings; to extract the minerals from black sand and gravel, and work the same; to purchase and acquire and to hire and lease such real estate, lands, mining location and ground as may be deemed essential to the working and reducing ores, tailings, sands and gravel situated on the Pacific coast. The Trustees are: William Holden, Julius Jacobs, S. F. Ambler, Solixas Solomons, William Eppelsheimer, Isaac N. Thorne and Aaron A. Adler. Capital stock, \$10,000,000, in 100,000 shares of \$100 each, \$175,000 of which has been subscribed.

CONCENTRATOR CO. M. Co.—May 29th. Location: Inyo Co. Capital stock, \$10,000,000. Directors—John P. G. Miller, H. P. Eayrs, Geo. A. Case, Wm. G. O'Hara, Ed. C. Hughes, F. A. Wilson and Rasmus Mikkelsen.

KIMBERLY COAL M. Co.—May 30th. Location: Alaska Territory. Capital stock, \$3,000,000. Directors—C. L. Dingley, I. E. Davis, J. P. Stearns, M. M. Kimberly and R. Sudden.

General News Items.

THE Tribune says \$106,000,000 worth of liquor is consumed in New York every year.

GEN. GRANT has arrived in England, and was received with great enthusiasm and ceremony.

THE Mariposa Gazette states that the rush of tourists to Yosemite this season is in excess of any previous year.

THE Tribune says: It is said that the English colonies have gained increased trade by the displays they made at the Centennial Exhibition.

THROUGH official channels a rumor has reached the State Department that Mexico is about to declare an additional 10 per cent. tariff on all imports into that country.

THE annual reunion of residents of Nevada county will be held at Badger's park on June 9th. The exercises will consist of addresses, poems, an oration by John Garber, music and dancing.

THE steamship City of San Francisco, belonging to the Pacific Mail Steamship Co., ran on a sunken rock on the Mexican coast this week and sunk. No lives were lost, but the steamer is a total loss.

THE Scherif of Mecca has placed the treasures of the Holy Shrine, the accumulated money gifts from pilgrims, at the Sultan's disposal. The treasures aggregate 200,000,000 piasters, \$4,000,000.

THE Secretary of the Treasury gives notice that the principal and interest on the 4,000,000 registered 5-20 bonds of March 3d, 1865, dated July 1st, 1865, and 6,000,000 coupons, will be paid at the United States Treasury, August 28th.

THE Chico murderers have been sentenced. Charles and John Slaughter, E. R. Roberts and E. Conway were sentenced to 25 years' imprisonment; T. W. Stainbrook, who stood trial, got 27½ years. The other indictments against them were dismissed.

HUNT, DOUGLAS & STEWART PROCESS.—We have given in this journal a detailed description of this process for the humid treatment of gold or silver ores associated with copper and other base metals, or ores free from base metals. It is now used in Colorado in connection with the Purvine wooden amalgamating pans and settlers. Mr. Stewart advertises in another column that the process can be adapted to any first-class gold or silver mill, at a reasonable additional expense.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

PATENTS AND INVENTIONS.**A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.**

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

FOR WEEK ENDING MAY 22d, 1877.
191,022. PLOW. J. D. Bowen, Roseburg, Ogn.
191,072. FRUIT DRIER. W. S. Plummer, Portland, Ogn.
191,101. CULTIVATOR. N. T. Brewster and A. D. Neher, Roseville, Cal.
191,194. WOOD PAVEMENT.—H. M. Stow, S. F.
TRADE-MARK.
4,658. ZEPHYR WOOL.—Bauer, Tobriner & Co., S. F.
LABELS.
1,085. STEELE'S PAIN ERADICATOR.—Orane & Brigham, S. F.

The "Mining and Scientific Press."

Our readers can do a good work for the PRESS and the mining interests, by calling the attention of their friends who are not already subscribers, to the merits of this journal. The MINING AND SCIENTIFIC PRESS is the oldest industrial journal on the coast, being now in its thirty-fourth volume, and has always been the advocate of the mining and mechanical interests of the coast. It has been so long established as to be standard in its character, circulating in every mining camp on the Pacific coast. We keep a complete record of the mining news of the day, and pay close attention to any new inventions, methods or processes which are likely to be of value to our practical and progressive readers. No miner or mechanic, who desires to advance in his trade, can afford to be without a home journal devoted to his interest, so they should all lend their assistance to maintaining one. A glance over this number of the PRESS will convince any one engaged in industrial pursuits that the journal is worthy of support and recognition. We desire, of course, to increase our subscription list, as it will aid us in still further improving the paper. With this number we issue an illustrated supplement of eight pages to accommodate our advertising patrons, so that the PRESS this week contains 24 pages, a large portion of which is interesting reading matter, closely set, interspersed with numerous attractive and instructive illustrations.

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PATENTS obtained promptly; Caveats filed expeditiously; Patent re-issues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting Business promptly and thoroughly conducted. Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons, and our success and business are constantly increasing. The shrewdest and most experienced inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

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San Francisco, 1877.

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INSTRUCTIONS OF THE U. S. LAND COMMISSIONERS.—Different Classes of Public Lands; How Lands may be Acquired; Fees of Land Office at Location; Agricultural College Scrip; Pre-emptions; Extending the Homestead Privilege; But One Homestead Allowed; Proof of Actual Settlement Necessary; Adjoining Farm Homesteads; Land for Soldiers and Sailors; Land for Indians; Fees of Land Office and Commissioners; Laws to Promote Timber Culture; Concerning Appeals; Returns of the Register and Receiver; Concerning Mining Claims; Second Pre-emption Benefit.

Abstract From the U. S. Statutes.—The Law Concerning Pre-emption; Concerning Homesteads; Amendment Act Concerning Timber; Miscellaneous Provisions; Additional Surveys; Laws for Pre-emption, List of California Post Offices. Price, post paid, 50 cts.

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This rare book on the treatment of gold and silver ores without quicksilver, is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and explains the why and wherefore.

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UNITED STATES**Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.**

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizens; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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METALS.

[WHOLESALE.]

THURSDAY, M., May 31, 1877.

IRON.—			
American Pig. ton.	32.00	33.00	00
Scotch Pig. ton.	32.50	34.00	00
White Pig. ton.	31.00	—	—
Oregon Pig. ton.	31.00	—	—
Red Iron Bar.	31.00	—	—
Horse Shoes, keg.	5.00	00	54
Nail Rod.	—	—	7
Norway, Oval.	—	—	7
Rolls.	—	—	—
COPPER.—			
Copper Tinned.	37.00	40.00	00
Sheathing, B.	37.00	40.00	00
Sheathing, Yellow.	21.00	22.00	00
Sheathing, Old Yellow.	10.00	11.00	00
Composition Nails.	21.00	—	—
Composition Bolts.	24.00	—	—
STEEL.—			
English Cast, B.	14.00	25.00	00
Anderson & Woods, ordinary sizes.	16.00	—	—
Drill.	16.00	—	—
Flat Bar.	16.00	—	—
Flat Steel.	16.00	—	—
Flow Steel.	16.00	—	—
TIN PLATES.			
10x14 C. Charcoal.	9.00	00	50
Banana Tin.	24.00	—	—
Australian.	19.00	20.00	00
ZINC.—			
By the Cask.	11.00	—	—
Zinc Sheet 7x3 ft. 7 to 10, B.	11.00	—	—
7x3 ft. 11 to 14.	12.00	—	—
8x4 ft. 11 to 14.	12.00	—	—
8x4 ft. 11 to 10.	12.00	—	—
NAILS.—			
Assorted sizes.	25.00	30.00	37 1/2
QUICKSILVER.—			
By the lb.	10.00	42.00	00

LEATHER.

[WHOLESALE.]

WEDNESDAY M., May 30, 1877.

Sole Leather, heavy, lb.	26.00	29.00	00
Light.	22.00	24.00	00
Jodot, 8 Kil. doz.	48.00	50.00	00
11 to 13 Kil.	68.00	70.00	00
14 to 16 Kil.	82.00	84.00	00
Second Choice, 11 to 16 Kil.	57.00	60.00	00
Cornellian, 12 to 16 Kil.	67.00	70.00	00
Females, 12 to 13 Kil.	63.00	66.00	00
14 to 16 Kil.	71.00	74.00	00
Simon Ulmo, Females, 12 to 13 Kil.	68.00	70.00	00
14 to 15 Kil.	72.00	74.00	00
16 to 17 Kil.	72.00	74.00	00
Simon, 18 Kil.	61.00	63.00	00
20 Kil.	65.00	67.00	00
24 Kil.	72.00	74.00	00
Robert Carr, 7 Kil. 9 Kil.	35.00	36.00	00
Kips, French, lb.	1.00	00	35
Cal. doz.	40.00	42.00	00
French Sheep, all colors.	8.00	00	15
Eastern Calf for Backs.	1.00	00	15
Sheep Roams for Topping, all colors, doz.	9.00	00	15
For Linings.	5.50	00	15
Cal. Russet Sheep Linings.	1.75	00	45
Boot Legs, French Calf, pair.	4.00	00	45
Good French Calf.	4.00	00	45
Best Jodot Calf.	5.00	00	45
Leather, Harness, B.	35.00	38.00	00
Fair Bridle, doz.	48.00	50.00	00
Skirting, B.	33.00	35.00	00
Wet, doz.	30.00	00	50
Buff, ft.	18.00	20.00	00
Wax Side.	17.00	20.00	00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, May 30, 3 P. M.
 LEGAL TENDERS IN S. F., I. A. M., 94/94 1/2. SILVER, 56/61.
 GOLD IN NEW YORK 106 1/2.
 GOLD BARS, 890/890. SILVER BARS, 10/15 1/2 cent. discount.
 EXCHANGE ON NEW YORK, 50/55-100 cent. premium for gold; on London bankers, 49/ Commercial, 49 1/2; Paris, five francs \$ dollar, Mexican dollars, 84/85.
 LONDON CONSOLS, 93 1/2; Bonds, 106 1/2.
 QUICKSILVER IN S. F., by the flask, 1 lb, 41/42.

Another Compliment.

LOS ANGELES, May 21st, 1877.

Messrs. Dewey & Co., Patent Agents, S. F.—Gentlemen:—I have just received my letters patent on machine for opening oyster shells, and compliment you upon your success. I shall not only contribute to you my own business, but also that of friends. Thanking you, gentlemen, for your promptness and the very thorough manner in which you have prosecuted this matter, I am, yours truly,
 T. W. TEMPLE.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Booth Gold Mining Company.—Location

of works, Auburn, Placer county, California.
 Notice is hereby given that at a meeting of the Board of Directors, held on the thirtieth day of April, 1877, an assessment (No. 2) of five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, No. 320 California Street, Room 8, San Francisco, Cal.
 Any stock upon which this assessment shall remain unpaid on the fourth day of June, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on the twenty-fifth day of June, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors,
 GEO. R. SPINNEY, Secy.
 Office, 320 California St., Room 8, San Francisco, Cal.

California and Arizona Mining Company—

Location of principal place of business, San Francisco, California. Location of works, Cedar valley, Mohave county, Arizona.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 2), levied on the third (3d) day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Edmund Burch.	13	50	\$1.00
Edmund Burch.	15	500	10.00
Edmund Burch.	17	500	1.00
Edmund Burch.	18	400	4.00
Edmund Burch.	19	200	4.00
Edmund Burch.	21	200	4.00
Edmund Burch.	24	100	0.00
Benjamin Flint.	89	4,000	80.00
W. H. Hall.	41	2,500	50.00
James W. Thrift.	43	2,500	50.00
E. E. Rice.	44	2,500	50.00
J. Jewell, Trustee.	49	50	1.00
Martin Corcoran.	50	1,250	25.00

And, in accordance with law, and an order of the Board of Directors, made on the third (3d) day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at Room B, No. 507 Montgomery street, on Monday the fourth (4th) day of June, 1877, at the hour of two (2) o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
 T. E. JEWELL, Secretary.
 Office, 507 Montgomery Street, San Francisco.

Dolores Consolidated Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Blasdel, H. G., Trustee.	16	10,000	\$1,000.00
Blasdel, H. G., Trustee.	17	5,000	500.00
Blasdel, H. G., Trustee.	18	5,000	500.00
Blasdel, H. G., Trustee.	19	5,000	500.00
Drexler, L. P. & Co., Trustee.	3	25,000	2,500.00
Fry, J. D., Trustee.	7	10,000	1,000.00
Keene, J. R., Trustee.	9	10,000	1,000.00
Talbot, W. C.	3	100	10.00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, P. M. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.
 J. W. CLARK, Secretary.
 Office, 413 California street, San Francisco, California.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of April, 1877, to the 18th day of May, 1877, and will then be held at the same hour and place as above named. By order of the Board of Directors. J. W. CLARK, Secy.

POSTPONEMENT.—The sale of the above described certificates of stock is postponed from the 16th day of May, 1877, to the 15th day of June, 1877, and will then be held at the same hour and place named above. By order of the Board of Directors. J. W. CLARK, Secy.

Excelsior Silver Mining Company.—Location

of principal place of business, San Francisco, Cal. Location of works, Lincoln County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the twenty-fourth day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Burke, James C.	13	25	\$2.50
Burke, James C.	58	15	1.50
Burke, James C.	59	10	1.00
Burke, James C.	not issued	230	23.00
Brooks, Richard.	42	25	2.50
Brooks, Richard.	not issued	25	2.50
Brooks, Henry B.	33	100	10.00
Brooks, Henry B.	not issued	460	46.00
Bulletti, C. estate.	21	100	10.00
Bulletti, C. estate.	84	50	5.00
Bulletti, C. estate.	111	100	10.00
Bulletti, C. estate.	110	100	10.00
Catania, Joseph.	184	25	2.50
Catania, Joseph.	182	25	2.50
Catania, Joseph.	201	50	5.00
Catania, Joseph.	202	130	13.00
Hunter, David.	not issued	230	23.00
Henderson, James.	14	25	2.50
Henderson, James.	43	20	2.00
Henderson, James.	107	20	2.00
Henderson, James.	127	100	10.00
Henderson, James.	not issued	115	11.50
Henderson, Edward.	15	20	2.00
Henderson, Edward.	30	20	2.00
Henderson, Edward.	106	20	2.00
Henderson, Edward.	128	100	10.00
Henderson, Edward.	not issued	115	11.50
Jury, Louis.	not issued	280	28.00
Magueral, Stella.	101	25	2.50
Magueral, Stella.	205	75	7.50
Magueral, Stella.	206	130	13.00
McMann, John.	not issued	280	28.00
Murray, William.	28	10	1.00
Osenbrock, Leonard.	97	75	7.50
Osenbrock, Leonard.	98	75	7.50
Osenbrock, Leonard.	not issued	410	41.00
Spositi, John.	99	100	10.00
Spositi, John.	204	130	13.00
Whiting, Henry.	190	10	1.00
Whiting, Henry H.	not issued	130	13.00

And, in accordance with law, and an order of the Board of Directors, made on the twenty-fourth day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the company, 306 Post street, on the 18th day of June, 1877, at the hour of seven and one-half o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
 W. A. KOLLMYER, Secretary.
 Office, 306 Post street, San Francisco, California.

Gover Mining and Milling Co.—The

Annual Business Meeting of the Stockholders of Gover Mining and Milling Co. will be held at the Company's office, Room 8, No. 402 Front Street, San Francisco, Cal., on Tuesday the twelfth day of June, 1877, at one o'clock, P. M.

W. O. WILSON, Secy.

Jennie A. & Black Rock Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, White Pine Mining District, White Pine County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1), levied on the twenty-second day of May, 1877, an assessment (No. 1), of twenty cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 413 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the fifth day of July, A. D., 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the thirtieth day of July, A. D., 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of Board of Directors.
 J. W. CLARK, Secy.
 Office, 413 California Street, Rooms 1 and 2, San Francisco, Cal.

Mariposa Land and Mining Company of

California.—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment, No. 10, levied on the twenty-eighth day of March, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Adams, Thomas.	1165	100	100.00
Adams, Thomas.	1162	100	100.00
Adams, Thomas.	1161	100	100.00
Adams, Thomas.	1162	100	100.00
Adams, Thomas.	1163	100	100.00
Adams, Thomas.	1164	100	100.00
Adams, Thomas.	1165	100	100.00
Adams, Thomas.	1166	100	100.00
Adams, Thomas.	1167	100	100.00
Adams, Thomas.	1168	100	100.00
Adams, Thomas.	1169	100	100.00
Adams, Thomas.	1170	100	100.00
Adams, Thomas.	1171	100	100.00
Adams, Thomas.	1172	100	100.00
Adams, Thomas.	1173	100	100.00
Adams, Thomas.	1174	100	100.00
Adams, Thomas.	1175	100	100.00
Adams, Thomas.	1176	100	100.00
Adams, Thomas.	1177	100	100.00
Adams, Thomas.	1178	100	100.00
Adams, Thomas.	1179	100	100.00
Adams, Thomas.	1180	100	100.00
Adams, Thomas.	1181	100	100.00
Adams, Thomas.	1182	100	100.00
Adams, Thomas.	1183	100	100.00
Adams, Thomas.	1184	100	100.00
Adams, Thomas.	1185	100	100.00
Adams, Thomas.	1186	100	100.00
Adams, Thomas.	1187	100	100.00
Adams, Thomas.	1188	100	100.00
Adams, Thomas.	1189	100	100.00
Adams, Thomas.	1190	100	100.00
Adams, Thomas.	1191	100	100.00
Adams, Thomas.	1192	100	100.00
Adams, Thomas.	1193	100	100.00
Adams, Thomas.	1194	100	100.00
Adams, Thomas.	1195	100	100.00
Adams, Thomas.	1196	100	100.00
Adams, Thomas.	1197	100	100.00
Adams, Thomas.	1198	100	100.00
Adams, Thomas.	1199	100	100.00
Adams, Thomas.	1200	100	100.00

COMMON STOCK.

Cal.

Mariposa Land and Mining Company of
California.—Location of principal place of business, San Francisco, California. Location of works, Mariposa County, California.

NOTICE.—There is delinquent upon the following described stock, on account of assessment, No. 10, levied on the twenty-eighth day of March, 1877, the several amounts set opposite the names of the respective share-

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,
SAN FRANCISCO, CAL.

Established for the Manufacture of
RAILROAD AND OTHER IRON

Every Variety of Shafting,

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

—ALSO—

Hammered Iron of Every Description and Size.

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. Box 2632, San Francisco, Cal., will receive prompt attention. Office: 16 First Street.
The highest price paid for Scrap Iron.

THE RISDON Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,

SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

THOS. PENDERGAST.

HENRY S. SMITH

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MANUFACTURERS OF

IRON CASTINGS

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OF ALL KINDS.

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HINCKLEY & CO.,

Manufacturers of

STEAM ENGINES, Quartz, Flour and Saw Mills,

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Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

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37 Fremont St., cor. Mission, S. F.

HALL & KELSHAW, PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

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ASBESTOS ROOFING AND ASBESTOS PAINTS, ASBESTOS CEMENT FOR LEAKY ROOFS

Asbestos Roof Paints for Leaky Roofs,

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FOR SALE BY ALL COUNTRY MERCHANTS.

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PACIFIC IRON WORKS,

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MANUFACTURERS OF

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING AND MINING MACHINERY, INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS, CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES, FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES, RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES, SUGAR MILL MACHINERY, WATER WHEELS, ETC., ALL OF THE LATEST AND MOST IMPROVED CONSTRUCTION.

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Steam Engines and all Kinds of Mill and Mining Machinery.

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Its use in mines brings about

- 1.—Decreased cost of ore.
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Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS.

HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch.
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Light and Heavy Castings of Every Description Manufactured.

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The Only Illuminating Tile Manufactured for Lighting Cellars, Basements and Dark Rooms which provides proper ventilation for such places

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Machinery and Castings of all kinds.

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The Ligersoll Rock Drill



Is Extensively Used in the East and

TAKES THE PLACE OF ALL OTHERS,

Wherever introduced, because it can be run with less power, labor and repairs, and do more work than any other Drill in the market. It has but few parts, is easily handled, being light, and has AUTOMATIC FEED, which saves labor. WE ASK FOR TRIAL AGAINST ANY COMPETITOR. For particular information regarding Drills or Air Compressors, send for circular to

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When all others fail, buy a "Gardner." We have all sizes of these celebrated Steam Governors on hand at all times.

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THE O'HARRA CHLORIDIZING FURNACE

Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing 20 Tons in 24 Hours by this Process:

One man.....	\$ 4 00
One man.....	3 00
Wood—2½ Cords at \$3 per cord.....	5 00
Salt—1,600 lbs at 2½ cents.....	40 00

Cost of 20 tons.....\$52 25

Cost of one ton.....2 61½

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Consolidated Co.'s mines, in Peavine District, Nev., and at the Exchequer mill, Alpine Co., Cal. For further information, apply to

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Compound Steam Pump.

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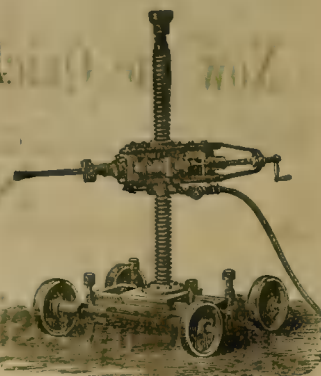
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Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

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Chemical Engines, Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.

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Was awarded the Highest

MEDAL AND DIPLOMA

AT THE CENTENNIAL EXHIBITION FOR A READY MIXED PAINT.

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THIS PAINT IS MIXED READY FOR USE.

THE PUREST WHITE, AND OF ANY DESIRED SHADE OR COLOR.

It will not peel, crack, nor chalk off, and will last twice as long as the best white lead, prepared in the ordinary way. Is cheaper, handsomer, more durable and elastic than the best of any other paint.

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"This Paint is quite different from paints in general use. * * * Work which has been done with it, some of it exposed for years to the moist atmosphere of the sea-shore, establishes its great durability. * * * It is mixed ready for use, easily applied, of great beauty, and economical."

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"It possesses merits unattainable by the old method of combining paint. * * * It can be applied with great facility and perfect regularity; dries with a rich, glossy surface, and will not chalk or crack off. * * * It never separates, is always ready for use, and will not spoil when exposed to the air. * * * It can be applied by any one whether a practical painter or not."

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CRUSHING ROLLERS, AMALGAMATING MACHINERY
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GOLD, SILVER AND COPPER MINING,
Reducing and Concentration Machinery.

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PICKERING ENGINE GOVERNOR.

VALLEJO FOUNDRY, October 17th, 1876.

Messrs. NEYLAN & YOUNG, San Francisco,
Agents for "PICKERING GOVERNORS."



Gents:—The 10 two-inch Improved Speed Adjusting Governors I bought of you this year for my patent Straw Threshing Engines give splendid satisfaction. They far surpass for regularity of speed any Governor that I have ever seen, and I have seen all the best kinds; I have seen the main belt fly off the pulley several times this season while threshing, and the engine did not discover it, so perfectly was the speed maintained, until he was told of it; this I consider something wonderful; I consider the Governor absolutely perfect, so far as speed is concerned. I bought and put on to one of my engines a Shive Governor, to see which was the best, and after one season's trial I have no hesitation in saying they are far superior to any other Governor that I have seen or used. I wish you would send me the lowest price that you can furnish 25 Governors for next season's engines.

Yours respectfully,
J. L. HEALD.

The only Governor that has received awards at each of the International Exhibitions. American Institute Fair, New York, 1865, Two Medals; Mechanics' Institute Fair, Baltimore, 1865, Silver Medal; American Institute Fair, New York, 1869, Two Medals; International Exposition, Paris, 1875, One Bronze and Two Special Medals; International Exposition, Vienna, 1873, Medal of Progress and Decoration; International Exhibition, Philadelphia, 1876, Medal and Diploma.

CAMERON'S CELEBRATED STEAM PUMPS

For Feeding Boilers and Draining Mines. MACHINISTS' TOOLS AND WOOD WORKING MACHINERY.

Engraving done at this office, Dewey & Co. { 224 Sansome St } Patent Ag'ts. NEYLAN & YOUNG, SOLE AGENTS FOR THE PACIFIC COAST, 18 and 20 Spear Street, S. F.

THE GIANT POWDER CO.,

Ask your special attention to their IMPROVED GRADES OF POWDER, Viz:

No. 1 GIANT

Now the Quickest and Most Powerful Explosive Compound in the World.

No. 2 EXTRA, a New Grade,

Which will hereafter be our second grade. It is of immense strength,

Far Surpassing any POWDER of its Class Ever Before Manufactured.

NOTWITHSTANDING ITS GREATLY INCREASED STRENGTH,

Will be sold at the price of the old No. 2. Where a Powder stronger than ordinary No. 2 is needed, we invite a trial of this new grade.

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New Break-Circuit Chronometer.

At the meeting of the California Academy of Sciences held May 21st, the President, Prof. Geo. Davidson, of the U. S. Coast Survey, exhibited the drawings and the working of an ordinary chronometer changed to a break-circuit.

In the earlier work of the U. S. Coast Survey for the determination of the difference of longitude between stations by means of the telegraph, the signals were transmitted by means of the pendulum or of the escapement of an astronomical clock, breaking the circuit. To transport a delicate clock over the rough roads of California was detrimental to its accuracy of rate, and Prof. Davidson proposed to himself the problem of changing an ordinary chronometer into a break-circuit chronometer at a trifling cost; but the chronometers examined were constructed with such an arrangement of banking-piece and detent that he did not succeed.

The subsequent construction of special break-circuit chronometers by the regular makers seemed to leave little more to be desired. But when executing some telegraphic longitude work in Japan in 1874-75, the weakness of the method of using clocks or chronometers, when both heat and record sidereal seconds upon a single pen chronograph, again brought the problem before him. In that work it happened upon two nights that the chronometers at Tokio and Nagasaki broke at the same epochs, and it was therefore impossible to directly decipher or separate the synchronous signals on the record without resort to unusual expedients. These were successful; but had a mean time chronometer, or an ordinary sidereal chronometer breaking half seconds, been available at one end of the line for the making and transmission of signals, that trouble would have been obviated.

The opportunity to study the question was not again afforded until last June, when regulating one of his chronometers he clearly saw how the problem was to be solved.

In the more recently made chronometers, the "banking-piece" and the "detent" are separately attached to the plate, near its outer edge. The figure shown on this page exhibits the relation of these parts, and of the balance and escape wheel. *P* is the chronometer plate; *W*, the balance; *E*, the escape wheel; *D*, the detent; *G*, the gold or passing spring of detent; *B*, the banking-piece; *I*, the newly introduced insulating plate, upon which the blocks of the detent and banking-piece are secured; *A*, the set screw of the banking-piece; *C*, the detent, resting on the point of the set screw; *J*, the jewel standing up from the detent, and against which each tooth of *E* rests in turn; *R*, the jewel in the verge or upper roller of the arbor of the balance; *S*, the jewel or pallet in the lower roller of the arbor of the balance; *T*, *U*, *V*, etc., the teeth of the escape wheel, of which there 15 in chronometers beating half-seconds; *L*, *L'*, wires through local battery and chronograph helix; *L*, *D*, *C*, *A*, *B*, *L'*, the course of the electric circuit through chronometer.

In these parts, the jewel, *J*, of the detent, rises above the plane of the detent, and also above the gold or passing spring, so that the teeth of the escape wheel can rest against it and at the same time be clear of the gold spring. The outer extremity of the gold or passing spring is attached to the outer extremity of the detent at the block; and the free end of the gold spring is moved only by the projecting jewel, *R*, of the verge or upper roller of the arbor of the balance.

When the balance turns in the direction contrary to that of the arrow, this jewel, *R*, of the verge, passes the end of the detent, which is too short to be touched, but strikes the free end of the gold spring, and pressing it back, passes it. But when the balance turns in the direction of the jewel, *R*, strikes the free end of the gold spring, which now presses against the free end of the detent, which is thus carried away from its contact with the set screw, *A*, of the banking-piece, *B*, and far enough to free the jewel, *J*, of the detent from the tooth, *T*, of the escape wheel, which then springs forward,

ward, whilst the tooth, *V*, impinges upon the pallet, *S*, and thereby imparts its impulse to the balance. When the tooth, *T*, has escaped from *J*, the detent springs back to the set screw, *A*, before the tooth, *U*, has come forward to *J*, which is in place to receive and hold it back until the next similar break occurs in half a second.

Taking advantage of the relation of these parts and the insulation afforded between the verge, the lower roller, the escape wheel and the detent through the jewels, *J*, *R*, and *S*, Professor Davidson insulated at *I* the blocks or affixed ends of the detent, *D*, and of the banking-piece, *B*. The part of a circular area having a radius of three-eighths of an inch, was drilled out near the edge of the plate to the depth of about one-eighth of an inch and inlaid with a hard, insulating material tooled flush with the face of the plate. Upon this was secured the blocks of the detent and banking-

sec., 1 sec., 2 sec., where three consecutive second breaks followed each other and thus indicated the commencement of each minute.

The second was an ordinary mean time chronometer by Hutton, changed under Prof. Davidson's direction to a break-circuit, by Mr. Charles Pace, and breaking every half second. The break of this chronometer, recording half seconds, was one-half the length of the break of the chronometer recording each two seconds. The sidereal chronometer gains upon the mean time chronometer one-half second every three minutes and three seconds, and there was a practical coincidence of beats at each such period.

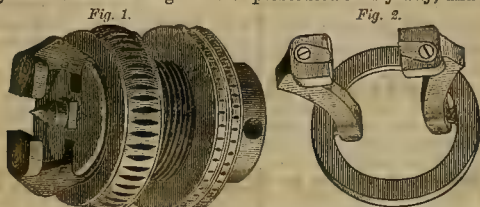
THE SUTRO TUNNEL.—In an interview, Mr. Sutro gives the following information with regard to the progress of the famous tunnel that bears his name: The header is now in about 17,000 feet. The future rate of progress is ex-



DAVIDSON'S BREAK CIRCUIT CHRONOMETER.

pected to average about 300 feet a month. Work has been prosecuted for eight years, and the average cost has been about \$1,000 a day. The exact time of reaching the Comstock proper, at the Savage workings, cannot at present be definitely fixed. One estimate is that ten months more will suffice. At present the intention is simply to push the tunnel ahead as expeditiously as possible and disregard all side issues. The work of prospecting has never been prosecuted in any way, and will not be attempted.

It is evident, from this arrangement, that the current from the battery passes through the block and banking-piece of the set screw, *A*, and thence through the detent, *D*, and its block to the other pole of the battery; and that the record upon the chronograph is made when the circuit is broken by the detent leaving the set



HARRIS'S PATENT LATHE-DRIVER.

screw. The length of the break is about one-twentieth of a second.

In those chronometers designed for breaking the electric circuit to make the chronograph record, special means have been introduced by which the beginning of every minute is noted, although the observer has to make the record of the minute; but in the adaptation of the ordinary chronometer, as above described, this designation of each minute by the chronometer itself cannot be accomplished, and the observer must carefully note upon each sheet the beginning of one of the minutes.

The Professor exhibited two chronometers, breaking circuit and making their records upon the fillet of a field chronograph; one was a regular break-circuit chronometer, by Frodsham, breaking every even second, except at the

ed until the tunnel has been put through. Mr. Sutro expressed the opinion that before the Savage ground was reached the tunnel might be expected to cut some valuable ore body, and that he, in common with many mining men, would not be surprised at such an occurrence.

THE WEATHER IN MAY.—The variations of the weather in May in this city, as reported to us by the U. S. Signal Service officers, were as follows: highest barometer, 30.052; lowest, 29.812. Highest temperature, 75°; lowest, 48°. Prevailing direction of wind, west; greatest velocity of wind, 28 miles per hour. Total number of miles, 9,147. There was one rainy day, when 1.8 inches of rain fell. The total rainfall, since July 1st, 1876, has only been 11.03 inches.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

The Gila shaft is now down 134 feet, with the bottom in hard lime.

Average assay of Chollar ore is \$24.16 per ton. Six hundred and twenty-three tons were taken out last week.

The flow of water in the upraise of the El Dorado South continues heavy.

In the Consolidated Virginia they are yet engaged in enlarging the south drift (the main air passage) on the 1550-foot level. The new drift on this level south and east of ore stopes has been extended 18 feet the past week. The ore is very fine. On the 1650-foot level the ore breasts are looking very finely. The south drift has been connected with the deep winze. This connection is being enlarged to admit of the free passage of air.

The west drift on the 1750-foot level of the C. & C. shaft has been extended 40 feet the past week; total distance from shaft, 100 feet. The level is very hot. The flow of water continues.

In the Justice, the east drift on 1150-foot level is still advancing through a very favorable formation, and every foot of progress the flow of water increases, but not in sufficient quantities to retard the progress. South drift on 1000-foot level is advancing through a very favorable ore body, which continues to expand as progress is made. Winze sinking from 800-foot level is looking well, and is entirely free of water. A very marked improvement has occurred in face of 750-foot level, north lateral drift. Improvements consist of a better quality of ore found, and the vein, to all appearances, is widening out to a very respectable width. The ore-producing stopes throughout the company's mine are looking and yielding extremely well.

From the 19th to the 26th ult the Manhattan reduced 112½ tons, the assay value \$23,281.07. Of this amount there was purchased 48 tons of an assay value of \$11,524.80. At the first shaft, the stopes on the upper levels are being cleaned up, preparatory to abandonment, they being worked out. The 500. west drift has shown some very good indications. The 570 east drift has met a slip in the ledge, cutting it entirely off.

Obviating the Use of Numerous "Dogs."

We saw this week at the shop of Joshua Hendy, corner Fremont and Mission streets, one of Harris's patent lathe drivers or dogs, a long needed and successful tool, of which Mr. Hendy is now manufacturing a large number.

It is constructed so as to drive regular or irregular shapes and will allow work to be turned straight or tapering without making any change in the driver. This is accomplished by the ring, with driving jaws attached, as seen in Fig. 2. The ring is fitted loosely in a recess formed between the two nuts, so as to allow the outer ends of the jaws to grip any irregularity without having any tendency to press the work from off its center.

Fig. 1 shows the driver ready to be screwed on the spindle of the lathe. To operate the jaws, the outer nut is run back, allowing the jaws to receive the work on its center. The work is put on the lathe on its centers and the lathe started in motion. All that is necessary is to press on the nuts, checking its revolutions, which will cause it to close the jaws on the work, gripping it firmly. The jaws can be spread wide enough to pass over any ordinary inequality in the work. Fig. 2 shows the ring with driving jaws attached.

This is really a very useful lathe driver and obviates the use of numerous "dogs." It was found by experiment at the Central Pacific shops at Sacramento that on small work it saved two hours a day over a lathe running alongside of it with the ordinary appliances. This tool is endorsed by such persons as Prescott, Scott & Co., Union Iron Works; Pendergast, Smith & Co., Etna Iron Works; Hinchley & Co., Fulton Iron Works; John T. Wilson, master mechanic, S. P. R. R.; W. H. Milliken, master-mechanic, machine shop, Sacramento, etc. These tools are being made here by Mr. Hendy, and a good many of them are being shipped East.

CORRESPONDENCE.

Calaveras County Mining Interests.

EDITORS PRESS:—San Andreas, the county seat of Calaveras county, occupies a central and elevated position in a broken and hilly part of the county, where nature's roughness seemed hardly to need the help of the miner to make chasms and precipices and piles of cobble quartz. But everywhere as you travel through the county you see the marks of the early miners' work.

The town and environs probably contain about 500 population. During court weeks it puts on lively airs; has a first-class hotel, kept by Cavin & Co., and restaurant by H. Watson; about six stores, and well represented in the trades and mechanical arts. The able county paper, called the *Citizen*, issues weekly.

At present not much mining is going on near town, though gold exists on every side, and

The Mother Lode

Of Amador county passes about one mile west of San Andreas, where are made some very favorable locations, for example the Cash mine and San Andreas, on which two well timbered shafts have been sunk 40 feet and 50 feet and cross-cuts run which show large bodies of sulphuretted gold ore. Average thickness of ledge matter, six feet; length of claim 1,500 feet. It is considered to be on the true Mother lode of the Hayward mines of Amador county. The ledge is found between a slate foot wall and granite hanging wall. Direction north and south, nearly, with an eastern dip of about 70°. Connected with the mine is a water ditch 27 miles in length to convey water to the mine. Prospect workings have yielded as follows: 10 tons unassorted ore, \$13 per ton; a small lot worked in San Francisco gave \$46. When pounded and horned shows well. The early placer mines on the line of this lead or belt paid generally very well. Mr. Benj. Thorne, one of the principal owners in these mines, is contemplating more extensive improvements and developments thereon, and, when completed, the mine will be able to announce its own value and that also of hundreds of other as yet undeveloped bonanzas in Calaveras county.

Mokelumne Hill

Yet stands and maintains much of its ancient grandeur, though so often tested by fire. There are not as large mining operations as formerly, still there is considerable trade in gold; but the glory of the place now might be its fine, elevated residences, with shades, fruits, flowers, birds, honey bees, and, in fact, all the luxuries of a city and farm home on a five or ten-acre tract on which some mainly depend for their income or living.

Jenny Lind,

Formerly a lively little mining town of near 100 dwellings and business houses, is now down to two stores, a saloon and a hotel. It depends mainly for its support on the farm trade from the adjoining good bottom lands. Four miles distant is

Milton,

The railroad depot for the Copperopolis railroad running from Stockton. It occupies an elevated site amidst the foothills, and, judging by extent of town lot stakes, it is the intention of its proprietors to try and supply all demands for lots; and they can be encouraged by the fact that there is plenty more ground adjoining that seems far better suited for town lots than for cultivation. It contains three stores, hotel, smith, harness and shoe shops, public hall and school-house.

Copperopolis,

Now quite dull by the stoppage of mining operations, is pleasantly located, and shows in its substantial buildings that it was built up at a time of large expectations. The adjoining country, sparsely settled by small farmers and sheep men, will not keep up the town that sprang up in a mining excitement and anticipated a rapidly increasing population. This town has but repeated the old lesson taught by so many cities before its day. Following up the rugged hills by a passable road, say 10 or 12 miles, you reach Altaville and its adjoining city, Angels, each a beautiful and thriving town, supported by mines and farms. Several arastars running by water power, a foundry, etc., gives quite an air of business.

Vallecito,

Another pleasant camp of a few stores and mechanics' shops, to accommodate miners and farmers, who seem to be getting along quite harmoniously. The main depot for all kinds of supplies is yet at the old stand of A. M. Mitchell, who seems to be doing a thriving business.

Five miles' ride on a moderate up-grade, that passes some creek mining, brings you to the once renowned

Murphy's Camp,

Or Flat, which is beautifully situated among rocky hills that shelter it from some of the severe winds. The mining at present is not very active, yet there are valuable interests in the mines, and will be gold taken out for years to come. The residences are hard to see, they are so hidden by shade and fruit trees. The Sperry hotel still maintains its high standard

of excellence and in all that pleases its guests Mr. Atwood proves his ability to run a hotel.

In all these mining towns they seem to keep up social, educational, and generally some general religious privileges, such as sabbath school, preaching, or the reading of some religious discourse. At Murphy's I heard one of Rev. Mr. Moody's sermons well read by a lady, who had a very attentive audience. Afterward she conducted a very pleasant sabbath school. In every village we now hear the organ and piano, showing that refined society is not confined to the valleys.

C.

The Hunt, Douglas and Stewart Process.

EDITORS PRESS:—In the issue of your paper May 5th, is an article by Mr. C. H. Aaron, to which I desire to reply as briefly as possible. When I wrote my circular on treatment of gold and silver ores by the Hunt, Douglas and Stewart method, in connection with amalgamation as practiced by me, I did so as a practical millman to other millmen, and not as a professional chemist; and while I made some errors in stating chemical reactions, yet the practical results observed by myself and others in working base metal ores are substantially correct, and the language used will, I think, be clearly understood by all practical millmen. For instance, what I call sulphite of silver, Mr. Aaron, in referring to similar observations or experience, calls "multiple sulphates." In the year 1872 I noticed that, although we had the best of Varney pans, yet we could not amalgamate to within 8% and sometimes 15% of the furnace chlorination as tested by hyposulphite of soda. Upon investigation I found that while 92% to 95% of the silver in our roast was soluble in hyposulphite of soda, yet only 75% to 82% was chloride of silver as tested by ammonia water.

There being no sulphate of silver present as tested by hot water, and still not any noticeable per cent. of raw or undecomposed ore, therefore as it was not a sulphide, nor yet a chloride, nor yet a sulphate, and yet had taken up oxygen, I gave the name of sulphite of silver, supposing it to exist chemically combined with the sulphate of lead or the sulphites of lead and zinc.

Now for the remedy, for it is of the utmost financial importance that this should be overcome. I have found nothing that gave as good practical results as leaching with a bath of protochloride of iron and salt, the ore to contain, either natural or artificial, some per cent. of oxide or suboxide of copper. Said bath when applied to oxidized copper ore was patented in 1869 by Messrs. Hunt and Douglas, and as applied to silver ores was patented in 1874 by Hunt, Douglas and Stewart. Further practical workings during the past year have proven the fact of still greater utility in using said bath with mercury and metallic copper in wooden vessels, so arranged that the recovery of said bath should be economical and rapid; and thus used over and over again similar to the use of mercury (for which a patent is also applied for). And in presenting our improvements to the attention of the mining and milling community of the "coast," I do so desiring the fullest investigation and gentlemanly criticism, and if our improvements shall stand the test of time, I will not feel much depressed in having made a few errors in stating chemical reactions as set forth by Mr. Aaron.

J. O. STEWART.

Georgetown, Colorado, May 16th, 1877.

The Mechanics of Pan Amalgamation.

EDITORS PRESS:—It is not my purpose to take up the question of "not grinding" or "grinding" in pans, but to deal of such points as are or should be as applicable to one as the other.

Nobody will disagree to the assertion that for amalgamation a good circulation is required, but the numerous differing theories, or rather ideas, to attain this are illustrated in the various patterns of shoes and dies now seen in use. By their shape shoes and dies naturally divide themselves into two classes. First, inside feed—or when the pulp enters under the muller at the center; Second, outside feed, or the reverse of class first. In observing the pulp in motion, where no wings are employed, it will be seen that the pulp rolls up at the sides and down at the center, taking a spiral course around the pan; that with the inside feed this spiral course is uniform throughout and extends under the muller, while with the outside feed the spiral course is only above the muller, and at the center there is a boiling up.

For convenience we may say that two forces operate to give motion to the pulp; force direct with the muller and centrifugal force. In shoes that give an outside feed the advance edge touches a radius at the end toward the center, while the outer end extends ahead. The action of this may be compared to a plow throwing its furrows to the centre or against centrifugal force, which is power lost. Shoes of this class, to work successfully, require to be at the outer end about one-quarter of their length ahead of the radius. With shoes which give an inside feed the outer end falls back of the radius, or acts as a plow throwing its furrows outward and with the centrifugal force. Shoes of this

class do good work when their outer end is about one-sixth of their length back of the radius. These shoes give a current exactly as does a centrifugal pump; the slip is the amount taken under the shoe and it should be equal in its entire length, which is only acquired by a straight shoe.

Shoes and dies should be made to operate together to form the same current (in many mills they may be seen to induce directly opposite currents,) and when the dove-tails are alike in muller and pan there is no objection to, and much in favor of, having them of one and the same pattern.

The foregoing principles are as true for a "slum muller" as for any other, only a "slum muller" should have deeper grooves and perhaps a stronger draft. An old idea was to create a current by wings, but this did not extend under the muller or through the quicksilver. Wings of proper shape may be employed to add to the capacity of the pan by throwing the top current sooner to the center.

Mullers should be very open at the center. There are still two difficulties often met which shorten the service of the pan-driver. First, in many mills the toe wears out, and an otherwise good driver must be thrown away; a sure remedy is to make the toe-square amply large and a true fit to the muller, better if it requires to be hit lightly with a hammer to turn it to place. Second, the bore of the driver often wears oval with the long diameter through the key seats; by using spindles with three or four leather no wear will ever occur.

Whatever of theory this article contains the writer has thoroughly proven by practice.

M. P. BOSS.

Mining in Amador County.

EDITORS PRESS:—Volcano, Amador county, in common with the other mining towns, has never recovered from destructive fires that visited it when its more flush days of general mining had passed. But even now it is a beautiful mining town, having very many neat and luxurious residences, adorned with fruit, flowers and ornamental shrubs, and trees in abundance. The business houses are largely of stone and brick.

There are various stores, in all about half a dozen; the mechanics' shops very well represented; a photographic gallery and drug business is carried on by D. S. Boydston. This present year is alike for miner and farmer for scarcity of water, thus allowing but little gravel mining this season. But the little valley and mountain ranches seem very green and prosperous when compared to many of the lower valley ranches.

Volcano has a good local trade from the surrounding ranches and the various lumber and quartz mills for 20 miles above. Has a daily stage out by Jackson 12 miles and thence 12 miles to Ione City to railroad. There are many valuable mining properties in way of quartz and gravel claims here, abundantly proved to be rich, but now requiring some small outlay of capital to open them properly for successful working. The hopes of the camp are now brightened by the energetic movement of the

Volcano Gold Gravel Mining Company, A San Francisco incorporation with office at 331 Montgomery street. The company hold a tract of the best mining gravel of all this region, but owing to lack of drainage could not be worked to bed-rock. To obviate this difficulty they secured ample rights of way down the main ravine and are now running a working tunnel eight feet by eight feet in the clear, in the solid rock, which will, in less than 3,000 feet, strike their claims, 40 feet below the former workings, and afford an outlet for working many valuable mines.

The principal mover of this enterprise, Mr. George Muck, President of the company, has his name properly coupled therewith, as it is known as

The Muck Tunnel.

Now running three eight-hour shifts, and all first-class white labor under the Superintendent, L. E. Bamber; P. N. Peck, wood mechanic. The car is run by water power and a wire cable, a very economic success. Work began July, 1876, and have now completed over 600 feet, and have all their shop arrangements complete; will soon call to their aid the latest improved power drills, with which they confidently expect to reach their claims early the coming winter. To do this every foot of tunnel run will require the blasting and removing of over 10,000 pounds of hard rock, but the live interest shown by those in charge of the work is the best assurance that it will be successfully completed. It is not every mining camp that has an enterprise of such certain and apparent value as this, and yet it is a fact that in almost every part of Calaveras and Amador counties are

Openings for Small Capital

To engage in straight and legitimate mining, with ample assurances of success; and I am glad to see some one here and there taking hold in a quiet business way to properly open up old claims of gravel and quartz. Here and there can be heard the unpretentious little five or 10-stamp water mill doing its prospect work.

If only a small fraction of the wildcat stock money had been here invested in actual mine development, instead of going to enrich the office and street brokers of California street,

there would have been for the many a better prospect than now.

David Robinson & Sons, who have fine hill ranches on ridge three miles north of Volcano, also have a good five-stamp prospecting mill run by water power, with which they are prospecting several quartz leads. This looks like a careful way to prospect safely.

This country is full of opportunities for doing that safe kind of prospecting with even small means.

C.

Volcano, Amador county, May 28th, 1877.

The Lead Market.

We are in receipt of a circular letter from Edward A. Caswell, a metal broker of New York City, giving some of the causes of the present depressed condition of the lead market. His remarks are directed more particularly to the Missouri and Illinois lead miners, but they are, nevertheless, of interest to the lead producers of other sections. He says:

The fall in the price of lead last autumn was unexpected and unusually rapid, but the cause was a larger supply than the trade could absorb. The reaction from six cents currency in November, the lowest point touched, was slow, and as late as the end of January the price had recovered only to six and one-quarter currency. At that time the apparent and prospective supply was fair, and the legitimate price, according to the immutable laws of supply and demand, should have ranged through the spring from six to six and one-quarter cents, and there were no valid reasons for an advance beyond the latter figure.

At the beginning of March a speculative purchase was made simultaneously in St. Louis and New York, amounting in all to nearly 2,000 tons, an insignificant quantity compared to the supply and to the objective end which the buyers had in view. The price then advanced rapidly until it touched six and three-quarters cents, a figure which at that time was only two dollars per ton below the cost of Spanish lead laid down in New York, duty paid. It was therefore evident that speculation could in no case advance the price any higher and large buyers declined to take lead at that figure. A few small sales were made at the top notch, six and three-quarters cents, but within three weeks' time over 1,500 tons were sold in New York at or about six and one-half cents, currency. The parties who bought on speculation "held the candle" sufficiently high for other holders and agents to see their way clearly to selling at high prices, which they did freely. These sales were distributed among all the large consumers, and gave them so sufficient a supply that they were then satisfied to wait and watch the turn of affairs. Heretofore, the production of February, March and April, has been appreciably less than the consumption of those months, and during that period all the surplus was used up, and we began the summer with very light stocks; but this year not only has Missouri kept steadily increasing, but the output of argentiferous bullion in the first four months of 1877 exceeded that of 1876 by over 4,000 tons. The incoming supply was ample for the spring demand (rather a light one), and the stocks held on speculation proved to be a surplus, and were consequently unsought for by any anxious buyers. While the stocks on hand January 1st, 1877, throughout the country were not much over 3,000 tons, they are to-day nearer 6,000 tons.

It has been stated that the decline in price was owing to a "bear" movement in this city, but the incorrectness of this statement must be evident to any careful observer of figures and facts. There have been no sales made to depress prices, no rumors started, no importations, nor in fact any extraneous efforts to bring about a decline; on the contrary, sales have been from first hands and at the best price obtainable. The market has fallen of its own weight, and must recover either by fresh speculation or when the price gets so low that production is curtailed.

THE Black Hills Times of a recent date says: The influx of gold seekers is assuming vast proportions and surpasses the most sanguine prophet of a month or so ago. They are coming in upon every road and trail, and from every quarter of the Union, and represent all ages, sexes and conditions. The rush by the Fort Pierre route has increased greatly within the past two weeks, and there are now over one hundred arrivals daily. Steamboats leave Yankton every other day for Fort Pierre heavily loaded, and there are no longer any delays. Eight new coaches, fully equipped with extra horses, were shipped to Fort Pierre last Monday, to run between that place and Deadwood, making the trip in two days by daylight, and were to begin running Monday last.

THE Deer Lodge, Montana, Northwest, of May 18th, says: Miners are commencing to leave Deadwood to prospect the Wind river, Big Horn and Tongue river country. There will soon be a permanent cessation of Indian hostilities in that region. There is a superabundance of men in the Black Hills proper, and of these who have sufficient means many will prospect toward Montana this summer. There are also many prospectors on the Yellowstone who will move to the south as soon as it is considered safe. These circumstances indicate that if there is gold in paying quantities in that much suspected and little prospected region it will be discovered this season.

MECHANICAL PROGRESS.

Mixtures for Steel Tempering.

The *English Mechanic* furnishes the following formulas for tempering small steel articles: By melting together about one gallon of spermaceti oil, two pounds of tallow and a quarter pound of wax, a mixture is obtained very convenient for tempering any kind of steel articles of small size. Adding one pound of resin, it is used for the tempering of larger articles. The addition of resin must be made with care, for an excess of this material renders the steel too hard and brittle. After several months of use the mass loses its energy; it must then be wholly renewed, taking care to thoroughly cleanse the bottom of the tub which contained it. Another mixture of which practice has likewise proved the efficacy, consists of 20 gallons of spermaceti oil, 20 pounds of tallow, 10 gallons of ox-foot oil, one pound of pitch and 3 pounds of resin. The pitch and resin are melted together, then the three other materials are successively added, and the whole is heated in an iron pot till all the water is evaporated. This is ascertained when the mass takes fire at the approach of a burning chip of wood; the flame is put out by hermetically shutting the pot with a cover. The tempering is effected in both cases as follows: Saw blades, for instance, are heated in special ovens, and when they have reached the temperature they are dipped in the mass contained in tubs arranged side by side. For a continuous manufacture a certain number of tubs are used, so as to allow the mass time for cooling during the progress of the operation. As soon as the blade is cooled it is withdrawn from the bath and cleaned with a piece of leather, so that there remains still on it a thin layer of grease. It is then passed over a coke fire till the grease catches fire and burns with a clear smoke. In this way the blade acquires elasticity. If it is desired very hard, a part only of the grease is allowed to be burned; the more softness is desired the more the burning is completed. For springs the flame is left to burn itself out. If the objects are of various forms and sizes the burning is repeated on the several parts till all the parts are deemed equally tempered. The blades are finished by hammering and heating them again on a clear coke fire till they return to a straw yellow hue. The coloration is then taken away by washing in diluted hydrochloric acid, and afterward in plenty of water.

A NEW STYLE OF STEAMBOAT.—The *Baltimore Sun* says: George G. Caldwell, a Baltimorean, has invented a steamboat called the *Alpha*, without paddle wheels or propellers, which is projected by the repellant power of water. She is 40 feet long, 10½ feet beam, and four feet draft, with a 16-horse power horizontal boiler. Two streams of water by means of a force pump, are ejected by steam at the stern or bow as desired, below the water line, through two five-eighth inch nozzles, and the force of the streams against the larger body of water propels the boat. She obeys her rudder readily. The object sought to be obtained by the invention is the propulsion of steamboats on canals with as little disturbance of the water as possible. Mr. Caldwell recently took a number of persons on an experimental trip of the *Alpha* down as far as Fort Carroll, which was quite satisfactory. She has the appearance of an ordinary harbor tug, and moves through the water with a speed of nine or 10 knots an hour, but unlike a tug, makes no waves, and disturbs the surface of the water very little. During a stoppage made on the trip the hose was attached to nozzles and a stream was thrown 100 feet, to show the efficacy of the boat in extinguishing fires. Mr. Caldwell proposes to take his boat to Buffalo to compete for a prize offered by the managers of the New York canals.

PUDDLERS' PLUGS.—An English exchange notes an improvement in stoppers for closing the discharge openings of ladles or vessels used, especially in the Bessemer process, in the filling of the ingot molds. Mr. A. Mason, of Horwich, near Bolton, has invented an improved method of attachment, whereby the stoppers are not so liable to become detached from the rods as when previous methods of attachment are employed. He forms a slot or opening extending from one side to about the center of stopper, so that a rod formed with a head can be passed through the slot into a central position in the stopper, the remaining space in the slot being then filled up with ganister or refractory material. He prefers to form the rod with a tee head, and to so form the slot as that when the rod is introduced into position and turning a quarter round it cannot be drawn out of the stopper in that direction of its length. He makes the slot wider inside the stopper than at the outside, so as to retain the filling material.

A NEW PULVERIZER.—A disintegrator and grinding or pulverizing mill is described in the *Moniteur Industriel Belge*, which consists mainly of an internal and external cylinder, the former revolving at a not very high speed and carrying with it a series of shot or balls fitting loosely in hemispherical holes arranged along a spiral line round the cylinder. The machine is used for pulverizing various substances, such as grain, drugs, ores, etc., and is very simple.

How to Lay Street Railways.

At a recent meeting of engineers in London a paper was read by Mr. R. Souttar on street tramways. He said that Portland cement concrete formed the best foundation for a tramway, but care must be taken to give it time to set before laying and paving the lines. Where the work had to be hurried, bituminous concrete was preferable. Rectangular cross sleepers injured the concrete by their vibration, but if they had slightly beveled sides, this objection would be overcome. Tramways with cast-iron bearings had been constructed in this country to a limited extent, but timber was preferable, as the jarring was diminished, and the traveling was rendered noiseless and agreeable. The life of the rail was probably increased, and the concrete was saved from injury. Flat grooved rails, spiked through the groove, were first used, but the spike-heads wore so quickly that it was necessary to adopt a side fastening, and flanges were added to the rail, with holes into which clips were driven. The objection to this rail was that the fasteners projected and kept paving stones away from it. The author had introduced a rail, the flanges of which were brought in beneath the thickness of the clip, so that the clip could be driven flush with the rail. The paving of a tramway was expensive, but indispensable, as without such protection the rails would be shaken loose, forced out of gauge, and worn quickly. A row of paving stones on each side of the rail, with macadam between, was unsatisfactory, as it could not be kept in repair, so that the horses were lamed by running on an uneven roadway. Experiments had been made with wood, concrete, and asphalt paving; but the wear along the sides of the rails was so great that nothing would endure but stone. An impervious pavement was of special value on a tramway, as it prevented the water sinking alongside the rails.

BRONZE CASTINGS FOR LINCOLN'S MONUMENT.

—A communication from Springfield, Ill., to the *Chicago Times*, gives the following particulars of the bronze groups for the pedestal of the Lincoln monument: It has already been reported that the two bronze groups designed to ornament the base of the National Lincoln monument have arrived here, and that they are to be placed in position at once. These two groups were designed by Larkin G. Meade, of Florence, Italy, who is also the architect of the monument, and who designed the statue of Lincoln, already described. The groups were cast in bronze by the Chicopee Arms Company, of Massachusetts, and are said to be the most elaborate bronze castings ever executed in this country. They are now on the monument grounds, and have been so far stripped of their casings that a comparatively good view is to be had of them, and a really excellent idea of the spirit of the composition is obtained. They have already been inspected by many members of the General Assembly and by hundreds of our citizens.

PARIS WORLD'S FAIR.—The buildings for the Paris exhibition of 1878, says *Engineering*, are growing rapidly. On the Champ de Mars the foundations are laid. The angle pavilions, which are of masonry and 50 feet high, are ready for the iron domes that are to cover them; and the walls of the central gallery, which is likewise of masonry, and intended for the fine arts exhibition, are almost finished. The piers of the rest of the building are ready for the superstructure of iron and glass. On the Trocadero, in spite of the great difficulty of laying the foundations on the hill undermined by quarry-galleries, the two elliptical wings are built, the substructures of the great towers are laid, and the masonry of the central rotunda is finished. Two thousand men were employed upon the works; and up to the 1st of April 1,800,000 francs had been expended upon excavation and masonry; covering 158,000 cubic meters of excavation, 30,000 cubic meters of concrete foundation and 35,000 cubic meters of masonry. Six miles of pipes and sewers had been laid.

A METALLIC DROP CURTAIN.—Voss, Mutter & Co., of Berlin, are fitting a new metallic fire-proof curtain to the theater in Dresden, now rebuilding after destruction by fire. It is of corrugated iron. Exposed to heat a brisk circulation of air is set up in the sections of tubes formed by the corrugations, the heated particles ascending and colder particles flowing in to supply their place. The latter keep down the temperature so completely that a sweating breaks out in the plate of which the curtain, or shutter, as it is, strictly speaking, is composed. The shutter made for the Dresden theater is 40 feet high and 46 feet wide. The method of riveting the plates of which it is composed, and of raising and lowering it, are the subjects of patents.

BELT PULLEYS.—Mr. P. Jansen has devised a way of casting belt pulleys in parts so as to avoid the strains in the metal due to contraction and cost of turning. The rim is cast in a suitable mold of yielding non-chilling substance, but smooth and true, and the boss and spokes are cast in another mold. Afterwards the two parts are united by placing the rim on a face-plate and the boss on a mandril concentric thereto, and then pouring metal into a mold made upon the meeting parts of the spokes and rim, the metal joining the rim and spokes by suitable projections cast on the rim and cavities in the ends of the spokes.

SCIENTIFIC PROGRESS.

Monads.

An exceedingly interesting discussion on these minute forms of life was lately given in London by Dr. W. H. Dallinger, whose researches have been noted from time to time. He gave the results of his observations made during the last six years with high microscopic power on monads. Ten years ago he saw the need of such work in its bearing on the questions of spontaneous generation. No life history of any of these minute forms of life had been worked out; the experiments conducted by those who wrote on the subject relied on high temperatures to destroy organisms in the fluids they examined. After four years spent in preparation he commenced his work in conjunction with Dr. Drysdale, the plan needing two observers. A characteristic feature of the work was that each set of observations should be made absolutely continuously, so that nothing should have to be inferred. An arrangement was made by which the little drop of septic fluid containing the objects under examination should be free from evaporation, and very high powers were employed. The largest adult objects included in the examination were the one-thousandth of an inch, and the smallest adults were the four-thousandth. Six forms altogether were selected, and, by long, patient and unbroken watching, their whole history was worked out. While reproduction by fission seemed at first to the observers to be the usual method, prolonged research made known that spores were produced. These were so small that a magnifying power of 5,000 diameters was needed to see them as they began to grow. The glairy fluid from which they developed seemed at first homogeneous, and it was only when growth set in that the spores became visible. All that could be learned about the origin of the glairy fluid was that a monad, larger than usual, and with a granulated aspect towards the flagellate end, would seize on one in the ordinary condition. The two would swim about together till the larger absorbed the smaller, and the two were fused together. A motionless spheroidal glossy speck was then all that could be seen. This speck was found to be a sac, and after remaining still for ten to thirty-six hours it burst, and the glairy homogeneous fluid flowed out. The young spores that came into view in this were watched through to adult condition. Bearing on the subject of spontaneous generation, this fact was learned, that while a temperature of 140° Fah. was sufficient to cause the death of adults, the spores were able to grow even after having been heated to 300° Fah. for ten minutes. Can it be philosophical, Mr. Dallinger asked, with the life history of bacteria still unknown, to assume it has a different method of propagation? Some experiments based on Prof. Tyndall's use of the electric beam to test typically pure air were made. The remains of infusions known to contain certain spores were diffused through glass tubes, in which were placed vessels with fluid. Adult monads always appeared in the fluids, but when, after the air in the tubes had been allowed to purify itself by settlement, fresh fluids were introduced, no monads appeared. That there is no such thing as spontaneous generation of monads seems quite clear, and when bacteria are in like manner studied, there can be hardly a doubt the same law will be found to hold good with them.

"Growth" of Minerals.

The Mineralogical Society of Great Britain and Ireland is a new organization, but it finds itself abreast of a vexing problem thus soon. We read in English reports that at the last meeting there was a good sprinkling of scientific gentlemen present as visitors to hear Mr. Readwin read his promised paper "On Mineral Growth at Ordinary Temperatures, under Ordinary Conditions." This was a rather lengthy proceeding, but the novel interest was fully kept up by the continuous handing round of about 100 out of 500 at hand of gold specimens by way of proof positive of the truth of the proposition he enunciated.

There has been going on lately a correspondence in the *Chemical News* touching the growth of copper, silver and gold by the aid of heat, steam, hydrogen, etc., at a temperature as low as 300° Cent. Mr. Readwin looks on coolly, as if he should say, "Gentlemen, do not trouble yourselves; I can show you goings-on like yours, brought about somehow by the aid of hydrogen, steam, or heat, or anything else that I know of." This spontaneous "growth," as he half facetiously calls it, with the authentic stamp he seems to put upon it, if true—as Mr. Hutchings, one of the visitors said—really opens up an entirely new field of investigation, touching what Mr. Readwin alludes to in his paper—"Mineral formations in Relation to Time."

The lecturer said that about this time last year, at Aberdeen, he pointed out to Prof. Nicol palpable gold-growths in the museum of his University, and that within the last 24 hours only he had done the same to Mr. Moore, the courteous curator of the Liverpool Free Museum in the collection of that Institute.

After reading and speaking in explanation for nearly three hours to as attentive an audience as he could wish to have, Mr. Readwin wound up by telling of two interesting gold-

growths, which he said he was sure would be easily remembered—one was an angular fragment of auriferous quartz which had got buried in the palm of a miner's right hand after a "scattering shot" at a mine in Wales as long ago as 1846. He said that it was given to him by the miner himself in 1863, and that now there is gold-growth upon it, and it certainly looks like it under the microscope. The other fact was a gold shawl-pin, in which was set, by Hancock, in 1856, a bit of gold quartz from Dolfrwynog. This also has unmistakably grown, he says, and become partially curly, and a skeptic is obliged to acknowledge that it looks like it.

In addition to the reports we read that comment is reserved because more is to be heard of the subject from headquarters. Perhaps this means that some one is going to step upon Mr. Readwin and his theory of mineral growth.

Recent "Remains" in Santa Barbara County.

The *Santa Barbara Press* of April 21st, had an account of digging for "prehistoric" remains at Westminster. Large numbers of human bones were found and also a plentiful supply of bottles. Col. Otis made the philosophic observation, that the "curiosity hunters have simply struck a big graveyard of the native population whom the missionary *padres* found and taught here 80 or 100 years ago, and that they have been digging up the bones of the grandfathers and grandmothers of native people now living among us; or else that the glass beads and bottles found in these uncovered graves were obtained by the natives from Spanish navigators who traded along these shores in the time of Cabrillo and before. In either case the "prehistoric" character of the remains seems to be an extremely attenuated theory."

This position is approved by the following letter from the Pacific coast historian, Bancroft, which was read at the meeting of the Society of Natural History in Santa Barbara last week. It is in response to an inquiry addressed to Mr. Bancroft asking his opinion as to the supposed prehistoric character of the human remains, implements, etc., recently dug up in Carpinteria. The letter is as follows:

DEAR SIR:—Absence from the city is the cause of the delay in answering your very interesting letter. There is no evidence whatever in California of a race older or more civilized than that found by Europeans a century or so ago. In Mexico and Central America the case is very different. There are a few material remains in Northern Mexico, Arizona and New Mexico, but nothing, so far as I have been able to discover, north of these points. Very sincerely, H. H. BANCROFT, May 23d, 1877.

CHEMISTRY OF METEORS.—In a recent lecture Dr. Gladstone, an English scientific man, made these points: The shooting stars, which sometimes appear in showers, no doubt enter our atmosphere from the planetary spaces, and are believed to be connected with the orbits of comets. They seem to be very small pieces of solid matter, which are ignited by rapid compression of the air during their transit, and are dissipated into powder before they fall to the earth. There are, however, larger meteors, which, after their course through the sky, are seen to burst into pieces, often with a loud report, leaving a luminous track behind them. Similar appearances have sometimes been accompanied by the fall of stones from the sky, either singly or in many fragments, strewn over several miles of country. In ancient times these stones were often the objects of worship; now they are collected in our museums. In the finest collection, that of the British museum, there are masses varying from rough powder to a stone weighing three and one-half tons. They always covered with a crust, due to the melting or oxidizing effect of their rapid passage through the air. In chemical composition they show great differences, and while no new elements have been found in them, the arrangement of the constituents is different from that of terrestrial minerals. Some are metallic, principally iron and nickel, others are crystalline rock, consisting mainly of silicates of magnesium, but the large majority of these stones comprised both these species. The most curious points in the composition of some—such as the occurrence of monosulphide of chromium (Daubreilite), and hydro-carbons, were brought forward and described.

GEOLOGY AND THE DIAMOND DRILL.—Famous as is the sub-Wealden boring in the annals of English geology, the interest in it is for a while eclipsed by another deep bore carried on in the heart of London. The object of the new bore is purely commercial, but the scientific results of the operation are carefully noted and preserved for geologists' use. The intention is to sink a well for the use of a large brewery on Tottenham Court road. At 150 feet the clays and gravels were passed and the upper chalk began; from 490 to 812 feet the work lay through hard lower chalk and marl; at 840 feet gault; at 1,004 feet, "greensand," which is a solid stone. The work is done with a diamond drill. One crown of diamonds has cut 400 feet; but the strata have proved of very varied hardness, and the flints in the chalk have occasionally delayed the speed of the work, though not wholly stopping it. When there are no mishaps the progress is 14 or 15 feet per day. The value of the diamond crown of the boring tool is about \$500. Since the above was written advices have been received, stating that water was struck below the greensand and the flow was abundant.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 17.	Week Ending May 24.	Week Ending May 31.	Week Ending June 7.
Alpha.	84	98	98	98
Alta.	60c	25c	11	1
Andes.	40c	25c	30c	40c
Baltimore Con.	40c	25c	30c	40c
Belcher.	3	2.45	4	3
Belmont.	50c	35c	35c	45c
Best & Belcher.	10	7.14	11	14
Bullion.	3	2.00	2.35	4
California.	11	95c	1.95	2.10
Challenge.	27	23.74	25	30.74
Chollar-Potosi.	21	15.2	22	28
Confidence.	14	12	4	24
Con Imperial.	50c	35c	35c	45c
Crown Point.	27	23.74	25	30.74
Coso Con.	4	2.20	5	4.10
Eureka Con.	15	12.1	18	16
Exchequer.	1.80	1	2.40	3.10
Geddes & Bertrand.				
Gen. Thomas.				
Grand Prize.	4	2.60	4.70	5.4
Globe Con.	20c	5c	20c	15c
Golden Chariot.	41	2.20	3.10	2.1
Gould & Curry.	9.70	2.90	5.40	7.1
Hale & Norcross.	1.95	1.4	2.10	2.40
Hussey.	10c	10c	5c	15c
Julia.	11	90c	1.20	1.05
Justice.	4.15	2.1	2.4	2.3
Kentuck.	24	24	34	34
Kentuck.	24	24	34	34
Knickerbocker.				
Leviathan.	25c	10c	35c	30c
Levy.	11	1	1.45	1.20
Madison.	25c	10c	35c	30c
Modoc.	24	2.40	34	3.65
Manhattan.	64	6	7	7
Manhattan.				
Manhattan Valley.				
Mexican.	4.80	3.20	5.2	4.80
North Con Virginia.	10c			
Northern Belle.	11	15	16	15
Occidental.	34	3.10	34	3
Ophir.	81	64	81	12
Overman.	74	4	14	9
Pacific.				
Phil Sheridan.	34			
Panther.				
Poorman.	40c	20c	40c	20c
Prospect.	24	24	34	34
Raymond & Ely.				
Rock Island.				
Sage.	22	24	3.90	2.15
Seg Belcher.	15	11	15	15
Sierra Nevada.	1.25	7c	1.85	1.20
Silver Hill.				
South Chariot.				
Succor.	50c	37c	1.05	85c
Trojan.	2.55	3.30	2	2
Utah.	62	2.90	9	11
Wells-Fargo.				
Woodville.				
Yellow Jacket.	5	3.20	5	4

Sales at S. F. Stock Exchange.

FRIDAY, A. M. JUNE 1.		550	Grand Prize.	54	54
2020 Alpha.	11	10c	150	Golden Chariot.	24
2030 Best & Belcher.	17	15c	175	Gale & Norcross.	24
70 Belcher.	4	10c	140	Hale & Norcross.	24
1250 Sullivan.	4	45c	465	Julia.	1.65
1561 California.	30	35c	50	Justice.	4
750 Crown Point.	44	35c	250	Leviathan.	30c
590 California.	30	40c	420	Leopard.	1.10
1000 Con Virginia.	30	25c	395	Manhattan.	4
350 Chollar.	30	35c	380	Mexican.	4
100 Confidence.	40	35c	200	Meadow Valley.	25
765 Caledonia.	26	85c	200	Morning Star.	24
1320 Exchequer.	34	34c	210	New Coso.	34
1150 Gould & Curry.	34	34c	210	Northern Belle.	16
695 Hale & Norcross.	45	5c	160	North Carson.	10
1030 Julia.	1.35	14c	275	Overman.	12
910 Justice.	6	35c	300	Ophir.	10
Knickerbocker.	34	15c	150	Prospect.	35c
745 Mexican.	45	5c	160	Sierra Nevada.	35c
540 Ophir.	15	13c	460	Savage.	2.90
970 Overman.	124	12c	425	Silver Hill.	2.01
1365 Savage.	36	20c	30	Seg Belcher.	18
1155 Sierra Nevada.	4.15	24c	410	Sierra Nevada.	4.15
510 Union Con.	7	10c	1070	Union Con.	4.10
385 Utah.	11	12c	85	Ward.	25c
620 Yellow Jacket.	6	26c	45	Yellow Jacket.	54
AFTERNOON SESSION.					
100 Advance.	30	30c	270	Alpha.	10
300 Alps.	80	35c	30	Andes.	35c
500 Andes.	40	35c	1645	Best & Belcher.	15
200 Alps.	1	14c	45	Belcher.	41
1365 Best & Belcher.	15	14c	145	Bullion.	5.40
200 Belmont.	45	35c	50	Bullion.	5.40
500 Benton.	25	11c	1170	Con Imperial.	45c
750 Con Virginia.	23	29c	1140	California.	30
410 California.	23	30c	80	Chollar.	25
450 Crown Point.	155	30c	155	Crown Point.	25
1850 Con Imperial.	40	45c	970	Crown Point.	4.40
110 Chollar.	23	23c	1585	Caledonia.	2.15
60 Challenge.	65c	10c	100	Confidence.	41
200 Dayton.	60	60c	150	Dayton.	60c
210 DeFrees.	12	12c	1300	Exchequer.	34
5 Empire Id.	11	135c	300	Gould & Curry.	7
340 Exchequer.	24	27c	2005	Hale & Norcross.	3.20
50 Eureka Con.	16	40c	150	Justice.	60c
350 Grand Prize.	5	5c	370	Kosuth.	2.01
2710 Gould & Curry.	5	5c	370	Kosuth.	2.01
1550 Golden Chariot.	2	2c	785	Mexican.	84
150 General Thomas.	25c	10c	100	Morning Star.	24
310 Hale & Norcross.	2.70	24c	185	Ophir.	12
30 Jefferson.	30c	30c	330	Overman.	25
100 Kosuth.	25c	130c	300	Prospect.	35c
210 Leopard.	1.10	21c	200	Peytona.	25c
325 Leeds.	1.70	60c	765	Sage.	34
680 Lady Wash.	75c	30c	805	Sierra Nevada.	4.40
50 Leviathan.	9c	10c	10	Seg Belcher.	18
975 Modoc.	36	20c	755	Silver Hill.	1.10
275 Manhattan.	7	7c	400	Trojan.	80c
955 Mexican.	74	7c	770	Utah.	12
100 Meadow Valley.	40	40c	475	Union Con.	12
100 Morning Star.	24	24c	250	Yellow Jacket.	54
650 Northern Belle.	15	15c	80	Alpha.	10
500 North Con Vir.	10c	10c	145	Alps.	10
650 New Coso.	11	11c	325	Best & Belcher.	15
585 Overman.	11	11c	325	Bullion.	15
Prospect.	35c	35c	460	California.	65
170 Raymond & Ely.	5	5c	315	California.	25
360 Savage.	10	10c	320	Con Virginia.	25
585 Sierra Nevada.	3.70	30c	30	Chollar.	25
3 Seg Belcher.	18	18c	340	Crown Point.	3.90
840 Silver Hill.	11	11c	335	Con Imperial.	5.45
350 Trojan.	10	10c	100	DeFrees.	12
50 Woodville.	30c	30c	375	Exchequer.	34

SATURDAY, A. M. JUNE 2.		150	Grand Prize.	54	54
510 Alpha.	9	9c	500	Golden Chariot.	24
150 Andes.	30c	30c	1000	Grand Prize.	54
20 Advance.	3	3c	795	Gould & Curry.	64
1580 Best & Belcher.	15	14c	100	General Thomas.	5c
350 Belcher.	30	30c	150	Gla.	30c
380 Bullion.	40	40c	250	Hale & Norcross.	2.80
525 Belmont.	40	40c	420	Justice.	64
360 California.	28	28c	250	Jackson.	25
755 Crown Point.	3.65	30c	50	Jefferson.	30c
715 Con Virginia.	25	25c	425	Leeds.	1.65
130 Chollar.	24	24c	100	Leopard.	1.10
950 Caledonia.	1.80	90c	215	Mexican.	74
2635 Con Imperial.	40c	40c	680	Modoc.	2.90
130 Confidence.	4	4c	415	Manhattan.	64
130 Exchequer.	4	4c	50	Meadow Valley.	35c
100 El Dorado South.	30c	30c	300	New Coso.	34
165 Eureka Con.	164	164c	80	Northern Belle.	16
2185 Gould & Curry.	64	64c	195	Overman.	12

105 Ophir.	114	114c	415 Sierra Nevada.	34	34c
55 Raymond & Ely.	6	6c	1120 Utah.	12	12c
550 Savage.	3	3c	430 Union Con.	4	4c
130 Sierra Nevada.	34	34c	100 Yellow Jacket.	54	54c
50 Silver Hill.	11	11c	WEDNESDAY, A. M. JUNE 6.		
210 Union Con.	11	11c	100 Alpha.	10	10c
190 Utah.	13	13c	780 Best & Belcher.	14	14c
60 Yellow Jacket.	13	13c	105 Bullion.	14	14c
THURSDAY, A. M. JUNE 5.			185 Caledonia.	25	25c
105 Alpha.	10	10c	55 Baltimore Con.	50	50c
75 Andes.	35c	35c	835 California.	1.85	1.85c
940 Bullion.	4	4c	380 California.	25	25c
150 Belcher.	40	40c	250 Con Virginia.	25	25c
50 Baltimore Con.	50	50c	300 Con Imperial.	45	45c
280 Con Virginia.	25	25c	460 Con Virginia.	25	25c
2330 Con Imperial.	45	45c	610 Crown Point.	3.40	3.40c
655 Caledonia.	1.50	1.50c	100 Dardanelles.	3	3c
100 Chollar.	24	24c	305 Exchequer.	3	3c
100 Crown Point.	3.40	3.40c	1365 Gould & Curry.	64	64c
100 Confidence.	4	4c	760 Hale & Norcross.	2.60	2.60c
870 Hale & Norcross.	2.60	2.60c	185 Justice.	6	6c
750 Gould & Curry.	64	64c	935 Lady Wash.	1.35	1.35c
50 Hale & Norcross.	2.60	2.60c	200 Leviathan.	30c	30c
475 Julia.	11	11c	80 Lady Wash.	75	75c
445 Justice.	6	6c	935 Mexican.	74	74c
270 Mexican.	74	74c	245 Ophir.	11	11c
200 Morning Star.	24	24c	220 Overman.	13	13c
400 North Carson.	10c	10c	125 Prospect.	40c	40c
165 Ophir.	11	11c	250 Savage.	3	3c
405 Overman.	12	12c	350 Sierra Nevada.	3.70	3.70c
250 Prospect.	40c	40c	210 Silver Hill.	1.40	1.40c
755 Savage.	3.70	3.70c	350 Trojan.	70	70c
300 El Dorado South.	30c	30c	125 Union Con.	4	4c
350 Silver Hill.	1.40	1.40c	125 Yellow Jacket.	54	54c
20 Seg Belcher.	18	18c	AFTERNOON SESSION.		
300 Trojan.	70	70c	60 Alpha.	10	10c
550 Utah.	12	12c	1105 Best & Belcher.	14	14c
405 Union Con.	4	4c	55 Bullion.	14	14c
310 Yellow Jacket.	54	54c	100 Belmont.	45c	45c
AFTERNOON SESSION.			370 Crown Point.	3.40	3.40c
90 Alpha.	10	10c	830 California.	30	30c
770 Best & Belcher.	14	14c	50 Chollar.	25	25c
110 Bullion.	14	14c	100 Confidence.	3	3c
5 Belcher.	4	4c	220 Chollar.	25	25c
10 Chollar.	25	25c	150 Exchequer.	3	3c
670 California.	25	25c	155 Exchequer.	3	3c
380 Con Virginia.	25	25c	210 Golden Chariot.	2.55	2.55c
1485 Crown Point.	3.40	3.40c	200 Grand Prize.	54	54c
1090 Con Imperial.	50	50c	1735 Gould & Curry.	64	64c
220 Exchequer.	3.15	3.15c	1245 Hale & Norcross.	3.10	3.10c
300 El Dorado South.	30c	30c	560 Justice.	6	6c
350 Gould & Curry.	64	64c	3080 Leeds.	1.10	1.10c
1230 Grand Prize.	54	54c	70 Lady Wash.	75	75c

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

THE GOOD HOPE.—Amador Dispatch, June 2: The company who recently bonded the Good Hope mine, near the edge of town, have gone to work in good earnest to develop the mine and ascertain its real extent and value. The work is being prosecuted without cessation both day and night.

CRUSHING.—The Kearsling mill commenced crushing rock from the Evans mine last Wednesday night. Also the Onida mill commenced crushing Monterichard rock this (Friday) morning.

MODOC.—Amador Ledger, June 2: J. C. Ham has purchased one-half of this ledge. At present work is confined to running a tunnel to tap the lead at a greater depth. Two shifts at work night and day. The Modoc has yielded some excellent rock, and the quality seems to improve as sinking progresses. Three crushings have been made, the last two giving much better averages than the first. One of the owners tells us that the ore so far has surrendered 827, 840 and 887 to the ton.

PIONEER.—This mine is located near Mace's mill above Volcano. The Irving Brothers and Richard Stoken last summer discovered two small veins of quartz close to, or upon the Pioneer ledge, and which they have been operating at intervals ever since, and from which they have taken considerable money. There is now a dispute about the ownership of the ground.

MERK CLAIM.—The new quartz claim just opened up by Nevill & Co., near the Coney mine, about half a mile outside Jackson, is looking well. The shaft is down over 30 feet, and the ledge at the bottom shows three feet in width. The material is good, and the prospects are bright. The shaft is being worked by the Kearsling mill was started on the ore on Tuesday, and we are told the gold already shows well on the plates.

BUTTE.

MINING ON THE FEATHER.—Oroville Mercury, June 2: Within two miles of Oroville, there are more preparations going on for mining in Feather river than we ever knew before. The new mining machine of Hedge & Co. is working a complete revolution in the business of river mining. The grand trouble heretofore has been to get rid of the water. With this machine the water is wanted and a dozen or even 25 feet of it does not hinder or delay the work a particle. It can go on by day or by night. No windings in the way, nothing to interfere with the successful working of the machine. One of them is now at work on the claim of Col. I. C. Logan and W. S. Higgins, just below town, and is taking up gold at a rate only known to the owners themselves at the present time. Another, and a larger one, is being built up the river and will be ready to go to work by the last of June. This is to be used on Hedge's claim just above Feather river bridge, where it is claimed the bed of the river is very rich in gold. The Main Feather River company are to commence the construction of still another to be used on the old Cape claim, which they now own. This will be begun in a few days and pushed as rapidly as possible to completion. Of the richness of this claim there is no doubt in the minds of those who saw it when opened years ago. We may therefore expect to see three of these machines at work on our river, nearly in front of town, in less than six weeks.

BIG BAR.—From the Secretary of the Big Bar company we learn that work has been suspended on account of the lack of water. During ordinary seasons there would be an abundance of water except perhaps two months in the year. But this year with no snow in the mountains, the supply has been reduced to such an extent, not enough to carry the rocks through the sluices, and the company thought best to shut down until fall. The claim was purchased last January and put in running order, being completely fitted up with pipe, flumes, and two immense chutes, and it has paid well. Already parties on the look-out for paying claims are bidding for this, but as it is mostly owned in town, we hope it will not be sold. It is one of the best places for property in this State. **DUNSMITH.**—Cor. Butte Record: Our mines are second to none in the State. In addition to the extensive operations of the Spring Valley company, Ed. Davis & Co. have, within the last year, completed a ditch costing \$80,000, and they are now working one of the best paying mines in California. Mr. Vinton is working a large force of men on St. Clair flat. Mr. Beard is mining on an extensive scale north of the town. The Flat Valley company have established a mill within three miles of town, and are doing an immense business in lumber.

CALAVERAS.

TIGER.—Calaveras Chronicle, June 2: An immense ledge has been uncovered in the Tiger mine at Rich Gulch flat. A cross-cut has been run 14 feet without reaching the hanging wall, and no one knows how wide the ledge is. The ore is low grade, but there is such an immense body of it that \$5 rock can be made to pay handsomely.

THE RAIN.—One of the heaviest rain-storms of the season visited us this week. Rain commenced falling early Monday morning and continued, almost without intermission, until Tuesday evening. In the neighborhood of two inches of rain fell. Miners generally speaking the rain was a blessing, and the physiologists of miners and ditch men are corrugated with smiles. There is now a ditch full of water, and as considerable snow fell in the mountains, the water supply will continue several weeks later than the most sanguine had hoped. The consequence will be to extend hydraulic operations well into the summer.

Snow.—Considerable snow fell in the vicinity of Blue mountain last Tuesday night, and at a greater altitude it is said to have been unusually heavy.

SHILL RILL.—The remarkably rich rock struck in the Gwin mine several weeks since still continues, and the indications are favorable that it will be found the entire length of the level. The whole ledge, outside of the exceptionally rich streak, is composed of first grade ore, and we learn that the yield of the mine is largely increased. The Gwin is now certainly entitled to rank first among the mines of the coast, and its yield is greater to-day than that of any other quartz mine in California.

UPPER COUNTRY MINING ITEMS.—Intelligence from the upper country is of the most encouraging character. We are informed that the mining interest is in the most flourishing condition, and that the times are livelier in West Point than they have been for three years. Splendid rock continues to be taken from the Chamouni mine. There are 50 tons of first grade ore now on the dumps and about 100 tons of second grade. Crushing will be commenced next week. The crushing of ore from the Granite mine, in the Josephine mill, is about concluded. We understand that the company to whom the mine is bonded is much pleased with the result of the crushing and will undoubtedly be purchasing the property. Splendid rock has been obtained from the Anderson Flat and Woodhouse mines, and the probabilities are that sales will be made to San Francisco companies in both instances. The new Zacateno mill is about completed. The engine and the other appurtenances are on the ground, and it is expected to have the battery running next week. Any amount of rock is in readiness for crushing as soon as the mill is completed. Fields & Co. have run a tunnel over 400 feet on their ledge, obtaining good rock the entire distance—one of the longest pay chutes in the county. The Mina Rica is looking splendidly, the immensely rich ore mentioned last week evidently being a permanent attribute of the mine. At Railroad times are brisk. Sunderland & Co. have out about 800 tons of rock. We understand that they have leased Clark's mill and will commence crushing shortly. It is their intention to keep the battery constantly employed this summer, and we have no doubt but that they will be able to do so. Potter & Co., at Mos-

quito, are still mining surprisingly rich rock from the "Blue Jay." They are down 100 feet and the mine is making a most excellent showing.

INYO.

MINER NEAR UK.—Coro Mining News, June 2: Among the valuable mines near Darwin there are none more deserving of special notice than the Chattanooga, American and Silver Fort. We made a trip over to the Chattanooga and the other mines mentioned a few days ago, and although within seven miles of Darwin, we had no idea that such prospects were to be seen. Passing down the Darwin Wash trail, near to the first springs, we go up a trail leading from the "Wash" to the summit of the Argus range, lying between this place and Panamint valley, and upon the eastern side we find the Chattanooga, from which a large number of sacks of the best ore ever found in Inyo county has been taken out and now awaits shipment. This ore assays all the way from \$80 to \$250 per ton, being free-milling, with no lead whatever. The ledge is not wide, but the croppings, visible for a long distance, indicate that all that is requisite to establish a permanent and paying vein is deeper sinking thereupon. Their workings at present consist of two or three cuts run in upon the ledge from the east side of the hill, in every instance striking the ledge. The ledge lies between granite and limestone. There are several other mines in this same hill which show nearly as well as the Chattanooga, and in due time will receive the attention they deserve. We next went to the Silver Fort and found two men at work sinking an incline upon the ledge, and although looking well at a depth of 30 feet, to which the shaft has been sunk, it is not yet deep enough to indicate correctly of the mine. The mine is cropping true waste and character of the ore, however, lead us to believe that deeper exploitation will develop a most valuable mine. The ore from this mine is free-milling, in fact is impregnated all through with horn silver and rich black and grey chlorides. The fact that this mine is within a mile or so of springs of sufficient capacity to run an 80-stamp mill makes it all the more valuable. Ore from the mine can be delivered at a point where the mill might be located for not to exceed 75 cents or \$1 per ton. We predict that before another year has passed one or two mills will be industriously at work upon ore to be extracted from the mines in this particular vicinity.

NEVADA.

EMPIRE.—Grass Valley Union, June 5: This mine has quite a history. It is situated on what is known as the Ophir Hill ledge. The location was made in 1850, by George D. Roberts. In 1851 Roberts sold to Woodbury, Park and others, and in 1852 that firm failed and the property was sold at auction. John R. Rush purchased one-half of it and the Empire Mining company the other half. In May, 1855, Rush sold his half interest to the Empire company for the sum of \$12,000. During all the changes work on the mine was kept up. The mine has been more than once on the point of shutting down, and underground appearances have caused the trustees frequently to consider the propriety of quitting work. Whenever, however, the pumps were ordered to be taken out and the machinery housed up in silence, the ledge delivered a new and sudden richness and more strength, which caused sudden countermanding of the orders to stop. The Empire mine in that matter seems to have been a sentient thing. The mine is skillfully and economically managed by David Watt, Superintendent, and he is ably seconded by James Bennelack, Underground Foreman. For a long time the returns from the Empire have been uniformly good, and the oldest working mine in the State has been a constant source of wealth. A man-up made for last Saturday gave about \$16,000 in gold, not including sulphurets, for a 20 days' run of the mill.

THE IDAHO shows no material change. Yesterday the trustees met and declared the 94th dividend of \$7.50 per share of capital stock. This gives \$28,250 for the month just past.

SHALL VALLEY NEW.—The hoisting works have been in running order for several weeks. The contractors for sinking the old shaft, which was 60 feet in depth, have got down 23 feet, making present depth of shaft 83 feet. The ledge in the bottom of the shaft 18 inches on one side and 12 inches on the other.

BULL-DOZER.—This valuable mine, located some months ago by Judd and Hearsch, still continues to send out \$150 rock.

BUFFALO.—This property is situated north of Cincinnati flat, and is owned by J. W. Peters & Co. A crushing was had four loads of ore a few days ago, and the result was \$80 worth of gold, or \$20 worth to the load. The owners are going to put on eight hour shifts and do constant work. The mine looks promising.

INKERMAN.—On Lafayette hill, located in 1854, and near the North Star mine. For many years it yielded no rock was done up to it to hold the property, but that work showed most excellent quartz—much of it being beautiful specimens. It is now owned by Oakland capitalists and is being developed with satisfactory results.

HOMEWARD BOUND.—Located in 1854. It is in an excellent quartz region. The machinery has been lately removed to the new and permanent shaft, and the pump was started up yesterday. A common rumor had it, a few days ago, that the Omaha had shut down. The rumor was not true. The Superintendent pulled up 120 feet of pumps, and prospecting will proceed in the upper levels to the north of the shaft, to find a pay chute.

ALASKA.—Is running full handed, and is taking out and milling ore that is paying well and profitably, and, at the same time, is sinking the shaft ahead with a view of opening up other levels.

KENTUCKY RIDGE MINE.—On the tunnel level the west drift is down 185 feet and the east drift 125 feet—the ledge being from 18 to 21 inches in width, and prospects well throughout. The building and machinery for an eight stamp mill is now on the ground, ready to be put up. It is expected that the mill will be completed early in July. It will be run by water power, by a ditch from Deer creek. A contract has been let for building a dam across Deer creek and constructing the ditch. The dam will be 13 feet in height, the ditch 24 feet in width and two feet in depth, and 260 rods in length. The mill will be run by an overshot wheel 304 feet in diameter and will be capable of running 20 stamps. When the mill is ready to start, a compressor will be put up, and two Ingersoll drills set to work for the speedy completion of the second, or lower tunnel level.

NEW YORK HILL.—The main incline is being sunk for the 9th level. The company intend putting in a compressor and power drills, and are only waiting to decide which is the best to adopt. Ore is taken out of the 6th and 7th levels in sufficient quantity to keep stamps and 40 men are doing regular day work in the mine, and 35 men are engaged to do contract work—driving the 8th level, sinking winzes, etc. The mine is looking well, is paying expenses, and with the opening of the 8th and 9th levels, dividends are confidently anticipated. The mine is superintended by George Johnson.

PITTSBURG.—The 7th level north of the shaft has been driven in 187 feet, and is in fine body of ore. The work, commenced several weeks ago, and shows a fine ledge all the way. Over 100 tons of rock is now being crushed from this portion of the mine, which shows a yield of \$30 per ton. An air compressor has been put in, and power drills (the National) have been set in the stopes between the 6th and 7th levels. By the last of this week two of these drills will be started on the 6th and 7th levels north of the 7th to the 8th level. It is thought the shaft can be put down to the 8th level in six weeks. Tribute rock is being taken from the levels south of the shaft, but the main development of the mine is being made to the north of the shaft, where a rich pay chute is found down to the 7th level, which has a northerly pitch on the course of the vein. The same chute will be out on the 8th level, and will give extensive beds of high grade ore.

LAFAYETTE NO. 2.—Is the southerly extension of the original Lafayette, on Osborn hill. The latter claim has, in years past, yielded ore which milled \$40 to \$150 per ton. The deepest workings on the ledge attain a depth of

only about 70 feet. Usually 50 feet reaches water in such quantity as to render the aid of machinery imperative. Machinery has never been employed. The company owning Lafayette No. 2 will proceed at once to run a tunnel at such a place as will enable them to cut their ledge at a point which will give them about 120 feet of backs. This will be the greatest depth, by 60 feet, yet reached on the ledge.

LOWELL HILL GRAVEL MINES.—The Swamp Angel mine near Lowell hill is working away with grand success. The ground is worked by drifting and is paying better than any drift mine in the State, the sum of \$30 a day to each hand being realized. The Planet, adjoining the above and on the same ledge, is having a tunnel driven direct for the place in the channel where splendid pay gravel was found in the old tunnel—the old tunnel being too high for successful work. The Planet company own 240 acres on the ledge. The ground has been thoroughly prospected through the mine and is known to be rich. The contractors who are running the tunnel have known the ground for years and they take a good portion of their pay in stock of the company. In the winter the Centennial has again struck the pay chute, and are taking out more of that rich rock. A crushing at John Smith's Orleans mill is now going on. They began crushing last Saturday. Dillon has all the machinery up and will start up about Thursday of next week. Pacific, of New York hill, is paying well, averaging about \$110 to the load. The "Couch" is about 3,000 pounds. Hughes McGuire & Co., adjoining the Pacific, on New York hill, are taking out fine ore that will pay well.

SUGAR LOAF.—Nevada Gazette, June 2: Frank Guld is sinking on a ledge next to the road leading to Sugar Loaf. The rock from this ledge is rich, and, if thoroughly worked, will undoubtedly develop into a good mine. Henry Randol and Wm. Sloan are prospecting a quartz ledge at Coyote hill. They have an incline down 40 feet. The ledge varies from two to 12 inches in width. It shows well in free gold and carries sulphurets and galena. Captain Connor has caused work on the North Banner and taken up the machinery used there. We hear it said that the ledge will not be abandoned, but, when worked again, heavier machinery will be required.

PLACER.

ANOTHER BONANZA.—Placer Herald, June 2: Beside the bonanza struck by A. O. Bell, as mentioned by us on former occasions, he has another ledge near Bald hill, from which he is taking out much as much as the pay chute. Some parties have put a string of sluice-boxes in Red ravine, about a mile below town, and are washing out some old ground that was mined over in early days.

The Big Gun hydraulic mine, owned by the Van Emom brothers at Michigan bluff, has been able to get in only about 20 or 25 days' run this season, though for the time they have done well.

MILBERRY & CO., the purchasers of the Dardanelles and Oroville hydraulic claims, near Forest hill, have closed down for the season, and express themselves, we understand, as very well satisfied with the results. They propose putting on a force of men for the purpose of running a hydraulic tunnel and fitting up their claims generally for the next season.

BEECE & WICKLER., owners of the famous hydraulic claim at Bath, have shut down for the season after a run of 55 days of 10 hours each, from which they realized about \$40,000. With their large four-foot flumes, put in last year, and steep grade, they are enabled to run off very large boulders, which enables them to work the claim at much less cost than formerly.

Most of the hydraulic claims on the north side of the Forest Hill divide, near Smith's Point, Brushy canyon and Yankee Jim's, are reported to us as having had a reasonably fair season's run. Most of them have now shut down.

SHERIFF & LAWLER, whom we mentioned recently as having realized over \$130 per ton from a small crushing of rock taken from a ledge recently discovered by them about a mile north of Auburn, continue to find most encouraging prospects. They have made a thorough examination of the ledge for about 200 feet along the surface, and find it two feet wide and rich for the whole distance. About 150 feet from their main shaft they have sunk another about nine feet deep, and find the rock the same as in the first shaft, very rich in galena and free gold.

MR. WILLIAM TAYLOR, who has been working for some time on the Taylor & Gwynn mine, about a mile south of Auburn, near Bloomer ranch, has just completed a whim for hoisting purposes. He is now down about 60 feet, has a ledge two feet wide and growing wider as he sinks, and has never sunk a foot, it is said, without taking out rock that showed free gold.

THE STORM.—Dutch Flat Forum, May 31: Our miners have again been made glad by an unusually heavy storm for this time of year, which we are informed has deposited about 18 inches of snow on the mountains above us. This will extend the winter season beyond the expectations of the most sanguine, our mines are all washing about the same as last reported, and the time has not yet come for their monthly clean-ups.

SHADY RILL.—Hydraulic still progresses in the Wild Yankee; and from the large amount of gold that is seen in cleaning bedrock, the results from the next general clean-up is expected to be very large. The North American is again the scene of activity, the force of men having been increased and the dirt now being extracted is said to be paying large dividends.

REMINOTON HILL.—Ground sluicing continues to be the leading feature in the Rhode Island, the results from which as usual pay well. The Wide West company have added several improvements to the working of their mine, consisting of a large water tank, dirt dump, new sluices and box. Both tunnels are being advanced rapidly; the gravel tank is being extended to the very rich ore. The drift that was opened east of tunnel No. 2 was found to be too high for practical working, another is being opened on a lower grade, and the gravel they are passing through it is said will pay large dividends.

LOWELL HILL.—The Swamp Angel mine was never in a more prosperous condition, there being a large amount of ground opened up ready for breasting out, all of which will pay good dividends. This company declared another dividend last week.

LIBERTY HILL.—The Liberty Hill company are washing with two streams, and considering the amount of boulders they have to contend with, are making good progress.

YOU BET.—Washing in the Nees & West is progressing without interruption. The Walopoa, last week, after a very fair season of 10 hours each, cleaned up and shut down for the season. The Nevada company are still washing from four points, which they expect to be able to continue until September. The Hussey company made their final clean-up last week, resulting in the obtaining of five or six thousand dollars in amalgam.

SIERRA. **BETTER AND BETTER.**—Mountain Messenger, June 2: The Swallow company, of Monte Cristo, have declared a dividend for May—four weeks working time—of \$145 to the interest, \$100 more than that for the preceding month. The gross yield was \$2,135. This is over 22 cents interest for that time, each dollar invested. The boys declare they will keep it up next month.

BELL'S BAR.—A company of gentlemen from Forest City and San Juan have taken up a claim on Middle Feather river, in Plumas county, and will commence work immediately. They have a splendid prospect of striking the real blue lead, which can be traced about nine miles to Nelson Point.

P. H. CHASER.—A gentleman has bought an interest in the Swallow claim, Monte Cristo, which he intends working.

SNOW.—It is reported that about two and one-half feet of snow fell at Gold Lake during the storm, and about 18 inches at Rattlesnake.

CHUNKS OF GOLD as large as your hand have been taken out of the Bald Mountain claim this week, at Forest City. The last clean-up here was larger than any heretofore.

Some more rich discoveries were made this week, near Forest City.

There was a cave in an air course in the Bald Mountain this week, which it took three days to repair.

TRINITY.

CLOSED FOR THE SEASON.—Trinity Journal, June 2: J. G. Trotter informs us that this week will end piling, and work in the Union Hill claim will be closed for the season. The claim was in a terribly bad condition when Trotter took hold of it last year, but is now in a condition for making a splendid winter's work next year. The slide den top, which checked work a year ago, has been moved up to solid earth all around, and the course of the pay streak for over 200 feet in width exposed. The claim now shows heavier "wash" than ever before, and every miner knows that to be a good indication.

CHANGED HANDS.—The claims at Point Bar, with the ditch, carrying water thereon from Foker, or Tom Lang's ditch, was sold this week to Mr. J. C. Wallace. We are informed that it is the design of that gentleman to bring the ditch along on a higher grade from Murphy's Flat, and extend it to the claims of Hughes & Wallace, opposite Garden Bar. The proposed re-survey also gives a better pressure to work the Point Bar claims.

TUOLUMNE.

THE MOUNTAIN MINES.—Union Democrat, June 2: A correspondent, who has been rambling through the mining region in and about Summerville, informs us that Mr. Reuben and partner, who are working a re-location of the great Eastern mine, have struck the pay chute of the ledge at the south end of this level, having connected \$23 per ton. This mine is situated above the on unstocked ranch, and in early days was worked by the Nalls Brothers with good results, the rock at that time paying from \$70 to \$100 per ton. The pay chute was lost and the mine abandoned by the original locators, lying idle until within a year ago, when it was re-located by Mr. Brooks and partner, who, in cleaning out the debris, struck the lost lead. The present enterprise in re-opening an arastra on the mine, and have several tons of good ore on the dump, which will be worked by this process as soon as the arastra is completed. The work of extracting the ore continues.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—Gold Hill News, June 6: Daily yield, 500 tons. The various ore breasts through out the mine are looking well and yielding finely. Especially is this the case at the 1650-ft level, where the great ore body being breasted out is all of high average grade. The drift south of this level having connected with the deep winze, it is being trimmed out and enlarged to allow of the best possible passage for the air. This connection allows of good ventilation, and has cooled off that portion of the mine considerably. The broken crank shaft at the Consolidated mill will be replaced by a new one in a day or two, when the mill will be run to its full capacity as before.

YELP.—The east drift of the 2200-ft level is in 85 feet to-day, and still continues in regular vein matter, consisting principally of hard bird's-eye porphyry, with occasional small streaks of quartz. Little or no water is encountered. The lateral drift south at the same level, following the ore vein, is also in 85 feet, and, during the past few days, has been passing through quite a number of streaks of quartz, giving promise of ore development. The drift south of this level, which is now in 85 feet. In fact, this level, which is 750 feet below the level of the Suro tunnel, is as dry thus far as could be wished.

JUSTICE.—Daily yield, 450 tons. This quantity, however, will be increased as soon as preparations to that effect are completed. On the first of the present month a transfer of the milling of the ores from this mine was made to the Union mill company, and to-day the hauling of the ore by the Overman street car to the Virginia and Truckee railroad was commenced for transportation to the mills of the company, on the Carson river. The mine is looking, at present, better than ever before in its history. Plenty of good milling ore is in sight in the upper working levels, the winze below the 800-ft level continues in fine ore, the face of the main drift south at the 1000-ft level shows more and more improvement in the quality of the complete drift advance, and the main drift east at the 1100-ft level is running very favorable vein material.

CALIFORNIA.—Daily yield, 500 tons. The mine is looking exceedingly well, and the various ore sections are yielding handsomely, as usual. The winzes sunk below the 1600-ft level are making good progress, and the bottoms of each are in rich ore. The foundations for the large new air compressor are being pushed forward to completion, and other preparations are being made to secure better ventilation to the lower levels through the C. & C. shaft.

NEW YORK.—The third compartment to the shaft has been completed, and timbered throughout, from top to bottom, in a workmanlike manner, and this shaft is now one of the best in the State. The pump tank stations are cut out, and the pump is ready to be put in whenever required.

LADY WASHINGTON.—Arrangements are now being made to open and work this mine through the 1150-ft level of the Justice. This will be an important as well as economical move, as it will open the mine at a considerable depth below the present lowest workings.

LEVATHAN.—The face of the south drift at the 600-ft level is now nearly all in ore of a fair milling grade, which shows constant improvement in both quantity and quality further up the level.

OVERMAN.—The south drift, at the 1100-ft level, is pushing ahead in very favorable vein material, carrying occasional streaks and bunches of ore.

SURO TUNNEL.—The header is now passing through vein material, which works easy, allowing of much better progress than heretofore. This tunnel having now reached the vicinity of the Comstock, might have been in ore body at almost any time. Total length of tunnel to-day, 17,947 feet.

UTAH.—The drift eastward at the 1100-ft level, cross-cutting the ledge at that point, reached the east wall yesterday morning, and a drift south has been started from it to explore the ledge in that direction. This cross-drift shows the ledge to be over 100 feet wide. It is simply a huge, solid, well defined vein of solid quartz, showing no impure opportunity for finding some in drifting either south or north.

CHOLLAR-POTOSI.—Daily yield a little over 100 tons. Average assays, \$25. Total yield for May, \$43,550. The old ore sections hold out well.

IMPERIAL CON.—The south winze below the 2185-ft level is making good progress downward, and is passing through quite a number of rich ore breasts.

CALIFORNIA.—To-day the sum to the shaft is being completed below the 1600-ft level. Will open a station at once and start a drift west for the ledge at that level.

GOULD & CURRY.—The V bob for the heavy pump has arrived, and as soon as practicable the pump will be put into working condition.

JULY.—The cross-cut west from near the south end of the 1300-ft level is steadily advancing and shows constant improvement, assays yesterday averaging \$13 to the ton.

UNION CON.—At the 1300-ft level the drift north is steadily advancing, and showing constant improvement in the character of the vein matter encountered, more and more quartz making its appearance.

PROSPECT.—Work is suspended at present in order to make room for the new machinery.

BLANCHER.—Daily yield, 75 tons. Prospecting at the 1000 and 1600-ft levels goes forward as usual.

CROWN POINT.—There is no decrease in the flow of hot water from the face of the east drift or cross-cut at the 2000-ft level, and the heat makes it almost impossible to work there. The prospects are very good, however, for a development of some kind.

OUTA.—Daily yield, 40 tons. At the 1900-ft station the station timbers are put in and a sump is being completed and as soon as a water tank can be cut out and the pump lowered a drift will be started to open out the 1900-ft level.

BEST & BLANCHER.—Good work is being done on all prospecting points, and the machinery operates finely.

MEXICO.—The north drift at the 1462-ft level is run-

Continued on page 372.

THE ENGINEER.

A Monument on the Sand.

It is perhaps well that the Washington monument, which has been the mortification of the people ever since it was begun, has not been completed.

The commission heretofore appointed to examine into the sufficiency of the foundation of the Washington monument, consisting of Lieutenant-Colonel Kurtz, Duane and Gilmore, submit their reports as follows: First. That the stratum of sand and clay upon which the monument rests is already loaded to the limit of prudence, if not, indeed, to the limit of safety, and that it does not offer sufficient resistance to compression to justify completion of the shaft in accordance with the modified design or any other design that will load the underlying soil beyond 10,000 pounds per square foot. Second. That the additional weight imposed at the top of the structure will, in all probability, cause additional and probably extensive spilling and splitting in the ashlar facing near the base. Third. It is evident that the masonry foundation was not given spread enough to carry safely the weight it was designed to place upon it. If sufficient spread and depth had been originally provided, the full height of the structure might have been placed upon it, and the weight distributed over a larger area, so as to be within the limits of security. Fourth. There has been an actual compression of the soil to the extent of between eight and nine inches; the shaft is sensibly out of plumb, and the foundations show an increasing departure from horizontality. The imperfections may be expected to increase as additions are made to the weight of the structure, if not to a dangerous degree, at least to an extent that will make the monument very unsuited to the purpose for which it was designed. If it were a tower, or shaft, or chimney, intended for manufacturing or industrial uses, such defects might be overlooked and useful results still expected from it. But this structure is to be an exposition to the world of the estimate which is placed upon Washington by his countrymen. It is a great bare obelisk, plain to severity—a conception, perhaps, most suitable to symbolize the great character it would commemorate, but for these very reasons exacting in all its parts and particularly in all its foundations. The stones which compose the foundation should be strong and perfect, and truly shaped and accurately placed together. There should be no yielding of the parts and no disturbance of the levels. Upon such a foundation a monument could be reared fit to commemorate Washington, and worthy of the nation of whose foundation he was the chief master-builder.

Life in the N. P. R. R. Enterprise.

From reports in the *Railway World* we learn that the North Pacific railway enterprise shows some hopeful signs of life. It has gained possession of that portion of the St. Paul and Pacific between Watab and Brainerd, which was to shorten the distance from St. Paul to Bismarck, on the Missouri river, and to Manitoba, in the Canadian Dominion, 100 miles. The unfinished interval was 64 miles long. It was mostly graded, partly tied and bridged. The Holland bondholders, who financially controlled the property, refused to advance more money. The N. P. R. R. Company agree to finish the road in August, and have Northern Pacific trains running into St. Paul.

The *Railway World* remarks further that the stockholders of the company had a most satisfactory surprise at their recent meeting, in that, instead of being confronted by a directorial scheme to raise money to build and equip the company's branch to coal, they were met with a resolution adopted by the board the day previous, that the revenues of the road had so increased, and were so increasing, as to suffice for the completion of the branch, and to make a resort to mortgage unnecessary.

The reorganized Northern Pacific Railroad Company has astonishing life and promise. It has, within four months, nearly completed 31 miles of road to an 11-foot vein of the best bituminous coal. Both divisions of the road earn a surplus; a largely increased area of its lands have been put into "No. 1 spring" wheat, and the promise of traffic from this source this year is great. The country on the line of the road in Minnesota and Dakota is rapidly settling with farmers.

A corporate meeting, which began with resolving to keep out of debt, fitly closed by the stockholders instructing the directors to devise and present to them, at a future meeting, a plan to raise means to extend the road west of the Missouri river into Montana Territory.

RAPID BORING.—A remarkable example of rapidity in deep boring has recently been furnished by the first bore hole put down by a company formed to search for coal in Switzerland. A depth of 1,422 feet was reached in two months, including the re boring of the upper 640 feet from three and one-half inches to seven inches in diameter. The work was done, including all delays, at a rate of over 1,000 feet per month, the highest speed being nearly 77 feet in 24 hours. The results obtained were negative, the section showing about 1,200 feet of Permian strata resting upon old crystalline rocks, but the trial is only the first of a series.

The New Bergen Tunnel.

The new tunnel through Bergen hill, back of Jersey City, was formally opened on May 12th, about three and one-half years from the first beginning of work. In 1873 there were excavated 690 linear feet; in 1874, 2,922 feet; and in January, 1876, the tunnel was finally opened through its whole length. By this time, however, it had been found that the rock was less solid than had been supposed, more friable and likely to fall, and it was necessary to arch the tunnel for the greater part of its length. This work has been thoroughly done, but it necessarily took much time.

The tunnel has two tracks and is 27 feet wide and 4,219 feet in length, exclusive of the heavy stone arched portals, 35 feet long at one end and 25 at the other, making a total length of 4,279 feet, or 100 feet shorter than the Erie tunnel. The shafts are seven in number, giving light and ventilation. Nos. 3 and 4 shafts are the full width of the tunnel, and all are surmounted by a brick wall rising to a height of 16 feet above the surface and open on top so that the smoke may freely escape.

It was at first designed to have an open cut at shaft No. 4, which is about midway, to the extent of 300 feet; but this idea was abandoned, and there was constructed instead a large shaft, 27 by 18 feet. Here a signal station may be placed, so that two trains may be run in the same direction at one time, thus doubling the capacity of the tunnel.

The masonry in the side walls is two feet thick and 10½ feet in height. This is surmounted by a brick arch 22 inches thick, covered with felt and asphaltum where there is a chance of water leakage. The space between this and the rock is filled with broken stone and concrete. The arching is carried three-fourths of the length of the tunnel, the remainder being a solid mass of rock, so that no apprehensions may be felt in regard to the falling of fragments of rock. A better idea of the extent of the tunnel may be formed from the fact that 94,000 cubic yards of rock and 76,000 cubic yards of earth were excavated therefrom. In arching the tunnel 10,000 cubic yards of rock and 5,000,000 brick were laid. The track is of 68-pound steel rail, and the ballast consists of broken stone. The trap-rock was found to be difficult to drill, but easy to fracture.

Improvements of the Mississippi.

Captain Eads has achieved such signal success with his engineering dentistry in the mouths of the Mississippi, that he now proposes to doctor the upper portions of the river. He has matured a plan which is a practical application of his jetty theory, to the entire extent of the river to Cairo, and we suppose also to St. Louis. It is to reduce the width of the river, making the entire body of water pass through one channel, which, by the increased velocity, scours out the sediment formed as it becomes wider and the velocity of the current correspondingly weakened. The work at the jetties has increased the depth of the South Pass from eight to twenty-two feet, and the depth is still increasing. This plan, if applied to the full length of the river, would supersede the necessity of the levee system, for this regimen would keep the river in its banks at flood height, and the rich alluvium of the valley would be saved from overflow without levees. The estimated cost of the levees is \$44,000,000, and even when made they are liable to break in high floods or to cave off, leaving large districts exposed. We have heard no estimate of the cost of Captain Eads's proposed work, but have no idea it would reach near this vast sum.

The *St. Louis Journal of Commerce*, from which we take the above facts, remarks further that there is nothing to prevent the establishment of a permanent channel of twenty or twenty-five feet depth from the City of St. Louis to the mouth of the river. And now that the jetties have secured that depth to all the outer markets of the world, there is no reason why ocean steamers with that draft should not ascend the river and discharge cargoes from all parts of the world, and load again with Western produce and manufactured articles to supply their varied wants. But in place of this we have the miserable condition that for not more than four months in the year does there exist an assured depth of ten feet in very many places from here to the Balize. The result is that much that is produced, unable to bear the high rates of rail carriage, does not go to market, and the inducements to increased production are destroyed.

THE OTHER SIDE OF THE PICTURE.—The *Deadwood Times*, pitying the condition of the thousands of tender-feet who do not know a mine from a mill-site, but rush into a new gold district with barely money enough to get there, under the delusion that they will find gold lying around loose, tells the following tale of misery: "Our city physician reports a considerable number of immigrants sick in their cabins. There are too many men coming to the Hills with barely enough money to bring them here, and the result is they become sick from exposure and destitution. The bulk of those who come in this way to the Hills know nothing of mining, and necessarily are in a bad way. The sooner men can be made to understand that mining to succeed must be systematically prosecuted the same as any other business, and is more precarious than farming or merchandising, and requires an investment of capital, the better they will be off."

The Rights of Aliens to Mining Property in the United States.

A Supreme Court Decision.

We condense the following from the detailed decision of the Supreme Court of Nevada, in the case of the Ruby Consolidated mining company (limited) appellant, vs. Hermann Heynemann, et als, respondents. The case is a very important one, but the decision is unfortunate for the encouragement of foreign capital in our mines. We have commented on this point in another column of this issue:

"It was admitted in open court by counsel for plaintiff and defendants that, at the time of the commencement of this action, the plaintiff was and is a corporation, organized under the laws of Great Britain, and not a citizen of the United States, and that it never had declared its intentions to become such. Plaintiff thereupon offered to establish by testimony all the allegations in the complaint herein, and defendants thereupon objected to such or any evidence, on the ground that the plaintiff, not being a citizen of the United States, nor having declared its intention to become such, and being a foreign corporation and an alien, cannot enforce the contracts or trust set forth in said complaint, and that the same is contrary to public policy and to the laws of Congress relating to the public mineral lands; and the court sustained such objections and refused to allow plaintiff to introduce any evidence or testimony, to which ruling and decision counsel for plaintiff then and there excepted." Whereupon the court denied the injunction and dismissed the application.

The appeal from the order of the District Court consequently involves but one question: Whether, taking the allegations contained in the complaint to be true, they show a *prima facie* right in an alien corporation to the injunction prayed for.

The complaint is extremely voluminous, but for the purposes of this opinion a brief statement of the substance and effect of the allegations affecting the defendants, Heynemann and Plater, will be sufficient.

It is charged that in August, 1872, the defendant, Heynemann, claiming to be the owner of various unpatented mining claims in Eureka (then a part of Lander) county in this State, in consideration of the insurance to him of certain shares of paid-up stock of the plaintiff, contracted in writing to sell said claims to plaintiff free and clear from any charge or incumbrance whatever, and further agreed to give to said company free and undisturbed, and actual possession of the same, and to use his best endeavors to promote the interest of the company in working said mines.

That Heynemann then agreed to hold said mines in trust for the plaintiff and to manage, develop and work them as its agent. That as such trustee and agent he took possession of the mines and held them for a long time for the plaintiff, and while so holding them expended \$30,000 of plaintiff's money in their development and in the purchase of adverse and conflicting locations.

It is further alleged "that shortly after said Heynemann became the trustee of said plaintiff, as aforesaid, he represented to the plaintiff that it was important that patents should be obtained from the United States Government for said lands, mines and mining lands by him sold to the plaintiff, and that until the patents should be issued everything would have to be done in his name, as being the ostensible owner of said property, and agreed to and with the plaintiff to take all necessary legal proceedings to obtain the same, and employed surveyors, counsel learned in the law and others for that purpose at the cost of the plaintiff," etc. That afterwards he did obtain patents in his own name for various of said mines, which patents are now in his possession and under his control. That plaintiff had entrusted the management of its business and the care of its interests in Nevada entirely to Heynemann, reposing the fullest confidence in his integrity and good faith. That, while so trusted, he had been guilty of many acts of duplicity and fraud; and, in particular, he and the defendant Plater, who was employed under Heynemann in the working and management of the mines, and was receiving compensation therefor from the plaintiff, availing themselves of the opportunities afforded by such employment to ascertain the situation of the best ore deposits, entered into a conspiracy to defraud the plaintiff of its most valuable mine. That, in pursuance of such fraudulent conspiracy, Plater, with the connivance of Heynemann, made a location called the "Atlas," covering the better part of the "Dunderberg"—one of the claims sold by Heynemann to plaintiff. That Plater then applied for and obtained from the United States a patent for the ground embraced in said "Atlas" location, and now holds the same under a secret understanding that it is to be shared with Heynemann. It is alleged that plaintiff was deprived of all opportunity of contesting Plater's application for said patent by the fraudulent practices and concealment of its agents, Heynemann and Plater.

It is further alleged that said Heynemann and Plater have converted to their own use large sums of money arising from the net product of the Dunderberg and other mines of the plaintiff. That they are now extracting val-

uable ores from said mines. That, notwithstanding plaintiff has issued to Heynemann and his nominees the shares of its capital stock which it agreed to issue to him in consideration of the sale of said mines, and done everything on its part to be done to entitle it to a conveyance, Heynemann refuses to convey. That there is danger that he and Plater will imperil plaintiff's rights by conveying to third parties, and that, in various ways, plaintiff may be irreparably damaged if the defendants are not restrained.

The prayer of the complaint is that the defendants may be decreed to be trustees of the plaintiff and compelled to convey said mines to plaintiff, and to account for the ores extracted therefrom, for a perpetual injunction and for general relief. Pending the litigation, plaintiff asks for a receiver and for a temporary injunction. The order of the District Court, denying such temporary injunction, is the subject of this appeal.

The defendants, in their several answers to the complaint, by denials and the allegation of new matter, contravert most of its material charges. But, for the sake of argument, it is agreed that they shall be considered true, defendants contending that the plaintiff is, nevertheless, entitled to no relief, for the reason that "the contract declared on and the trust sought to be enforced are invalid as contrary to law, and void as opposed to public policy, as declared by the paramount law of the land."

The "paramount law" here referred to is that established by the several acts of Congress relating to the disposition of the public mineral lands. According to counsel for respondents: "The United States, the absolute owner of the mineral domain, in disposing thereof has seen fit to select certain classes as the donees of its bounty, and to prescribe when, how and by whom, and upon what conditions and limitations this bounty may be enjoyed. In so legislating it declared a policy and a purpose, binding of course upon all courts, without any regard to its wisdom or expediency. The statute enacts that the land is declared to be free and open to exploration, occupation and purchase by citizens and those who have declared their intention to become such. Thus citizens, and citizens only (leaving out here and hereafter, to avoid repetition, the other class), may occupy or obtain a patent; they and they alone shall have the 'right of possession and enjoyment.' Express power is given to alienate the title to others than citizens after the patent is obtained, the implication on the maxim *expressio unius* being that before patent obtained they cannot convey to an alien."

Counsel for appellant says: "The act of Congress of July 26th, 1866, which granted the mineral lands belonging to the United States unto those who explored and occupied them, limited such grant to citizens of the United States only, and thereby excluded aliens from the right to enjoy the same or to receive a patent therefor, but did not prevent aliens from purchasing said lands from those who, as citizens, had lawfully received a patent for them."

So far as these propositions agree, there can be no doubt that they express the true construction of the law and to this extent they clearly agree: that an alien is incapable of acquiring any right to occupy or enjoy the mineral lands so long as the title remains in the United States, and consequently that he can never become entitled to apply for, and can never obtain a patent for such lands. This brings us to the most important question involved in this appeal: Was the contract declared on an attempted evasion of the law of Congress? Would its enforcement be to set the law at naught?

The position of plaintiff is that the contract was in no manner opposed to or evasive of the laws of Congress, and that, since the mining lands in controversy have been patented, since the Federal Government has parted with its title to citizens of Nevada, the rights of the United States are no longer involved, and the laws of Congress no longer applicable in the decision of the controversy between these parties, whose rights, it is said, now depend exclusively upon the common law respecting aliens, which has been adopted in this State without any unfavorable alteration.

Counsel have not been able to produce any decision upholding the right of an alien to enforce specific performance of such a contract.

Upon the whole it is, to say the least, very doubtful whether, if Heynemann had held the Government title to these mines when he contracted to sell them to the plaintiff, a specific performance could be decreed, except at the suit of and for the benefit of the State. The character of that contract was not such as counsel for plaintiff seek to attribute to it. It was not an agreement on the part of Heynemann to convey the mines in question after he should receive the Government title, but an agreement to convey them on receipt of certain shares of plaintiff's capital stock. The arrangement under which he continued to hold the property, "as the responsible owner," for the purpose of obtaining the patents, was an afterthought, and was entered into for the express purpose of accomplishing a forbidden object, viz: To enable the alien corporation to obtain, through him, the Government title, and, in the meantime, to occupy and enjoy the mines under the cloak of his pretended ownership. This is substantially and in effect what the complaint says, though it would make no material

A Practical Miner's Suggestions.

An old practical miner of Eureka district, who is a close observer, gives the following sensible suggestions in the *Sentinel*: The query, "why not help ourselves," is a subject for the business portion of our community to digest. Eureka as a mining camp is one of the best, if not the best on the coast. Its past record shows this; its future is in the hands of the people. Who is to be credited with making Eureka a number one mining camp? The resident population or outsiders? How many are in this town who have really done anything to develop or bring the mines of this district to a paying basis? The number is very small. When our business men, men of money, have money to invest in mining they almost invariably seek investment in some outside stocks, when they should, if they studied their own interest, invest something at home. Ruby hill has heretofore kept up the whole community. It has enriched its owners, besides giving employment to thousands of laborers; but the treasures of Ruby hill are locked up in litigation, and may remain so for several months. What has the people to fall back on to keep the place up in the interval? The truth is, they should do something to help themselves. The business men of Eureka say it is out of their line of business to engage directly or indirectly in mining. The question is: Is Eureka likely to keep up a first-class mining camp unless there are new developments made? Outside capital has made Eureka what it is or has been. Is outside capital likely to come to our rescue the second time? It is hardly likely that it will unless some new developments in our mines are made. It is generally believed that there is rich mining ground enough in this district outside of Ruby hill to keep up a larger community than there is in the district. Why not do something, then, to open new mines, so as to give employment to the idle population, by reason of the shutting down of the mines of Ruby hill? Who is to do this? Why, the merchant, the hotel-keeper, the saloon-keeper, men of all trades must take hold and help themselves; do something to help open new mines, and not be dependent on Ruby hill alone. When they do this, they will find that by helping to keep up the mining interests they lay the foundation for a good legitimate business in trade, and not before. By helping themselves they help others, or by helping others they help themselves.

Oregon Minerals.

The total product of mines worked in the counties of Jackson and Josephine, in southern Oregon, since 1851, when gold was first discovered, is estimated at upwards of \$18,000,000. Baker and Grant counties in eastern Oregon have also yielded many millions. On the ocean beach near Coos bay, placer mines have been worked to a considerable extent. Rich gold quartz leads have been partially worked in the southern part of the Cascade mountains. Lead and copper have been found in large quantities in Jackson, Josephine and Douglas counties. Large deposits of rich iron ore exist in nearly every part of the State. The mine at Oswego, on the Willamette river, about six miles south of Portland is the most extensive so far developed. Coal abounds in nearly all portions of the State. Extensive beds exist on Coos bay, in Douglas county and on the northern Umpqua. Partially explored beds have been discovered on Yaquina bay, at Port Orford near St. Helens, and at different points in Clackamas, Clatsop and Tillamook counties. The Coos bay coal ranks very high in the San Francisco market. The want of invested capital has retarded operations, but Oregon is coming to the front and the day is not far distant when our mines will attract the attention they deserve.—*Oregon Mining-Immigration Journal*.

Increase of Shares.

The increase of shares in the Comstock mines since 1870 is thus indicated by the Bulletin:			
Mine.	1870.	1877.	Increase.
Sierra Nevada, shares.....	15,000	100,000	85,000
Union Consolidated.....	10,000	100,000	90,000
Mexican.....	10,000	100,000	90,000
Ophir.....	16,800	100,800	184,800
California.....	5,000	540,000	535,000
Consolidated Virginia.....	11,600	540,000	528,400
Best & Belcher.....	22,400	100,800	78,400
Gould & Curry.....	4,800	108,000	103,200
Savage.....	16,000	112,000	96,000
Hale & Norcross.....	8,000	112,000	104,000
Julia Consolidated.....	10,000	110,000	100,000
Bullion.....	2,500	100,000	97,500
Eschschuer.....	8,000	100,000	92,000
Alpha.....	6,000	30,000	24,000
Consolidated Imperial.....	10,000	500,000	490,000
Confidence.....	1,900	25,000	23,100
Yellow Jacket.....	24,000	120,000	96,000
Kentuck.....	2,000	30,000	28,000
Crown Point.....	12,000	100,000	88,000
Belcher.....	10,400	104,000	93,600
Overman.....	12,800	38,400	25,600
Caledonia.....	20,000	100,000	80,000
Utah.....	10,000	20,000	10,000
Justice.....	21,000	105,000	84,000
Totals.....	204,300	3,431,200	3,136,900

COLORADO CENTRAL EXTENSION.—Captain Berthoud has completed the survey of the extension of the Colorado Central from Longmont, Colorado, to Cheyenne. Work will be begun at once and pushed to completion. The distance is less than 75 miles, the grade easy, and the road can be built at small cost. The road will pass through as good country as there is in the west for the first 50 miles from Longmont to Box Elder.

USEFUL INFORMATION.

Staining Metals.

This valuable specialty in artificers' work is made the subject of an article in the *American Art Journal*. The following practical hints are given:

Metals may be colored quickly and cheaply by forming on their surface a coating of a thin film of sulphide. In five minutes brass articles may be coated with any color, varying from gold to copper-red, then to carmine, dark-red, and from light aniline-blue to a blue-white, like sulphide of lead, and at last a reddish-white, according to the thickness of the coat, which depends on the length of time the metal remains in the solution used. The colors possess a very good luster, and if the articles to be colored have been previously thoroughly cleaned by means of acids and alkalis, they adhere so firmly that they may be operated upon by the polishing steel. To prepare the solution, dissolve one-half ounce of hyposulphite of soda in one pound of water, and add one-half ounce of acetate of lead dissolved in half pound of water. When this clear solution is heated to from 190° to 200° Fah., it decomposes slowly, and precipitates sulphide of lead in brown flakes. If metal be now present, a part of the sulphide of lead is deposited thereon, and, according to the thickness of the deposited sulphide of lead, the above colors are produced. To produce an even coloring, the articles must be evenly heated. Iron treated with this solution takes a steel-blue color; zinc, a brown color; in the case of copper objects, the first gold color does not appear; lead and zinc are entirely indifferent. If, instead of the acetate of lead, an equal weight of sulphuric acid is added to the hyposulphite of soda, and the process carried on as before, the brass is covered with a very beautiful red, which is followed by a green (which is not in the first scale of colors), and changes finally to a splendid brown with green and red iris glitter. This last is a very durable coating, and may find special attention in the manufactures, especially as some of the others are not very permanent. Very beautiful marble designs can be produced by using a lead solution, thickened with gum tragacanth on brass which has been heated to 210° Fah., and is afterwards treated by the usual solution of sulphide of lead. The solution may be used several times.

Progress in Silk Manufactures.

A correct notion of the state of the silk manufacturing interest in this country may be gathered from the report which was presented to the Silk Association of America at the annual meeting this spring by Franklin Allen, the Secretary. The total manufactures of silk for the past year are valued at \$26,593,103, the items which run into the millions being tram, \$2,768,490; organzine, \$1,614,961; machine twist, \$6,301,059; millinery and the silks, \$1,679,166; dress goods, \$1,350,535; ribbons, \$4,526,556; ladies' dress, \$3,705,076. The report states that on the whole last year's business was very unsatisfactory, though the raw silk consumed in manufacture was within 150,000 pounds of the largest amount used in any previous year. This unsatisfactory condition is ascribed to the great rise in the price of the raw material, amounting on the average to 100 per cent.; to the pressure brought to bear on our markets for goods by foreign manufacturers who had injured their markets abroad by excessive adulteration, in some cases reaching more than three-fold the weight of the silk; a pressure which became a crisis at Lyons and caused the surplus goods there to be thrown on this market, thus keeping the price of goods here comparatively low, while the price of the raw material was rising; and to the great extent of frauds by undervaluation at the Custom-house. The estimate of loss to the revenue from the last-named cause alone is put at \$4,000,000. Goods are sold here, "duty paid," at about the same price as they bear at the place of export without duties. The report suggests that the honest foreign manufacturers' interest and those of American manufacturers and honest merchants coincide. At the same time it does not recommend the substitution of specific duties, or of a mixed tariff, but the continuance of the present simple ad valorem rate of 60 per cent., which is sufficient if the present laws are thoroughly enforced.

REFINING MINERAL OILS.—Two Scotch inventors have devised a method of refining mineral oils in which the use of the sulphuric acid and subsequent washing with caustic soda, heretofore used and found very expensive, are dispensed with. And the nature and novelty of the invention consist primarily in the employment of sulphurous acid (instead of sulphuric acid) either in a gaseous or liquid state. The crude oils are received or placed in the ordinary refining cistern, tanks, or troughs, where they are washed with sulphurous acid gas, which immediately precipitates the tarry matter and other impurities in a much superior manner to that experienced with sulphuric acid. The sulphurous acid is preferred to be used in the liquid state, and is introduced amongst the oil gradually in such quantity or for such period as experience determines for the particular quality or kind of oil under treatment, the washing being continued until the tarry matter and other

impurities are precipitated and the pure oil left floating above, which, so far purified, is then run off into other vessels and again washed with sulphurous acid and water until the impurities are fairly removed. The oil is then finally refined in the usual manner, except that the use of caustic soda in quantity is not required in the washing process as heretofore when sulphuric acid was used in the refining process. Hitherto the tarry matter obtained or produced in oil refining has been considered as waste by reason of the vitriol contained in it, but the tarry matter resulting from the present process being free from vitriol may be utilized for various purposes.

A NEW USE FOR SAND.—The incompressibility of sand is suggested to the *American Journal of Industry* as a cheap and ready means of making supporting columns and bases for anvils, or for blocks designed to support heavy weights. Sand inclosed in thin wooden or iron walls, if thoroughly shaken down, may be made to sustain a much greater weight than the walls or cylinders alone, by placing all the weight directly on the sand and quite free from the walls that retain it. Wooden boxes filled with sand thus make excellent supports for anvils or tables for laboratory work. So long as the pressure is vertical, the sand will sustain far greater weights and resist heavier blows than could be borne by solid blocks of wood of the same size.

TESTING PETROLEUM LUBRICATING OILS.—There are few persons who can detect a worthless oil even among a number of good samples, but a few simple tests will aid a novice somewhat in this particular: First, require a bright green color; second, brilliancy of appearance when dropped upon a piece of clear glass, or as shown by throwing the oil up upon the side of a clear sample bottle containing it is indicative of purity; third, see that no precipitation is made in the bottom of a sample bottle or jar of whatever color; black, white or red. As oil is the best known lubricant for general use, avoid a mixture of it with foreign matter, whatever the claim.

CLOSING DOORS WITH COMPRESSED AIR.—The *Polytechnic Review* translates the following from a French authority: A. M. Pelletier has made a novel application of compressed air—namely, for closing doors. The doors are connected by means of an iron or caoutchouc tube surmounted by a ball at each end. When one door is opened, the series of levers act upon the rubber ball, compress it, and necessarily the air contained therein, which dilates the ball at the other end and by a series of levers similar to the first, closes the other door, and vice versa.

TO PREVENT STEEL FROM OXIDIZING DURING TEMPERING.—Small articles in steel are said to be preserved from rust while being tempered by giving them a coating of ferro-cyanide of potassium. For this, two parts of finely-powdered charcoal and one part of ferro-cyanide of potassium are boiled up to a thick paste with a solution of gelatine or strong glue. After warming them, the articles are dipped into this mass, dried, dipped again, and so on, until the coating is the twelfth of an inch thick. The articles can then be exposed to a coal fire, heated to redness, and tempered without fear of rusting.

GOOD HEALTH.

Clean Hair.

A lady says in the *Western Stock Journal*: No matter what our work is, the dust will gather upon the hair. With housekeepers this can be largely prevented by wearing something over the hair while sweeping or working where there is dust in the atmosphere. A cap made of cambric is as good as anything to wear, and may be made in this wise: Take a square of cambric of the usual width (three-quarters of a yard), cut from it as large a circle as possible, turn a hem an inch and a half in width all around, stitch it down, and outside this make another row of stitching, leaving a space of one-fourth of an inch between the two; into this space run a piece of elastic cord, and draw up until it is the right size for your head. Such a cap is easily made, looks well, will fit over your hair in whatever manner it is dressed, and will thoroughly protect it from dust. However, if dust does, and it will, collect upon the hair, it can sometimes be removed by brushing, but always by washing, provided we wash it properly. Never use soap—it leaves the hair stiff and unmanageable. The same is true of ammonia. Use the yolk of an egg, and in this way: Beat the yolk of an egg in a teacup, fill the cup with tepid water, let down the hair, shake it out well, and pour on a little of the egg and water, rubbing the head briskly meantime; repeat the process until the whole is used. If not enough to wet the hair thoroughly and to make a good lather, use more water on the head. After rubbing well, rinse the hair well with tepid water, applying a little cold water at the last. Dry it as well as possible with towels, and if it is long let it remain down upon the shoulders until quite dry. There is no danger of taking cold from this process if ordinary care is used. For children who are in school and often come

home with something in their heads, which you think is scarcely an idea, yet is certainly an enemy, a wash with ammonia and water will destroy both parasites and their larvæ. Use 10 or 15 drops of ammonia in a tumbler of water, and apply it in the same manner as directed for washing with egg. If anything is cruel, it is to take a little curly head between your knees upon a pillow and rake it through and through with a fine-toothed comb until the little scalp is red and bleeding. Try the ammonia cure, and the children will rise up and call you blessed.

POISONOUS CANDY.—The *Boston Herald* says: "The City Board of Health has, after considerable effort, succeeded in bringing five cases of adulteration of candy before the criminal courts, which the prosecution hope will stand the test of law and evidence, and result in the punishment of the persons accused and the deterring of others in the same business from using unwholesome ingredients. Within a few months quite a large number of specimens of candy have been subjected to analysis, and the trash found only shows that to the ordinary purchaser at random, candy is a good deal like Mark Twain's hash—a mystery. Only five of the cases, however, proved to be so strong as to convince the Board that convictions could be had, and in these the evidence was presented to the Grand Jury. Bills were found and yesterday William F. Schaffe, William Schnetzer, George Fera, William F. Stahl and S. Herbert Chase were arrested, brought into the Superior Criminal Court and gave bail in \$600 each for their appearance for trial. The material portions of the indictment are substantially as follows: 'That the defendant unlawfully and fraudulently did adulterate a certain substance, to-wit: one pound of confectionery, with a certain substance injurious to health, to-wit: with a certain substance called chromate of lead.' The second count charges the adulteration 'with a certain substance injurious to health, the name of which, and a more particular description of which is to the jurors unknown.' The indictment is drawn under chapter 106, section three of the Revised Statutes."

RECREATION.—The literal meaning of this word is to make over again; but in its ordinary acceptation it is intended to convey the idea of rest, refreshment, or rather, renovation. The body is refreshed by rest; the brain is renovated by sleep, by absolute repose. But both brain and body may be invigorated for a season by changing the direction of their respective activities, and also by working alternately. A man who has become tired of riding on horseback or in a carriage, rests himself, gets rid of his fatigue, by walking. The brain which has become weary in thinking of one subject is refreshed by taking up some other study. On the other hand, a man who feels tired all over, by work or a long walk, will get "rested" sooner by sitting down to read than if he did nothing. Rachel, the great tragic actress, when returned from one of her performances, at two or three o'clock in the morning, rested herself by spending an hour or two in changing the furniture of her rooms. The best sedative which a public speaker can take after a great effort, is to read a newspaper or anything else which has a variety of short statements. The great practical idea we wish to convey is that recreation is not idleness, but a change of direction in the operation of the physical or mental forces. A French actress lately went mad within an hour after the play, because she went home, laid down, and let her mind run on in the same track. She should have changed to bodily activity, like Rachel.—*Hall's Journal*.

LEMON-JUICE IN CARBUNCLE.—The *Doctor* says: "Dr. Gibbons, having been a sufferer from carbuncle, relates in his admirable journal his own case, in which lemon-juice seemed to have a most beneficial effect. Wine, whisky, tonics, and all the usual remedies gave him no relief, and did not help digestion. As soon as he took lemon-juice digestion improved, as well as the local symptoms; and the effect was such that he intends to treat his patients in the same way. He also thinks blue pill frequently useful. We have found in other diseases lemon-juice a most grateful remedy, especially where (as Dr. Gibbons mentions in his own case) there is a desire for acid drinks and vegetables."

FOREIGN BODIES IN THE NOSE.—Parents are often puzzled to help their children when they get beans, buttons, etc., in their noses. The *Medical Record* says: Blow the patient's nose for him, by closing the empty nostril with your finger and blowing suddenly and strongly into the mouth—an efficient method which has often succeeded when instruments have failed. The glottis closes spasmodically, and the whole force of your breath goes to expel the button or bean, which commonly flies out at the first effort.

VENTILATING CHAMBERS.—When it is considered that pure air is essential to the purification of the blood, and that the food we eat never becomes nutriment until it meets with the air in the lungs, and when it is furthermore remembered that a full third of our entire existence is passed in our sleeping apartments, it must be clear to the commonest understanding that the difference between breathing a pure and impure air while we are asleep is literally incalculable as to the effects upon our happiness and well-being.

MINING SCIENTIFIC PRESS

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Address all letters to the firm, and not to individual members, or others, who may at any time be absent.

Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, June 9, 1877.

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The Week.

Nothing of any special interest in connection with the mining industry has transpired during the week. Stocks are yet dull, and this affects everything more or less. The Comstock, particularly, feels the depression seriously, and many mines, a few months since actively worked, are now idle. The California mines, however, do not seem to feel this pressure to any great extent, and, in many parts of the State, notably Nevada county, the mining interests are in a healthy condition. Mining news from Arizona show good prospects in that Territory, but there are too many poor men there now, and everybody is waiting for capital. Several mills and furnaces have been sent down there of late, and there are two or three mills now being built here which will be sent there on completion. Our readers will notice by what is said in other columns this issue that the manufacture of mining machinery has by no means ceased in the city notwithstanding dull times. The Union Iron Works shipped this week the largest air compressor ever made in the United States, and also some unusually heavy and improved hoisting gear. Our "Mining Summary" gives all the late news from the mines in various districts, States and Territories, and will repay perusal by those interested in our mining developments.

Foundry Notes.

Business among the foundries and machine-shops in this city is extremely dull at present, and there is scarcely any work of any magnitude going on anywhere. The dull times affect large and small shops as well, and most of them are running short-handed, which at this season of the year is very unusual. As a general thing this is a busy time in the season for foundrymen, but the prevailing depression in the mining interests keeps away large orders for mining machinery, which forms a very considerable proportion of the work of the large foundries. At the

Union Iron Works

They are pretty busy and are engaged on the only large mining machinery now being made in the city. They have just finished a new 20-stamp mill, and are building a 10-stamp mill—the latter for Arizona, where they have shipped several within the past few months. They are also making a number of pans and settlers for different localities. Some magnificent machinery is also being shipped for the Yellow Jacket mine, and is of new design in many particulars. This is described in detail in another column of this issue. They are engaged also in shipping the heaviest air compressor ever made in the United States, which is intended for the C. & C. shaft. The steam cylinder of this compressor is 27 inches and the air cylinder 30 inches in diameter; stroke 36 inches. They are connected by a 12-inch shaft. The steam cylinder is furnished with patent drop or poppet valves, and patent expansion gear. The fly wheel is 14 feet in diameter, with a 12-inch face, turned all over in the rim and weighs alone 30,000 pounds. This is an extremely heavy fly wheel and is probably one of the finest turned out in this city. New patterns were made for it and it is being finely finished up. The air and steam cylinders are connected together and bolted to a heavy sole plate 11 feet long, 42 inches wide and three inches thick. The air cylinder is brass lined and fitted with brass inlet and outlet valves and seats. The big fly wheel is made in two pieces and held together by two five-inch bolts in the rim, and four three-inch bolts at the hub. The whole machinery is finely finished, and is a job creditable alike to the firm and the workmen at the

Pacific Iron Works

Business is slack as at other places, although of course some considerable work is being done. They are sending a complete ten-stamp silver mill to Turkey Creek district, Arizona, for the Murat Milling Co. This is to work ore principally for the Goodwin mine, the company owning the mill being largely interested in the mine. There is a fine outfit with this mill, consisting of a White roasting furnace, etc. They are just shipping the last of the machinery for the Hackberry mine, Arizona. This consists of a complete ten-stamp mill with white furnace, etc. They have just shipped from these works a quicksilver furnace of the Eames pattern to the Edith quicksilver mine, Lake county. Considerable machinery is being made for Tuscarora district, Nevada, as they are putting in new pans and settlers, and in fact re-building the Real Del Monte mill, with new batteries etc. The machinery is also being supplied for a new steam tug for Adams & Taylor, to go up the coast. This consists of a direct acting, compound surface condensing engine. The diameter of the high-pressure cylinder is 20 inches and of the low pressure cylinder 36 inches, with 24 inch stroke. The works furnish the steam pump, circulating pump and pipes, etc. In the yard of the works is the machinery for a street-car which is to be worked on a new principle, both steam and compressed air being used. This is a device of Mr. Chas. Stevens, and will be tried on the Mission street road in a few days. It is a "fireless" locomotive, that is, there is a reservoir for holding steam and hot water, which is supplied every trip, but no fire is used under this reservoir. There are new features connected with the device which make it different from anything heretofore used, and we shall give a detailed description of the machinery as soon as the trial comes off.

The Sacramento Boiler Works.

Messrs. Hall & Kelshaw, in Joshua Hendy's building, are at work building a large number of small tanks for a sugar refinery. They inform us that it is probable they will show our citizens what can be done in the way of an iron steam launch on this coast before long. Pressure of business has prevented them from constructing a launch before this but as this excuse no longer exists, they may have one on exhibition at the coming Mechanics Institute fair. There is no reason why these launches should not be built here as well as anywhere else and the proprietors of this shop having had considerable experience in this line, ought to be able to make a first-class one.

Joshua Hendy

Continues to make numbers of the "\$1,000 Challenge ore feeders" and of his concentrators. He has just shipped five of the ore feeders to Deadwood City, Black hills. This is the first machinery that has gone from this coast to the Black hills, all the rest of the mining machinery in use there having been made in the Eastern states. Four of the feeders were also shipped this week, to Briggs Brothers, at Black Hawk, Colorado, and three to S. B. Schrontz, at the

same place; with the last order were shipped, also, two of the Hendy concentrators. Mr. Hendy is also making a number of the Harris patent lathe driver, which is described in another column; this is a California invention which has attracted attention at the East, but instead of being made in the East, as is usual in such cases, they are made here and shipped there. This is the correct way to do, as it sustains home manufactures and gives employment to home mechanics.

The Tidal Wave.

In our issue of May 26th we gave a diagram showing the record of the earthquake waves that were indicated by the tide gauges of the U. S. Coast Survey at Fort Point in this harbor. Since then advices have been received from various points, showing that the waves in some cases caused great damage. In the Hawaiian Islands, according to the *Gazette*, it appears to have occurred simultaneously all over the group, but, as its incipience was at early dawn, it was not observed except in a very few places. At Kahului, on the island of Maui, as stated by a correspondent, the first unusual subsidence of the sea was noticed about a quarter before five in the morning, by parties who were out in the bay fishing. An observer in Honolulu, who was near the harbor and who had his attention attracted by the shouting of the natives, and saw the exposed reefs, places the occurrence at exactly the same time, viz.: fifteen minutes before five. Mr. J. J. Porter, of Hilo, Hawaii, fixes the moment of the wave which overwhelmed the village of Waiskea, at precisely the same time, and the statement of Capt. Smithers, of the whaling bark *Pacific*, which was lying at the time in Hilo bay, corroborates this. According to Mr. Severance, the oscillation of the sea was first remarked about four o'clock in the morning, nearly an hour previous to the great wave. The difference between the highest and lowest water mark at various localities we ascertain to be as follows: Hilo, on the east side of Hawaii, 36 feet; Kealekua bay, on the west side of Hawaii, 30 feet; Kawaihau, west side of Hawaii, 5 feet; Kahului, north side of Maui, 22 feet; Lahaina, south side of Maui, 12 feet; Honolulu, south side of Oahu, 4 feet, 10 inches; Nawiliwili, southeast side of Kauai, 10 feet.

The details of the disaster at Walakea, which was overwhelmed by the wave, are five people drowned, seven people badly injured, 37 dwelling houses entirely destroyed, 17 dwelling houses badly injured, 163 people left destitute without houses. There has been nothing like this wave at the Islands since 1837, when many houses were destroyed.

Advices received via Panama say that Callao was visited by a wave, and considerable damage done. The devastation was known to have extended as far south as the northern boundary of Chile, but how much further is not known, as communication is interrupted. The *Elder* reports the almost complete destruction of Antofagasta, Iquique, Arica, Tambo, Demora, Pabillon de Pica and Ilo. The destruction of life and property was owing entirely to the frightful upheaval and ingress of the sea. A gentleman who arrived by the *Trujillo* states that the flourishing town of Iquique, the principal port for nitrate shipments, is left as complete a ruin now as it was after the frightful earthquake and inundation in 1868. At Arica the sea washed over the town to the heights back of the church, and destroyed much valuable property. The wreck of the United States steamer *Waverer*, which was carried inland a couple of miles by the tidal wave in 1868, was again floated and carried a mile or two further up the coast. The lower part of Antofagasta, which is a part of the celebrated Caracoles mining district in Bolivia, is reported as completely destroyed. The smelting and other works near the shore are reported as all swept away. The shipping at Pabillon de Pica and the guano deposits suffered severely, and some half a dozen fine vessels are reported ashore and completely wrecked. The sea in some places is stated to have risen over sixty feet.

The Crown Point Mine.

The annual election of the Crown Point mining company was held this week, there being considerable excitement on the question as to who was to gain control for the ensuing year. The Sharon-Jones clique gained the day, although the contest was very close. The President, Col. Weller, in his report, said: The present year has unfortunately been a fruitless one for this company, and during a great portion of the time all mining stocks have been greatly depreciated, so that this company's management has undergone the closest, most persistent, and, as I think, quite disingenuous scrutiny. The result has been allegations of mismanagement totally unfounded in fact. It was alleged that there was a discrepancy of 10,000 tons of ore between the report of the Superintendent and the return of the Assessor at Virginia. This was simply the effect of a clerical error. He also denied that outside mills were kept running on Crown Point ore, and cited figures to prove the fact. He declared that no low-grade ore has been worked that has

run the company in debt; but that, on the other hand, they have made money by working such ores.

The Superintendent stated in his report that during the past year 1,150 feet of drifts and crosscuts have been run on the 1700-foot level, developing nothing but low grade ores, assaying from \$2 to \$5 per ton. The main incline has been advanced 577 feet. It has been thoroughly demonstrated that no pay ore exists on the 1700-foot level, and to open a new level, it was deemed best on the score of economy to continue the incline to a depth of 2,000 feet and there open a new level. On this level a distance of 300 feet, through hard blasting ground, was run before the vein was struck. At the time the vein was struck they also tapped a strong flow of water, and they dare not increase this flow of water with their present pumping facilities. The vein, so far as exposed, shows quartz of a good character, giving assays of from \$2 to \$7 per ton. The joint pump shaft is now down 1,950 feet, and at 1,900 feet a new level has been started to tap the ledge. He concludes by saying that the mine has never been in a better condition for the extraction of ore, and all that is needed is that pay ore be found.

The ore statement is as follows: 20,153 tons crushed yielded \$277,584.85, an average of \$13.77 per ton. The bullion yielded \$121,154.72 in gold, and \$155,435.34 in silver. The average cost of working the ore was \$9.11 per ton. The liabilities, June 1st, 1877, were \$71,846, and the assets \$463,462.

In the Secretary's report it was shown that the receipts of the company for the year were from six assessments, \$525,314.80; sale of bullion, \$277,584.85; overdrafts, \$129,153.27; other sources, \$17,201.26. Total, \$943,254.18.

This mine has since 1861 paid \$11,664,000 in dividends, and levied assessments amounting to \$1,373,400, showing a profit to stockholders of \$10,290,600. The mine has had a varied history, being at one time the lowest priced in the Stock Board, and again the highest priced.

Hydraulic Gravel Elevator.

We saw this week, at the shop of Joshua Hendy, a little machine for use in gravel mines, which in certain instances would be the means of saving a large amount of time and money. It is intended to be used in such places as the gravel is required to be raised a short distance to obtain fall, the object being accomplished as the gravel is passing along down the sluice, without the need of any expensive gear or additional expense to speak of. It would be extremely useful in such a case as where miners started a bedrock tunnel and found that after they got in the bedrock pitched deep or the tunnel was started too low to tap the gravel. In such cases the work has to be done over again, and when it is remembered that such undertakings cost from twenty to one hundred thousand dollars, it will be seen that anything likely to overcome such difficulties is exceedingly useful. With this little apparatus an incline could be run down and the tunnel continued along. At the low point this appliance can be set and the gravel raised up to the proper height, when it can flow off.

The thing consists of a pipe which is placed in the flume or sluice with another pipe coming into it at an angle so that a head of water in the branch pipe forces the gravel, etc., up the required height. It is claimed that 200 feet head will raise the gravel 30 feet; moreover, this additional water is not wasted, as it may, after it has done its duty of raising the gravel, be run back into the flume and assist in washing the dirt. One of these machines was tried some time since at Fiddletown, where it elevated the gravel thirty feet, but work on the mine was discontinued before the appliance became much known, as the dirt did not pay in the mine. A full working model is being set up at Mr. Hendy's, where it will soon be in operation raising gravel a few feet.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from prominent mines have been as follows: Grand Prize, May 27th, \$6,967.41; Tybo Con., 28th, \$12,694; total to date, \$79,568.04; Northern Belle, 29th, \$12,791.44; California, 31st, \$270,716.04; total to date; 1,306,295.85; Con. Virginia, 31st, \$211,652.01; total to date, \$674,042.64; Grand Prize, 31st, 7,200, June 2d, \$196,396.86; total to date for May, \$1,562,692.71; Con. Virginia, June 2d, \$54,171.36; total to date, \$728,214; Modoc, May 31st, \$6,179.20; total for May, \$95,827.65; Chollar, June 2d, 9 bars, value, \$23,241.31; total for month, \$43,550.16; Empire, June 1st, \$15,000; Standard, June 1st, \$20,329; total for May account, \$50,999; Grand Prize, 5th, \$9,500.

MECHANICS' INSTITUTE.—At the annual election of the Mechanics' Institute, held on Monday, there was but one ticket in the field, and the following gentlemen were chosen Trustees for the ensuing year: P. B. Cornwall, Henry S. Smith, H. L. Hutchinson, Ernest L. Ransome, A. L. Fish, Columbus Waterhouse, and James Duffy. One half of the Board of Trustees of the Institute is chosen each year, to serve two years. The full Board is therefore composed now of the above named gentlemen and the following, who hold over from last year: A. S. Halliday, H. L. Davis, George Spaulding, Asa R. Wells, J. B. Stetson, James Drury and James Spiers.

Structure of Iron and Steel.

We have received from John Wiley & Sons, 15 Astor Place, N. Y., a copy of Weyrauch's "Strength and Determination of the Dimensions of Structures of Iron and Steel," with reference to the latest investigations. This is an elementary appendix to all text books upon iron and steel constructions by Dr. Weyrauch, Professor in the Polytechnic school at Stuttgart, and has been translated by A. Jay DuBois, Professor of Civil and Mechanical Engineering, Lehigh University, Pennsylvania. The work also contains an appendix by Robt. H. Thurston, Professor of Mechanical Engineering in the Stevens Institute of Technology. The author states in the book that the present English translation of his work has been kindly made by Prof. DuBois at his special request, and that by the courtesy of the publishers, John Wiley & Sons, he receives a liberal copyright therefrom. No other English translation has been or will be authorized by him.

This work is a very important one and should attract particular attention at the present time when there is so much discussion on the subject of the strength of metal in bridges. The methods of calculation of the forces which act upon the various members of our bridges and other structures have within the past ten years, owing to the united labor of European and American engineers, gained remarkably in clearness and reliability. These advances can however, as Prof. Weyrauch very truly says, attain their greatest value only when the question as to what forces these members can sustain with the desired degree of security, is satisfactorily disposed of. The present work gives a systematic presentation of a new method of dimensioning based upon two formulae deduced by Prof. Launhardt and Prof. Weyrauch. This method, while simple, gives considerable economy of material as well as increased security, while the ordinary methods of statical calculation in general use remain unaffected by it. As the resistance of riveted constructions depends directly on the quality of the rivet connections, great attention is given by the author to this hitherto neglected subject. In order to make the work serviceable to the practical engineer, the author has subjected the numerous experiments upon the strength properties of iron and steel recently made in various countries to careful comparison and scrutiny and thus has given a concise representation of the present state of knowledge in this respect. Everything is there given, which, after the completion of the statical calculation, may be desired.

No one interested in constructions involving the use of iron and steel can afford to ignore the results set forth in this work. As the translator in his preface says, we have to do here, not with the results of theoretical reasoning itself based upon assumptions more or less questionable, but with legitimate deductions from the results of varied and careful experiments. It is but justice to American engineering to state that its best representatives have already long accepted and made use of these results. The author has paid to American practice in this respect a well merited tribute. The recognition by the author of American practice, which antedates anything of the kind abroad, imperfect though it may be in the light of present knowledge, only goes to show, if proof were needed, that the so-called practical engineer of the present day is no longer guided by "rule of thumb" alone, but is fully alive to the necessity of an accurate knowledge of the materials with which he works, guided by an intelligent comprehension of the principles which should regulate their use. The author of the book in question has taken occasion to call in question certain recent experiments made in this country, and Prof. Thurston has, by request, furnished an appendix to the American edition, treating of the strictures referred to in the text. In the appendix by the author will be found a review of the various methods thus far proposed for the dimensioning of parts, given at such length that these methods may also be used if desired, while their relative merits as well as the merits of the method advocated are well brought out.

Chinese Miners.

The old "lava beds," as they are called, in Butte county, are being thoroughly worked over by Chinese miners, who are able to take out from one to three dollars per day to the man, making a yield of from \$10,000 to \$15,000 per month from these mines during the entire summer and fall. The *Mercury* says that at present there are an unusually large number of men at work there on the old claims, and some of them on new ones just opened up, so that the business of mining is going on as brisk as during the years of 1874-5, when several thousand Chinamen were at work. The *Mercury* states that owing to the large influx of white labor into the county the Chinese had been turned off and were compelled to go to mining again or starve.

A curious feature in this connection is the fact that several new steam pumps have been put in operation by these miners to keep the mines free of water. John usually rigs up some kind of a contrivance of his own to accomplish his ends, and does not take kindly to machinery of any style where hand-work will do at all. In this instance, however, he can do little with his crude water-raising apparatus, and has to fall back on a full-fledged steam pump.

The Heald & Sisco Centrifugal Pump.

The engravings on this page represent different styles of the Heald & Sisco centrifugal pump, lately introduced on this coast by Parke & Lacy, 417 Market street. The principle of the centrifugal pump is so well known as to need no particular explanation. These steam pumps are used for a great variety of purposes, and especially in places where there is a great amount of water to be raised in a short time, and with slight expenditure of power.

Fig. 1 of the engravings shows the vertical Heald & Sisco pump, which is intended to stand on the bottom of the tub, well or reservoir, as the case may be, or it can be fastened at any required distance from the bottom; the only essential point being that the pump should be constantly immersed in the fluid to be raised.

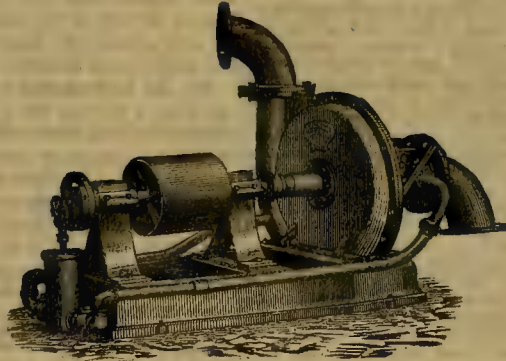


FIG. 2. HORIZONTAL PUMP AND SELF PRIMER.

The scroll or shell, A, is of brass or cast iron, as circumstances require, made in halves, and bolted together in the usual manner. The piston is attached to the shaft, D, and works in the scroll, running lightly in nicely fitted bearings. The fluid enters the pump at the bottom and is discharged at F. This style of pump is especially useful for draining lock pits, coffer dams, tan vats, etc., in short for any situation in which large quantities of very foul water, containing mud, sand, gravel, bark, etc.,

pressure system is the best when a moderate quantity of water is to be raised a great height. But when a large quantity of water is to be raised a short distance the centrifugal plan is preferred, as it accomplishes its results with small power. We now speak of centrifugal pumps run with a belt; when the question is narrowed down to a direct connection of engine with pump, it is obvious a limit is quickly reached. An oscillating engine of short stroke is the ideal machine for running a centrifugal pump by direct connection. There is less steam and less wear in general, and the engines are compact and simple. But oscillators have hitherto labored under serious objections, and have not, therefore, held their own against machines which were not open to these objections. The company manufacturing these pumps took hold of the oscillating engine to remedy the defects, and have succeeded perfectly. This engine saves steam, is strong, light and compact, and very cheap in view of its capacity.

Fig. 3 exhibits the main features of the machine as now made; D is the steam induction pipe; E the suction pipe; A the valve chamber on the cylinder, the rolling valve within fit being worked by an eccentric from the engine shaft. The guides for relieving the strain on the piston-rod project from the head of the cylinder, and are partially concealed by the counterbalance wheels J, J; but the end piece, G, is seen between the wheels. F is the force pump, used for priming the main pump B, through the pipes

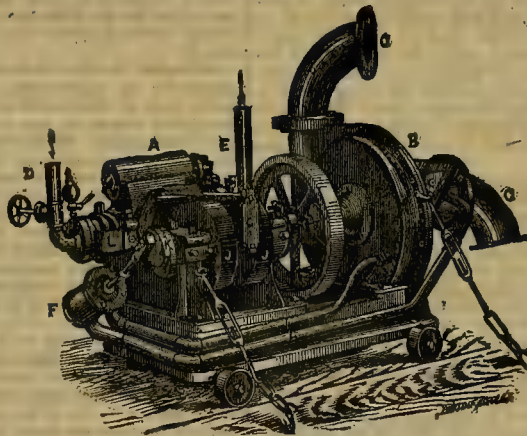


FIG. 3. HEALD & SISCO STEAM PUMP FOR IRRIGATING, ETC.

are to be raised expeditiously and cheaply. It is not liable to get out of order or clog.

Fig. 2 is the horizontal pump with "self-primer," a machine for the use of wreckers, contractors, and all who want an efficient and reliable pump, to be run by the belt from their own engine. This is the same as though the vertical pump (Fig. 1) were turned on its side,



FIG. 1. VERTICAL PUMP.

the shaft then being horizontal—the circumstance which gives the pump its distinguishing name. In point of execution there is no important difference; but the horizontal has the advantage of being more readily examined in case of accident.

Fig. 3 is the Heald & Sisco steam pump for irrigating, draining, wrecking, and for work in mines, quarries, etc. With all the numerous pumps in use it is well known that the direct

Trial of a Fire Extinguisher.

By invitation of Mr. G. W. Cummings, 126 Kearny St., agent for the Pacific coast, we were present on the 6th inst., at a trial of Rees's patent compound fire extinguisher, (Bucher's system improved).

The trial took place on Market street in front of the new City Hall, and among the spectators were Mayor Bryant, Chief Engineer Scannell and several insurance agents. A shanty of rough redwood boards had been smeared on the inside with tar and coal oil. A sort of table extended nearly across the shanty and on it was a row of iron pans containing tar, coal oil, benzine and naphtha.

These combustibles were connected with each other and with the wall by means of wicks of paper also saturated with oil.

The maker's description of the exterminator is as follows: "Rees's patent compound fire extinguisher (Bucher's system improved,) is a dry, solid mass, contained in cylindrical boxes of heavy pasteboard set in tin, of the weight of from 5 lbs. to 20 lbs., according to requirements. This mass is ignited, when needed, by the application of a lighted match or burning coal or cigar held to a fuse which protrudes from the box and causes the mass to burn gradually, without exploding, and to form the gases which are the exterminators of all other fires."

The combustibles were set on fire, and when the flames had extended to the walls a 12 lb. box of the extinguisher was ignited, pushed into the room, and the door closed. A tremendous amount of heat and smoke was developed, and, as there was a gale of wind from the west, it seemed for a time as though the fire would have the best of the contest.

Finally, however, the extinguisher conquered and, on opening the door, no flames were visible.

There was abundant evidence of the intense heat that had prevailed for a time in the charred walls and roof, and the tar which was boiling in the pan. The oils were consumed or evaporated.

The agent for the extinguisher claims that it is of particular value in closed buildings, where the gases given off are confined so that they have a fair chance to smother the fire. The building used in this case had a pipe through one corner of the roof, and, as we stated above, a high wind prevailed.

The makers give various cases where this article has prevented serious fires, in some cases having been put into operation by accident, as it were.

Simply storing a few packages of this extinguisher among valuable goods is claimed to be a very great protection.

The New Yellow Jacket Hoisting Works.

At Prescott, Scott & Co.'s Union Iron Works in this city, they are just shipping the hoisting works for the Yellow Jacket mine on the Comstock. This machinery is very heavy and substantial, and is intended for the new working shaft being sunk to the eastward of the old works, which is now down 727 feet. These hoisting works have two steam cylinders 18 inches in diameter by 24-inch stroke. The engine shaft is eight inches in diameter with a 25-inch pinion. The pitch of the pinion is three and one-half inches by 18-inch face. This hoist can be double-gear with a pinion 25 inches in diameter on the engine shaft working into a wheel 80 inches in diameter on a 10-inch intermediate shaft; and on the same shaft is a pinion 34 inches in diameter working into a spur wheel 165 inches in diameter. The change of gear is effected by sliding the intermediate shaft in and out by means of a screw and hand wheel on the outer end of the shaft. The object of this gear is for raising pumps and other heavy weights. This is a new arrangement altogether, as a separate engine is generally used for the purpose, and the means adopted in this instance answers for both. The reel shafts are 9 and 12 inches in diameter, respectively for the reels, of which there are two, 40 inches in diameter by 5-inch face. They can be worked together or separately with suitable clutches. Each of the spur wheels is furnished with a powerful brake, 15 feet in diameter by 6½-inch face, worked by suitable levers connected with a hand wheel gear.

There is also a brake on each of the engine cranks—another improvement insuring greater safety. These cranks are made 6 feet in diameter and very heavy, forming balance wheels for the engine. Each reel is furnished with the latest improved indicators, for telling the depth. The one used is the best one yet devised. On the dial plate is a spiral thread, in which the needle or pointer works, and instead of this pointer having to indicate the depth by one revolution, the use of the spiral gives it three revolutions, thus insuring greater accuracy. In a deep mine where a great deal of cable is out the old way is not accurate enough, but as the depths are plainly marked on the spiral thread, space enough is given for accurate indicating. The indicators are worked by suitable worm and screw wheels from the reel shafts. This machinery is all very heavy and finely finished. All the bearings are bushed with brass and fitted with tightened wedges. Each engine is furnished with link motion reversing gear, patent balance slide valves, etc. This machinery is among the heaviest on the Comstock, weighing altogether about 90 tons, and is capable of hoisting from any depth to which the shaft is likely to be sunk.

ORE.—We have received from H. C. Cory, Etna, Siskiyou county, California, some samples of quartz from his mine. A few hundred tons of rock like that sent would be handy to have in these hard times.

THE POPE'S "golden jubilee" was very generally celebrated on Sunday last with appropriate ceremonies, by Catholics.

Continued from page 366.

difference if it bore the construction which plaintiff endeavors to put upon it.

Under the law of the United States, as it had existed for more than six years at the date of Heynemann's contract to sell, the plaintiff was incapable of occupying, enjoying or securing the Government title to mining lands. Whether or not, as a matter of fact, the officers of plaintiff knew this is of no consequence. As matter of law, they must be held to have known it, and to have known also, that if they received a conveyance of the claims and took possession of them they would immediately become subject to re-location, by any citizen of the United States, who, under such re-location, could at once turn the plaintiff out of possession, and by compliance with the law, secure the title to himself; for, obviously the exclusive right of citizens to occupy is incompatible with any right of an alien to occupy, whether under a location made by himself or purchased from a qualified locator. This principle is settled by the decision of the United States Circuit Court for Oregon in the case of Chapman vs. Toy Long et al. (*Pacific Law Reporter*, August 15th, 1866.)

It was held that the defendants, although they were in peaceable possession of the claims when located by the complainants, were, because of their alienage, to be deemed trespassers upon the rights of the latter.

This fully sustains the proposition above stated: That if the plaintiff, upon the issuance of its stock to Heynemann, had demanded and received a conveyance of the claims mentioned in the contract, they would immediately have become subject to relocation by any citizen of the United States. To avoid such a contingency it was necessary that the title should be left in Heynemann, as the ostensible owner of the claim, and such was the course pursued. It was agreed that Heynemann should take possession of the claims and hold them as the agent and Trustee of plaintiff, and that, as the ostensible owner, he should apply for and obtain the Government title. It is strenuously contended that this is no proof of an intention on the part of the plaintiff to evade the policy of the law, but we are bound to say that we cannot regard it in any other light. The plaintiff may not have known the law, but it must be held to have known it; and its conduct was perfectly consistent with the supposition that it fully understood the extent of its incapacity to hold unpatented mining lands—that is to say, it acted precisely as any alien would act who deliberately designed to circumvent the law, and obtain by indirect and evasive means that which he was forbidden to take by direct means. If this contract should be upheld and enforced, so much of the law of the United States as excludes aliens from the right to occupy and enjoy the public mineral lands would be completely nullified, for it would only be necessary for aliens hereafter to follow the example of this plaintiff, in order to place themselves substantially upon an equal footing with citizens in the enjoyment of a privilege which the law has granted to citizens exclusively. If authority were needed to support so plain a deduction it exists in the amplest abundance. The State and Federal Reports are full of analogous cases arising under the pre-emption laws. We are constrained upon the principle established by these cases to hold that the contract upon which the plaintiff relies was void, and cannot be enforced.

This decision was delivered by Judge Beatty and concurred on by Judge Leonard. Judge Hawley, however, dissents. He says: In my judgment the contract declared upon and the trust sought to be enforced by appellant are not invalid on account of the alienage of said appellant, or void as opposed to public policy, as declared by the paramount law of the land. After quoting the law he says: Now, if an alien can lawfully purchase and hold valuable mineral deposits from any citizen who has obtained a patent from the Government, why cannot the citizen, prior to obtaining the patent, make a valid contract with an alien to convey the mine after the patent is obtained? If there is no statute directly prohibiting the making of such a contract, it can only be declared null and void for the reason that it is a fraudulent attempt upon the part of the contracting parties to evade the spirit of the law, and hence was, and is, in violation of the policy of the Government in relation to the mineral lands. The fact that express power was given to the citizen to alienate the title after obtaining a patent does not necessarily imply that before patent obtained he could not make a valid contract to convey the land after the issuance of the patent.

We are, however, told that to uphold this contract would enable aliens to evade the law and accomplish indirectly what could not be done directly, and that the result would be that the beneficial provisions of the mining laws in favor of citizens would be entirely set at naught. But in what respect is the contract in violation of the policy of the United States in relation to the mineral lands? It is true that statutes are not to be evaded any more than they are to be disobeyed. Yet it must be admitted that courts and judges, as well as other individuals, often differ very much as to the nature and extent of the policy of any law, and it is, to say the least, a very unsatisfactory reason, as well as unsafe rule, to declare a law void as being opposed to public policy.

It has been decided by the Commissioner of the General Land Office that a corporation created by the laws of the State, and performing

its functions under the authority of the State, may obtain a patent for a mine from the United States, although the stockholders may be aliens. Under this construction of the law, could not aliens make a valid contract to purchase a mine from any citizen who would agree to incorporate his mine under the laws of any State, and to have the stock of the corporation issued in the name of the alien purchasers? In such a case the aliens, by using the name of a citizen, could obtain a patent from the United States, and thus, in effect, if we adopt the argument of respondent's counsel, do indirectly what they could not do directly. Again, to pursue this line of counsel's argument, the aliens using the name of the citizen corporation need not obtain any patent, but, under the liberal policy of the Government, could hold the land and be protected in its enjoyment, and thus do indirectly what could not be done directly. The fraud in the case suggested would certainly be more apparent than in the case under consideration, for there the Government might actually be defrauded out of the purchase money.

It is a fact, of which we are, perhaps, authorized to take judicial notice, that aliens are stockholders in many valuable unpatented mines within this State, and that actions brought by them to protect their rights are frequently instituted and maintained in the Circuit Court of the United States. Now, if this action can be defeated because a citizen, for a valuable consideration, in good faith agreed to obtain a patent in his own name, and then convey the title to an alien, how much stronger the argument when applied to cases where the aliens have procured the stock of the citizen corporation that has failed to procure a patent from the Government! These suggestions tend to show how easy it is to imagine a case where a fraud might, perhaps, be perpetrated; or to imagine a case where the policy of a law might in some indirect way be partially evaded; but do not, as I think, tend to establish the fact that the contract in question was made for any such purpose, or that, if sustained, it would lead to any such results.

In the absence of any law declaring such contracts void, I think the question is, and should be, has the Government been defrauded, or its policy evaded?

Courts, in upholding contracts of this character, when made in good faith, would, in my judgment, protect both the citizens and the government. The citizen, after legally acquiring the right to obtain a patent, would be protected in his right to dispose of his interest upon the most favorable terms that capital might offer, and the Government would be protected by the purchase made by the citizen in pursuance with his contract with the alien. The alien, resting under the disability of the law which fails to protect him in the location, occupancy or purchase from the Government, is compelled to pay full value for the land and to have the law in all respects fully complied with by the citizen before he can obtain a title to the property.

I do not understand counsel for respondents to contend that the statutes of the United States in relation to the mineral lands changes the common law rule in any respect after the issuance of a patent; but they claim that under the statutes the alien is not permitted to make the purchase until after the patent is obtained, and that the contract herein sought to be enforced having been made before the issuance of the patent to Heynemann, it was absolutely null and void.

In the consideration of this case I have treated the contract between Heynemann and appellant as an agreement to convey the lands after the patent was obtained, for such, in my judgment, is the proper interpretation to be given to it. It is true that in the original agreement no such covenant appears to have been made, but the original contract was in many respects changed, by the consent of both parties. The agreement was first made before the plaintiff became a body corporate, and Heynemann then agreed to sell the mines for the sum of \$235,000. After plaintiff became a body corporate, Heynemann agreed to take 25,500 fully paid-up shares in the corporation, in lieu of the money, and while he remained in possession of the property, acting as the agent of the purchaser, he, in apparent good faith, suggests that it would be best, before executing the conveyance, to perfect the title in himself by procuring a patent from the Government. This was agreed to, not for the purpose, as respondents argue, to defraud the Government, but for the purpose, as above stated, of obtaining the title in Heynemann's name, so that he could make a valid deed of conveyance, as he had theretofore agreed to do.

From the reasoning of the authorities cited, and the particular facts and circumstances of this case, I am of the opinion that the alienage of the plaintiff in this action does not, of itself, incapacitate it from enforcing the contract as against the defendant, Heynemann, and that Heynemann, having obtained a patent from the United States, is not now in a position to take advantage of such alienage as a defense to prevent plaintiff from enforcing, as against him, a specific performance of the contract for the sale of said mineral land.

The plea of alienage has never been favored by the courts, and even admitting that the principles involved in this case are not free from doubt, I should, nevertheless, deem it to be my duty to give the benefit of that doubt in favor of the proposition which, while protecting the citizens and the Government, also furnishes some security to the alien, who, relying upon the good faith of the citizen and the Govern-

ment, without any direct violation of the law or any attempt to evade its spirit, or defraud the Government, or to interfere with its policy, is willing to lend his capital in the purchase of mines, and thereby aid and assist in developing the mineral resources of this State.

Entertaining the views herein expressed, I am compelled to dissent from the opinion and judgment of the Court.

Honorary Names in Scientific Nomenclature.

A few weeks ago an article appeared in the columns of the *Pacific Rural Press*, criticising the action of Mr. J. G. Lemmon, of Sierra valley, in naming a new flower—*Gilia Parryi*—"to honor a noble lady who has done eminent service for botany," etc. Mr. Lemmon answers the criticism by explaining the propriety of admitting a few such names to the records of science, in accordance with the practice of the masters in each, to the annoyance, it appears, of a few persons, who have evidently not given the subject much thought:

The plea for descriptive names is an old one, and many a scientist has kept strictly to the practice of giving them only, and by this very method has introduced confusion of the worst character into our nomenclature.

Let us look first to the origin of science and of scientific names. "Science is knowledge systematically arranged, so as to be conveniently taught, easily learned and readily applied."

Art is this knowledge applied to use. Coming down the steps of time, a master-mind arises one after another, seizes the materials at hand, arranges, names, publishes his book and departs, leaving his impress upon the science more or less indelible, according to the strength of his mind or the admiration of his followers. When all the known objects of a particular science or branch of science are thus collected and compared, no difficulty is found in distinguishing each from each, and very appropriate names are generally given them. As research continues, however, and more genera and species are added, many of the established names are found no longer distinctive, others are vastly more applicable to the new forms, etc.

Again, descriptive names sometimes prove indefinite afterward, because of the accumulation of material, showing that the first name was given to an aberrant form or variety, totally different from the typical plant or animal.

Still again, the early scientists, working with inferior or no instruments, made continual errors, both of observation and interpretation, hence their names are now mainly inappropriate or misleading. With every re-organization of a science, there comes an attempt to correct these manifold errors, followed in turn by confusion and contest, measured by the amount of re-naming done and the weight of the new authority. We can never hope to have our scientific names crystallized into a nomenclature as permanent as the conglomerate rock until research has revealed every form of plant that grows and every kind of animal that lives on the earth.

One of the first things we teach our pupils in science is the appropriateness and beauty of scientific names. We expatiate upon them with great pleasure and generally make the theme attractive, but no sooner does our tyro get well into the meshes of a science, than he finds one after another of its nice distinctions failing utterly, and that to follow the literal meanings would often totally mislead. Thus we learn to regard technical names, especially those coming down from the old masters, as distinctive only, not necessarily descriptive. Names denoting locality are often quite as unfortunate as descriptive ones. I could fill the *RURAL* with proofs that descriptive names as often fail in time to distinguish objects, as they continue to distinguish them. The name becomes merely a meaningless term, retained out of reverence for the author or to show the early conception of the object.

Linnaeus and Cuvier—worthies held in reverence by every true lover of nature—were the pioneers of modern research, and no better proof of their ability is needed than the statement that they studied and gave scientific names to every plant and animal known at their day, many of which names are retained to the present and, no doubt, a few will be until the end of time; but, as a matter of history, nine-tenths of their names have been quietly dropped or boldly overruled by subsequent scientists.

The thing aimed at in nomenclature is *distinctiveness*; the giving of such a name as will forever distinguish the object from every other in creation. In the naming of large families the distinctions become less prominent and certain, while upon the accession of a large number of species, the whole family has again and again to be revised. Each scientist aims as far as possible to give descriptive names, but each learns from his predecessors how meaningless most of them become; so he casts about him for other names that will stick he hopes, through time.

And right here comes in one of the most beautiful and touching characteristics of the true scientist—the recognition of the labors and merits of others. Full well he knows the toil and exposure of the explorer, the study and

pains-taking of the discoverer; and also how illy both are requited with this world's goods; so he is ever ready to give the poor meed of honor to whom honor is due. With an object before him, the result of severe exploration or research how natural that the discoverer's name should be indelibly associated with the new object; and with what love and loyalty he coins it into a technical distinction for the object given by unmeasured toil to science and the world.

Generic names are Latin nouns arbitrarily formed often from some medicinal or other virtue, real or supposed, or some resemblance to other objects, or they are derived from a country, or they are old classic words of no meaning whatever; and lastly they are sometimes coined from the name of a distinguished scientist or patron of science. Specific names are Latin adjectives, singular in number and agreeing in gender with the name of their genus. They are mostly founded upon distinctive characters, resemblances, uses, etc., and quite often are commemorative names. Specific honorary names are of two kinds: possessive and dedicative. If the person honored is the discoverer, his or her name is used in the form of the Latin genitive (or possessive case); as, *Viola Nuttallii*, *Cheilanthes Cooperi*. If the name is conferred as a recognition of merit, it is used as an adjective ending in *nus*, *na* or *num*; as *Ceanothus Veitchianus*, *Uncus Mariana*, and *Lilium Bloomerianum*, when the object is said to be dedicated.

The number of commemorative names of necessity will always be few compared with descriptive ones, but as every science has a small number it is quite certain that each will always retain a few in accordance with the law of human kindness, which, it is hoped, will always meet return.

What warm heart does not cheerfully acquiesce in the grateful affection of eminent scientists who have dedicated certain small genera of plants or animals to Linnaeus, Cuvier, Jussieu, De Candolle, Levoisier, Maximowicz, Agassiz, Adanson, Audubon, Berlandier, Bentham, Brown, Bigelow, Baykin, Brewer, Canby, Cary, Chapman, Clayton, Chamisso, Clinton, Dahl, Davy, Dana, Descartes, Engelmann, Eaton, Eschscholtz, Douglas, Faraday, Franklin, Fuller, Gay-Lussac, Gray, Hooker, Hudson, James, Jefferson, Kuhn, Lamark, Lavater, Le Conte, Lindley, Ludwig, Marsh, Marshall, Menzies, Michaux, Mitchell, Nuttall, Olney, Packard, Pursh, Richardson, Riley, Sprengel, Sullivan, Silliman, Thurber, Torrey, Towne, Tyndall, Wood, Watson, Wilson, Willdenow, Whitney, Wright, Parry, Palmer; and our Californians, Bolander, Kellogg, Bloomer, Davidson, Harford, Harkness, and Edwards.

Please permit a few words in regard to my practice of suggesting names and how I commenced it. In September, of 1873, I was suddenly informed that a plant had been named for me by Dr. Asa Gray, of Harvard University, at the instance of Prof. Bolander, who had recently been botanizing Sierra valley with me. I was thus ushered into the large and interesting family of *Astragalus*. I found myself in good company. There was Pursh, Gray, Hooker, Geyer, Coulter, Menzies, Douglas, Horn, Anderson, Morton, Parry, Whitney and Bolander.

But other good people to my knowledge were outside; I at once determined to try to get them within. I traveled extensively, collected largely and noted carefully. With every package of plants sent to Dr. Gray went up petitions of this import: "Should such and such a plant prove new, and it does not name itself by obvious characters (which is always best), please dedicate it to so and so, for the following reasons," etc.

My petitions have often been granted, and with great joy I have celebrated the admission, one after another, into the family of *Astragalus* alone, Mrs. Pulsifer-Ames, Dr. D. G. Webber, Prof. E. L. Case and Mrs. R. M. Austin; and, did your readers know these parties, I don't think one would protest.

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We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes: Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

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Importers of and Dealers in

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Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application.

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Deposits of bullion received, melted into bars, and re turns made in from 24 to 48 hours.

Bullion can be forwarded to this Office from any part of the interior by Express, and returns made in the same manner.

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Ores worked by any process.

Ores sampled.

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The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING AND TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 320 Sansome street, Room 10.

Continued from page 365.

ning in good vein matter, with streaks and bunches of ore occasionally encountered.

SILVER HILL.—The upraise above the 444-ft level is progressing upward in lower grades.

HALE & NONCHOS.—Reducing the water slowly, but getting the best of it. It is reduced sufficiently to see that the timbering of the incline holds good, and a point nearly 100 feet below the 1900-ft level has been reached.

BULLION.—At the 2000-ft level streaks of good looking quartz are making their appearance in the face of the drift.

SERRA NEVADA.—At the 1500-ft level the cross-outs both east and west from the main south drift continue in quartz and low grade ore.

DAYTON.—The work at this mine consists in the development of the ore bodies at the 400 and 220-ft levels.

MORNING STAR.—The old upper tunnel is showing some very good ore.

ATLANTIC CON.—The bottom of the winze below the main adit tunnel continues in quartz and low grade ore.

Arizona.

LUKE'S MILL.—*Arizona Miner*, May 25: This mill is about on the ground, and a portion of it is already up. It will take about four weeks before the machinery will all be in place and the mill in working order.

HACKBERRY.—Mr. H. C. Stevens, from Hackberry, arrived to day, and informs us that the company have been running their old mill on tailings, and after nine days' run cleaned up \$7,300 in bullion. The shaft of the Hackberry mine is down 450 feet and the lead shows at that depth excellent ore. The company's new 10-stamp mill had arrived at Hardyville.

GLOBE DISTRICT.—Globe City, the principal place in Globe mining district, has a shifting population of about 300. Everything is terribly dull here, owing to the lack of capital to develop the mines. There are two stamp mills here, one two stamp and the other five stamp; but their returns have been so unsatisfactory that the miners have no confidence in them and will not furnish them with rock. Mr. Kennedy has a smelter here, but as lead is too high, it makes that way of working so expensive. The ore of this district contains in large quantities iron, copper "glance," antimony and sulphur, and most assuredly requires roasting.

There is very little free milling ore found here. Messrs. Townsend, Jerrold and others, of Caribbo, B. C., have settled here, and sent on to San Francisco for a complete ten-stamp mill, with a "mechanical roaster." Messrs. J. D. Wilson & Co. are also having a mill built, with a capacity of twenty tons per diem, to erect in this district. As soon as these mills are erected and in working order, the miners will commence working their claims; and, as they can take their own ore and have it successfully worked, they can thus make expenses while developing their mines.

Idaho.

PROSPECTING.—Owyhee *Avananche*, June 2: We are glad to learn of the success of so many persons engaged the present season in prospecting the neighboring hills and mountains. This is infinitely better than lounging about hotels and loafing in bar-rooms. There is abundance of good ledges scattered all through these hills, and it only requires a little energy and hard work to get at them.

BULLION.—Quite a large quantity of bullion has passed through here recently for the railroad, shipped from different sections of the Territory. Two messengers left here on the stage which went below on Saturday evening.

GOLDEN CHARIOT.—The flow of water which usually interferes with mining operations here in the spring has somewhat retarded operations at the Golden Chariot during the past few weeks. No difficulty, however, is experienced in handling it, the heavy machinery at the mine being quite adequate for all such emergencies. A good yield is expected from the present crushings, the pulp assays ranging from \$40 to \$200 to the ton. The Superintendent expects to make the first bullion shipment of the Chariot in a day or two.

EMPIRE.—The progress of operations at the Empire continues to be most favorable. Work is going on in the sixth level both in a north and south direction, and the result leaves no doubt of the promising character of the ore shaft.

There are quite a number of persons working on small claims, scattered throughout the hills, and several good prospects are reported.

Montana.

CLARK'S FORK.—*Bozeman Afloat Courier*, May 28: The proposition looking toward lease of the smelter works, was not favorably considered by the company. It has such faith in the richness of the various leads, that it determines to proceed immediately to completion of the work begun last season. Preparations are now being made for the departure of a party of workmen in charge of some of the stockholders; and on the 1st of June a number of land owners will start for the mines outfit for a season's extensive work. We have reason to think more practical development will result this summer than ever before, and should no disappointment follow, a busy camp will be found next year at Clark's Fork.

Oregon.

QUARTZ.—*Oregon Mining-Immigration Journal*, May 25: Great excitement exists at Langell's valley. Lake county, over a very rich quartz ledge recently discovered by Wm. Bloyd. The County Clerk is one of the principal owners.

R. J. CAMERON is engaged in constructing a ditch to bring water to the mining-grounds on the Little Apple Creek, Jackson county.

FOR THE MINES on Little Apple Creek, 1500 feet of 15 inch pipe has been received. The nozzle weighs 400 pounds. There is 200 feet fall, and the amount of dirt it will wash out in a day is enormous. The pipe cost \$2,500. The whole length of the new ditch on Apple Creek is 19 miles. It will carry 400 inches of water.

PREPARATIONS are being made for sinking a shaft for an air shaft and means of hoisting ore in the Capital. The veins now show solid quartz about two feet in length, and the owners of this mine, with proper management, have a good thing. Some very rich specimens have lately been shown from the Capital.

ON COYOTE CREEK, Douglas county, Kelley's claims have paid \$10 per day to the land for all the work done in the mines since last fall. The claims above Kelley's which were worked during the mining season just passed, have all paid more than wages, with one exception.

MINERS in the gravel beds below Galesville are doing well.

There is plenty of water in the mining flume at El Dorado, Baker county.

About two weeks ago a man by the name of Short sunk a shaft (on a point of a hill near Pocatones, in the vicinity of Mill Creek, about five miles west of Baker City), about 25 feet in depth, and found an old lake deposit of rotten boulders and gravel, rich in gold, paying from 5 to 50 cents to the pan, some say more. Short did not reach the bedrock, and is now drifting. Some 30 or 40 claims have been located, and the presumption is that our palmy placer mining days will come again. There is plenty of ground left to be taken.

The Camp Creek mines are about 175 miles distant from the Dalles. Stages leave Dalles for Prineville every Monday morning; returning, leaves Prineville every Thursday; distance from Prineville to Camp Creek, 50 miles. The mail service will soon be extended to Camp Creek, and the coaches be put on between the Dalles and the mines.

Utah.

BINGHAM.—*Cor. Salt Lake Tribune*, May 27: Utah's mining interests are no longer based upon wild-cat speculations. Excitements are merely local. When mines are purchased, the inducements are such as to leave no

doubts in the purchaser's mind, and remunerative investments are to be made.

This Glasgow company (German, Greeley & Vulcan) works a full force. This company is about to erect a ten-stamp mill close to their mines, to work up their own ore. Mr. Jackson has a large force grading out for the mill, and is looking for the machinery soon.

DISCOLL, CULLEN & Co. have struck a large body of high-grade ore in the Caledonia. We congratulate the boys on their strike, as they have expended a good deal of time, money and labor upon this property. It is now one of our bonanzas.

ELMS & Co. are doing well on the Tiewatke. Wimmer and Dixon mines are doing as usual, shipping. At Sandy the Flagstaff smelter consumes 130 tons of ore every 24 hours. He employs 100 men and works eight-hour shifts.

The following mines are being worked: Neptune and Kempton, Live Pine, Ashland, Albion, Fanny Bonny, Ten-Forty, Chattanooga, British Flag, Cotton Tunnel, Saturn, Last Chance, Elmore, Jordan, Mary Ann, Utah, Spanish, Wall Street, Castro, Victor Tunnel, Old Telegraph, Reverse, Yosemite, Telegraph, Miner's Dream, Black Metallic, Evergreen, Morning Star, Omaha, Shakespeare, etc.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

PUGET SOUND PLANING MILL CO.—June 4th. Object: Manufacturing, rounding and finishing masts and spars and all work that can be manufactured by the cylinder planing process. Capital stock, \$50,000. Trustees: Wm. Irvine, H. H. Hayden, J. C. McCurdy, Theo. L. Payne, H. G. Donnel, H. S. Tibbey, J. J. Lyon, P. Zadis and L. J. Lewis.

ARGENTA M. CO.—June 4th. Location: Nevada. Capital stock, \$5,000. Directors—W. H. Raymond, Alfred Welsh, T. E. Jewell and Henry Raymond.

COMBINATION M. CO.—June 5th. Location: Black Mt. district, Esmeralda county, Nevada. Capital stock, \$10,000. Directors—Thos. B. Hayes, J. B. Low, Charles Stevens, H. A. Charles and Wm. H. Clarke.

Civil Service Reform in the U. S. Patent Office.

Secretary Schurz has determined to test the competitive examination system very thoroughly in connection with the U. S. Patent Office. Recently, when a vacancy occurred on the Board of Examiners-in-Chief, he appointed a committee to examine applicants therefor, a thing until then unheard of with respect to a Presidential appointment requiring senatorial confirmation. It created considerable stir among the gentlemen of the office who aspired to the place, and at one time it was doubted whether the programme would be carried out, owing to opposition "to the innovation" on the part of some interested. But on the appointed day a baker's dozen appeared, including all who had been prominently mentioned for the place, and a gentleman not in the office, but who had resigned the place of Principal Examiner to go into the army, Dr. Antisell. The questions were confined to the law and practice in patent matters, and the occasion was entirely satisfactory to all concerned, and especially so to three of the number, who betrayed the most learning or were most successful in telling what they knew, and whose names were sent by the Commissioner of Patents to the Secretary of the Interior with recommendation that one of them be chosen to fill the place. Mr. H. H. Bates, who stood first, was chosen and appointed to the place, Mr. T. F. Wilber, who stood next, was made Examiner of Interferences, the place which ranks next in importance to the Board to which Mr. Bates had been promoted. The third was Mr. B. R. Catlin, who will stand a good chance of promotion on the next vacancy. The salary of Examiner-in-Chief is \$3,000, that of Principal Examiner \$2,500. There are three of the former and twenty-two of the latter, as the office is now organized.

Messrs. Bates and Catlin were then, together with Mr. B. C. Tiffany, of the Secretary's office, appointed a committee to examine applicants in the next lower grade for the vacancy caused by Mr. Bates's promotion, and also for two other vacancies that had been made, one by the resignation of a Principal Examiner, another by resignation. This examination, like the first, was eminently practical and well-suited to determine the relative qualifications of the competitors, of whom there were twelve, and the result has given universal satisfaction. Mr. H. C. Townsend and Mr. C. B. Church were the fortunate competitors; the former has been put in charge of electricity and cognate subjects, and the latter the class of metal-working machines and processes. Both have acquitted themselves with great credit as Assistant Examiners, are well known, and go into their new positions enjoying the confidence of practitioners and inventors alike. Mr. Church has gained an enviable reputation as Law Clerk to the Commissioner and has had large experience in the class over which he now presides.

To discharge acceptably their duties, examiners of patents (of whom there are in all, including assistants, 88 in the office) should have a competent knowledge of law and mechanics, and should be men of honesty, general intelligence and good judgment. Many important questions come before them. They are frequently called upon to decide questions involving large moneyed interests. It devolves on them to examine into and determine the novelty and patentability of an immense number of applications for patents on every conceivable kind of devices. The patent interests of the country have grown to enormous proportions since the war, and it is difficult to keep in the service, at the meager salaries paid by the Government, the men who distinguished themselves in the discharge of their official duties. It will be seen then that the competitive examination system can be made, as indeed it already has, to a considerable extent, of great avail in assisting

the appointing powers in filling vacancies as they occur among the examiners and their assistants. It should be said, however, that it does not follow necessarily under the civil service reform in vogue, that the man who stands at the head of the list will be promoted. The efficiency of the several candidates is taken into consideration in all cases, and due weight given thereto, but the Commissioner does not, in his recommendations to the Secretary, set aside the highest candidate as ascertained by the examination, and substitute one ranking below, without good and sufficient reasons, not likely to exist.

The whole number of patents granted up to May 15th is 190,947, of which 31,533 only had been granted March 4th, 1861, when President Lincoln was inaugurated. The number of applications filed during the centennial year was 21,425, and the number of patents granted during that year was 15,595.

The Secor Amalgamating Process.

We have several times made the statement that there are an enormous number of mines on this coast which are to-day lying idle, although known to contain large bodies of paying ore. The usual method of wet crushing in a mill and amalgamating in a battery and on plates is the old plan, and scarcely any improvement has been made upon it in the last 18 years. Concentrator blankets, sluices, etc., are slight adjuncts, but in the case of saving sulphurets, the cost of chlorinating still leaves but little incentive to work in that manner.

To show how unsatisfactory amalgamating in battery and on plates is, we will suppose that a ton of ore (crushed dry and fine, that no flour gold may float away), should be put in a pan with a large charge of quicksilver, and worked cold and without chemicals for four hours (because in battery and plates it is cold and no chemicals are used), the result would be from 60% to 85% of the fire assay. Now, if with such a mixing and working together of ore pulp and quicksilver the result is so far from getting good returns, how much could be expected in the battery when the larger part of the ore goes through the screen, without going within three or four inches of the quicksilver which lies at the bottom of the mortar; and on the plates when the flour gold passes over in a thick, muddy water, quicksilver having no attraction whatever for gold or silver, but merely taking them up when the proper circumstances exist.

It is not an unusual thing to hear mill men say "they save \$8 per ton and their ore goes \$30, and the tailings will only assay \$3 to \$5"—showing the great loss which goes off on the water, but attributed to the loss in the sulphurets, and not to the true fact of having floated away.

It is stated that by taking a phial containing, say a half ounce of flour gold, put in three or four ounces of quicksilver with water, shake well together, and only a portion of the gold will be taken up; heat the contents to 200°, then shake again, and a portion more will be absorbed, some of the flour gold still floating on the quicksilver; heat again to 300° the entire gold will disappear by shaking. We now come to speak of a device intended as a remedy against loss of flour gold and also of silver.

The Secor amalgamator or pan is a strong iron closed cylinder, with gearing on top and a shaft passing down through, with mullers set at an angle of 45 degrees, something like the blade of a propeller; the action of the mullers sends up the mixture of ore and quicksilver in the machine to the top. Their action is precisely that of the propeller of a ship, and their force may be easily estimated by reflecting for one moment on that exerted by a propeller. Their effect is to thoroughly mix the whole mass together. The ore to be treated is crushed fine, charged into the machine in quantities of one ton of 2,000 pounds; quicksilver is put in the charge, the manhole plate is then put on, everything made tight, and the ore submitted to the disintegrating power of steam under pressure of from 10 to 60 pounds to the square inch, giving from 240 to 307 degrees of heat. But little steam is used for a charge, the ore so far filling the machine as to leave a space of about one and one-half cubic feet; then a slight condensing until the mass is heated to above boiling point, which is very soon done, as the machine is hot when the charge is put in, steam being then produced from the mass by the heat within itself. It is calculated where steam is used for running the mill, that taking it from the boiler, the cost would not exceed five to 10 cents per day.

For saving very fine gold in ores—gold that floats and cannot be precipitated—it can easily be understood that in amalgamation the heat of the steam agitates the quicksilver; the mullers carry it up to the top of the charge, bringing it in perfect contact with the metal it is seeking for. When finished, all is discharged into a settler, when a new charge can be put into the machine.

In working the ordinary open pan a long time is required, and from five to six-horse power to drive it; and it is the custom to heat the pulp by means of false bottom, coil, jacket, or by letting steam directly into the pan, which only produces about 180 degrees of heat, for a much higher heat dries the pulp, requiring the addition of water.

It is claimed that the Secor pan can be run with one-horse power, and a charge is worked in an hour, or about 20 tons per day, equal to the work of four open pans, and saving about

20 to 25-horse power in accomplishing the same amount of work, the open pan saving 60 to 75 per cent., while the closed pan, in free milling ore, saves from 92 to 98 per cent. of the fire assay.

Mr. Secor does not claim to work all kinds of ore, but should it contain sulphurets in considerable quantities, or other base metals, they should be treated by roasting or otherwise, when the same percentage is obtained as from free ores. In a subsequent issue we shall give an engraving of this apparatus, so that our readers may have a better idea of its construction and operation.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday night. Prof. Davidson in the chair. Dr. Kellogg read a paper on a number of new plants, under the following names: *Spheralcea insularis*, *Ecnothera frutescens*, *Triclis insularis*, *Heterocodon hispidissimus*, *Astragalus insularis*, *Rhaecia plumosa*, found on the coast islands of California by the late Dr. Veatch, who was the first naturalist to make a collection on those islands; *Cnicus Marinus*, a species of thistle, found at Lone mountain by the same naturalist. *Gonolobus barbatus*, variety *subauriculatus*, collected by Capt. W. J. Fisher on the Gulf of California; *Mimulus Clarkii*, by Joseph H. Clark, of Mendocino county; *Berberis Nevadensis*, by Dr. Harkness, found in Fresno county.

A plant, common in San Francisco, *Soliva pedunculata*, was described as a new plant. Specimens had been sent East, but the Eastern botanists had not seen fit to admit the new species. It differs from the *Soliva* described in their books.

Three new plants, found by Henry Edwards, Esq., were described; *Streptanthus Edwardsii*, found at Knight's Landing; *Collinsia ochroleuca*; or White Collinsia, found at Skaggs springs, Sonoma county; and a remarkable specimen of the golden thistle, *Cnicus Vailii* (not of Gray) *Citrinus*, a plant of a bright yellow flower.

A collection of plants was received from Mrs. Dr. Tilling, of Oakland; and another (*Alga*) from Dr. Anderson of Santa Cruz.

A number of ores for the cabinet were received from Homiguera mine, Triunfo, Lower California.

A photograph of a prehistoric sepulchral vase was received from the collection of Dr. L. M. Dimmick, of Santa Barbara. It was excavated from the ancient burial mound at Ottawa, Illinois, found at the side of the head of a human skeleton. It is unglazed earthen ware, and forms one vessel, the four compartments being connected at the base. It strongly resembles in its quadruple form some specimens of pottery found in the burial mounds of the ancient inhabitants of Peru, South America.

A paper on "Foods" was read by J. P. Moore, on the utility of turning attention to this subject, and prepare a collection of all foods for the uses of the practical producer. He thought that producers would co-operate with the Academy, if the latter would take hold of the subject in earnest, and bring the facts of science home to the interests of the people.

Prof. Davidson read a paper on English break-waters. At the next meeting, he will read another on other similar works.

He stated that he had advice of the departure of Dr. Hooker, President of the Royal Society, and Prof. Asa Gray, to visit California this month; and that Prof. Morse, on his return from Japan, would deliver four or five lectures on geology, under the auspices of the Academy.

Chloride of Calcium for Street Sprinkling.

Hearing that there had been successful experiments made abroad in the use of a solution of chloride of calcium for street sprinkling, and of its great advantages for such use, we interviewed Mr. E. L. Ransome, No. 10 Bush street, San Francisco, who is a large dealer in the substance, to gain what information he had on the subject. He informed us that according to a statement recently made before the Academy of Sciences, of Paris, by M. Housenau, great advantage arises from the use of chloride of calcium instead of water in laying the dust of public thoroughfares. The salt is, as we all know, highly deliquescent, and is applied in solution, one application sufficing for a period of from five to seven days. Thus a roadway of one kilometre in length by five meters in width, which would require in hot, dry weather four waterings per diem with water, at a cost of 60 francs per week, supposing the water to be supplied free, would require only one application of the chloride, at a cost of 40 francs only, that is to say a difference of 20 francs in favor of the chloride. Trials have also been made in Rome of a solution of chloride of calcium as a substitute for water in laying dust in streets, and the results are said to have been highly satisfactory. The dampness communicated to the road remains for a whole week. The road remains damp without being muddy, presenting a hard surface, on which neither the wind nor the passing of pedestrians or horses has any effect.

This subject seems to us worthy of experiment, both in San Francisco and the towns of the interior. Besides laying the dust it might prove serviceable as a disinfectant in some putrid streets where diseases generate, thrive and run riot during the sultry months.

General News Items.

THE Queen of Holland died on the 3d inst. They are having trouble with the Indians again in Arizona.

A VERY destructive fire occurred at Vacaville on Monday evening last, destroying half the town.

The debt statement shows a reduction of the debt for May of \$6,981,274. The reduction from July 1st, 1876, to date is \$36,062,000.62.

THIRTEEN failures were reported in the last fortnightly statement of the London Stock Exchange, some heavy.

A TERRIBLE storm struck the town of Mt. Carmel, Illinois, on the 4th inst., destroying \$500,000 worth of property and 12 or 15 lives.

EX-PRESIDENT GRANT is being honored on every hand in Europe, as a representative American, showing the good feeling which exists between the two nations.

A TEST case has been decided in a United States Court, which decides that an Indian, residing on a reservation and in charge of an agent, is an alien and therefore he has no right to vote.

THE French frigate *La Magicienne* has arrived here from Callao, making the trip in 31 days. She has on board Admiral M. Serre, 34 officers, 465 men and 28 guns. She is of 3,000 tons register.

THE daily requisition upon the Third Assistant Postmaster General, for postage stamps and stamped envelopes lately, shows a steady increase, indicative of a marked revival of business throughout the country. On the 8th inst., exclusive of postal cards, the requisitions filled by the department aggregated 6,217,000 stamps and stamped envelopes of various denominations, with a face value of \$147,759.

JUDGE BARRETT of New York has rendered a decision in which he holds that the By-laws of the Longshore Union Protective Association, making it compulsory on members not to work for less than 40 cents per hour, is void, as being against public safety, and members of the Association dismissed for its violation must be reinstated. This decision affects 800 members of the Union, expelled for disobedience to said law, as well as to Trades Unions generally.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

METALS.

WHOLESALE.

THURSDAY, M., June 7, 1877.

IRON.			
American Pig, ton.	33 00	63 00	00
Scotch Pig, ton.	32 50	63 00	00
White Pig, ton.	31 00	63 00	00
Oregon Pig, ton.	30 00	63 00	00
Ballard Bar.	5 00	63 00	00
Home Shoes, keg.	21 00	63 00	00
Nail Rod.	—	63 00	00
Norway, Oval.	—	63 00	00
Roll.	—	63 00	00
Copper Tinned.	37 00	40 00	00
Sheathing, lb.	37 00	40 00	00
Sheathing, Yellow.	21 00	22 00	00
Sheathing, Old Yellow.	10 00	11 00	00
Composition Nails.	21 00	—	00
Composition Bolts.	24 00	—	00
STEEL.			
English Cast, lb.	14 00	25 00	00
Anderson & Woods, ordinary steel.	19 00	—	00
Drill.	15 00	—	00
Flat Bar.	15 00	20 00	00
Flow Steel.	84 00	12 00	00
TIN PLATES.			
10x12 Charcoal.	9 00	60 00	00
Banca Tin.	24 00	—	00
Australian.	19 00	20 00	00
ZINC.			
By the Cask.	11 00	—	00
Zinc Sheet 7x3 ft. 7 to 10, lb.	11 00	—	00
7x3 ft. 11 to 14.	11 00	—	00
8x4 ft. 8 to 10.	12 00	—	00
8x4 ft. 11 to 10.	12 00	—	00
Assorted sizes.	3 25	63 37 1/2	00
QUICKSILVER.			
By the lb.	41 00	42 00	00

LEATHER.

[WHOLESALE.]

WEDNESDAY M., June 6, 1877.

Sole Leather, heavy, lb.	25 00	29 00
Light.	22 00	24 00
Jodot, 8 Kil. doz.	49 00	60 00
11 to 13 Kil.	68 00	67 00
14 to 19 Kil.	60 00	64 00
Second Choice, 11 to 16 Kil.	57 00	67 00
Cornellian, 12 to 16 Kil.	57 00	67 00
Females, 12 to 13 Kil.	63 00	67 00
14 to 16 Kil.	71 00	67 50
Simon Ulmo, Females, 12 to 13 Kil.	38 00	62 00
14 to 15 Kil.	60 00	67 00
16 to 17 Kil.	72 00	67 00
Simon, 18 Kil.	61 00	63 00
20 Kil.	68 00	67 00
24 Kil.	72 00	67 00
Robert Calf, 7 and 9 Kil.	35 00	40 00
Kips, French, lb.	1 00	1 35
Cal. doz.	40 00	60 00
French Sheep, all colors.	3 00	25 00
Eastern Calf for Backs, lb.	1 00	1 25
Sheep Roams for Topping, all colors, doz.	2 00	23 00
For Linings.	5 50	21 00
Cal. Russian Sheep Linings.	1 75	4 50
Boot Legs, French Calf, pair.	4 00	—
Good French Calf.	4 00	4 75
Best Jodot Calf.	5 00	5 25
Leather Harness, lb.	35 00	38 00
Pair Bridle, doz.	48 00	62 00
Skirting, lb.	33 00	37 00
Welt, doz.	30 00	60 00
Butt, lb.	17 00	—
War Skid.	17 00	18 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, June 6, 3 P. M.

LEGAL TENDERS in S. F., 11 A. M., 94 3/4 SILVER, 5 3/8.

Gold in New York 105 1/2.

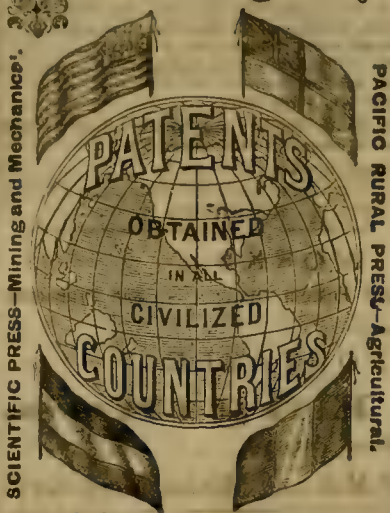
Gold Bars, \$800-\$900. SILVER BARS, 10 1/5 1/2 cent. discount.

EXCHANGE on New York, 50 to 55-100 cent. premium for gold; on London bankers, 49; Commercial, 49 1/2; Paris, five francs 94 dollar; Mexican dollars, 94 1/2.

LONDON Consols, 94 1/2; Bonds, 102 1/2.

QUICKSILVER in S. F., by the flask, 9 lb, 41 1/2 to 42.

Mechanics, write for your paper.

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San Francisco, 1877.

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DEWEY & CO., Publishers, S. F.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Booth Gold Mining Company.—Location

of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment No. 2, levied on the thirty-first day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Chenery, R. trustee.	12	100	5 00
Chenery, R. trustee.	14	100	5 00
Chenery, R. trustee.	15	100	5 00
Cahill, R.	158	50	2 50
Day, Thos H. trustee.	148	500	25 00
Gordon, Thos H. trustee.	88	750	37 50
Gordon, Thos H. trustee.	112	100	5 00
Gordon, Thos H. trustee.	114	100	5 00
Gordon, Thos H. trustee.	116	100	5 00
Gordon, Thos H. trustee.	117	100	5 00
Gordon, Thos H. trustee.	118	100	5 00
Gordon, A. C. trustee.	122	1000	50 00
Gordon, A. C. trustee.	123	100	5 00
Gordon, A. C. trustee.	124	100	5 00
Gordon, A. C. trustee.	125	100	5 00
Gordon, A. C. trustee.	126	100	5 00
Richardson, E. A. trustee.	130	100	5 00
Spinney, Geo R. trustee.	82	312	15 60
Spinney, Geo R. trustee.	95	1000	50 00
Spinney, Geo R. trustee.	96	500	25 00
Spinney, Geo R. trustee.	100	100	5 00
Spinney, Geo R. trustee.	101	100	5 00
Spinney, Geo R. trustee.	102	100	5 00
Spinney, Geo R. trustee.	103	50	2 50
Spinney, Geo R. trustee.	104	50	2 50
Spinney, Geo R. trustee.	105	50	2 50
Spinney, Geo R. trustee.	106	50	2 50
Spinney, Geo R. trustee.	149	500	25 00
Van Brunt, R. N. trustee.	7	100	5 00
Van Brunt, R. N. trustee.	8	100	5 00
Van Brunt, R. N. trustee.	9	100	5 00
Van Brunt, R. N. trustee.	10	100	5 00
Van Brunt, R. N. trustee.	11	100	5 00

And in accordance with law and an order of the Board

of Trustees, made on the thirtieth day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the salesroom of J. Middleton & Son, No. 310 Montgomery Street, San Francisco, Cal., on the twenty-fifth day of June, 1877, at the hour of two o'clock, p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

GEO. R. SPINNEY, Sec'y.

Office, No. 320 California Street, Room No. 5, San Francisco, Cal.

Consolidated Bonanza Gold and Silver Min-

ing Co.—Location of principal place of business, San Francisco, California. Location of works in Engle and Washoe Valley Mining District, Ormsby county, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the fourth day of June, 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Tuesday, the tenth day of July, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the twenty-fifth day of July, 1877, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Trustees, WM. MARTIN, Secretary.

Office No. 19 First Street, San Francisco, Cal.

Dolores Consolidated Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, Dolores Mining District, Esmeralda County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the seventeenth day of February, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Blasdel, H. G. trustee.	16	10,000	\$1,000 00
Blasdel, H. G. trustee.	17	5,000	500 00
Blasdel, H. G. trustee.	18	5,000	500 00
Blasdel, H. G. trustee.	19	5,000	500 00
Drexler, L. P. & Co., Trustees.	8	25,000	2,500 00
Fry, J. D. trustee.	7	10,000	1,000 00
Keece, J. R. trustee.	9	10,000	1,000 00
Talbot, W. C.	8	100	10 00

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of February, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of said company, on Monday, the sixteenth day of April, 1877, at the hour of two o'clock, p. m. of said day, to pay said delinquent assessments thereon, together with costs of advertising and expenses of the sale.

J. W. CLARK, Secretary.

Office, 418 California street, San Francisco, California.

POSTPONEMENT.—The sale of the above described

certificates of stock is postponed from the 16th day of April, 1877, to the 16th day of May, 1877, and will then take place at the same hour and place as above named.

By order of the Board of Directors. J. W. CLARK, Sec'y.

POSTPONEMENT.—The sale of the above described

certificates of stock is postponed from the 16th day of May, 1877, to the 15th day of June, 1877, and will then be held at the same hour and place named, By order of the Board of Directors, J. W. CLARK, Sec'y.

May 11th, 1877.

Empire Mining Company.—Location of

principal place of business, San Francisco, California.

Location of works, Silver City, Owyhee County, Idaho Territory.

Notice.—There are delinquent upon the following described stock, on account of assessment No. 13, levied on the 26th day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Balcom, C. F. trustee.	243	100	\$100 00
Miner, A. P. trustee.	400	100	100 00
Miner, A. P. trustee.	578	20	20 00
Schmiedell, Hochstadter & Co., trustee.	1007	100	100 00
Fisher, E. trustee.	008	25	25 00
Warren, J. B. trustee.	986	5	5 00
Schmiedell, Hochstadter & Co., trustee.	1007	100	100 00
Schmiedell, Hochstadter & Co., trustee.	1116	10	10 00
Schmitt, C. A. trustee.	1188	10	10 00
Woods & Fragon, trustee.	1205	30	30 00
Fisher, E. trustee.	1294	100	100 00
Noble & Co, H. H. trustee.	1315	5	5 00
Fisher, E. trustee.	1348	25	25 00
Dixon, T. H. trustee.	1433	150	150 00
Noble & Co, H. H. trustee.	1445	100	100 00
Noble & Co, H. H. trustee.	1446	100	100 00
Noble & Co, H. H. trustee.	1457	100	100 00
Johnson, J. M. trustee.	1511	50	50 00
Johnson, J. M. trustee.	1512	40	40 00
Swift, Frank.	1538	5	5 00
Dodge, Geo S.	1589	3	3 00
Classen, J. M.	1640	2	2 00
Noble & Co, H. H. trustee.	1644	20	20 00
Willis, William, trustee.	1682	100	100 00
Callaghan, Lynch & Co, trustee.	1677	20	20 00
Brooks & Lee, trustee.	1706	20	20 00
Schmitt, C. A. trustee.	1736	20	20 00
Hickox, Kuhl & Co, trustee.	1746	50	50 00
Noble & Co, H. H. trustee.	1748	100	100 00
Hosmer & Bourne, trustee.	1768	85	85 00
Major, D. G. trustee.	1769	400	400 00
Hall & Charles, trustee.	1783	100	100 00
Gordon, O. P. trustee.	1796	50	50 00
Carroll, James, trustee.	1830	25	25 00
Willis, William, trustee.	1831	50	50 00
Willis, William, trustee.	1832	50	50 00
Willis, William, trustee.	1833	50	50 00
Willis, William, trustee.	1834	100	100 00
Willis, William, trustee.	1835	50	50 00
Willis, William, trustee.	1846	100	100 00
Willis, William, trustee.	1852	100	100 00
Willis, William, trustee.	1853	100	100 00
Willis, William, trustee.	1856	100	100 00
Willis, William, trustee.	1879	100	100 00
Hubbard & Co, trustee.	1885	50	50 00
Willis, William, trustee.	1893	50	50 00
Hill & Kilgour, trustee.	1894	50	50 00
Wakefield, S. B. trustee.	1895	50	50 00
Taylor, A. C. trustee.	1902	25	25 00
Taylor, C. trustee.	1903	25	25 00
Hagerin, L. T. trustee.	1907	50	50 00
Noble & Co, H. H. trustee.	1908	100	100 00
Noble & Co, H. H. trustee.	1909	50	50 00
Willis, William, trustee.	1910	50	50 00
Willis, William, trustee.	1920	100	100 00
Willis, William, trustee.	1923	100	100 00
Willis, William, trustee.	1924	100	100 00
Willis, William, trustee.	1925	100	100 00
Willis, William, trustee.	1929	100	100 00
Willis, William, trustee.	1930	100	100 00
Willis, William, trustee.	1933	100	100 00
Willis, William, trustee.	1940	100	100 00
Willis, William, trustee.	1944	100	100 00
Willis, William, trustee.	2014	100	100 00
Willis, William, trustee.	2017	100	100 00
Willis, William, trustee.	2018	100	100 00
Burtzell, J. M. trustee.	2022	100	100 00
Wolf, F. trustee.	2026	50	50 00
Vernon, Tobin & Co, trustee.	2036	50	50 00
Higgins & Conkling, trustee.	2039	100	100 00
Callaghan, Lynch & Co, trustee.	2057	50	50 00
Crocker & Gunnett, trustee.	2062	100	100 00
Crocker & Gunnett, trustee.	2063	50	50 00
Crocker & Gunnett, trustee.	2064	50	50 00
Willis, William, trustee.	2066	100	100 00
Willis, William, trustee.	2068	100	100 00

Names.	No. Certificate.	No. Shares.	Amount.
Hubbard & Co, trustee.	2072	50	50 00
Hubbard & Co, trustee.	2073	10	10 00
McClintock, Wm H. trustee.	2095	50	50 00
McClintock, Wm H. trustee.	2095	50	50 0

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RAILROAD AND OTHER IRON

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One man.....	\$ 4 00
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Wood—23 Cords at \$3 per cord.....	5 25
Salt—1,600 lbs at 2½ cents.....	40 00
Cost of 20 tons.....	\$52 25
Cost of one ton.....	2 61½

In a furnace of three or four times this capacity the
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The furnace is now working successfully at the Poe Con-
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Best Material, and in a
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Yours respectfully,

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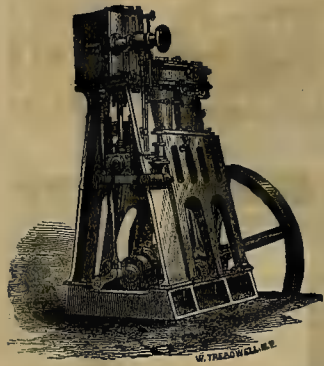
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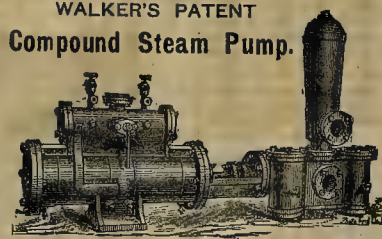
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, JUNE 16, 1877.

VOLUME XXXIV.
Number 24.

Pavement of Sluices.

Sluice boxes are the highways upon which hydraulic mining is carried on, and their greater or less efficiency has an influence upon this business like that of the establishment of railroads or common wagon roads, upon general commerce. Just as, by the cheapening of carriage, railroads open coal fields, grain producing regions, etc., to the markets of the world, and to a brisk commerce, where common wagon roads would hardly sustain a weak home trade, so well adapted sluice boxes will render inferior gravel deposits paying institutions, while on the other hand rich gravel deposits without proper facilities are worked at a loss. The great requirement is, of course, sufficient grade, but a very great deal also depends on the construction of the sluices and the methods adopted to catch the gold in the bottom as it passes down with the stream of water and debris.

The proper paving of the bottom of sluices is of paramount importance, and various methods are in vogue. Fig. 1 of the engravings on this page shows a plan greatly used, which was described by us some time since in the article by Chas. Waldeyer taken from the report of the United States Mining Commissioner. The bottom shows the rock pavement, the thick streak across the plank shows the plank lining on the sides. Fig. 2 shows the block pavement so universally used in sluices. These blocks are sawed, and set on edge and laid across the flume close together, forming a pavement which prevents wear and also numberless riffles in which to catch the gold. These blocks wear out more rapidly, however, than one would suppose, and have to be frequently replaced.

Recently considerable improvement has been made in the construction of these sluice pavements and different material has been introduced. Condemned car-wheels have been broken up and placed in the bottom of the sluices and are found to answer the purpose excellently, as the numerous irregular crevices make first rate riffles and the bottom is not quickly worn out. Old railroad iron is also used to a considerable extent and is found to be far superior to wooden blocks. An instance showing the superiority of this kind of pavement over the blocks, was shown in a recent experiment carried out at the Morning Star claim, at Iowa Hill. They laid out three sections of the flume, of equal length, (about 65 feet each,) and at a sufficient distance from the bank so that the flume would always run clear. The first section, nearest the bank (about 300 feet distant) was made with the ordinary wooden block pavement. The second section was laid with old iron rails, and the third with wooden blocks similar to the first. On cleaning up they gathered nine ounces more gold from the section laid with railroad iron than from the other two sections put together. This test was made very carefully and shows the superiority of the rails as riffles.

The rails are laid lengthwise the flume, but when in long lengths scantlings have to be spliced on to keep them in position, as they are apt to spring with the vibration caused by big rocks passing over them. The efficiency of this bottom is increased by putting wooden blocks on the sides of the flume with the rails in the center, slanting the surfaces of the blocks toward the center from both sides.

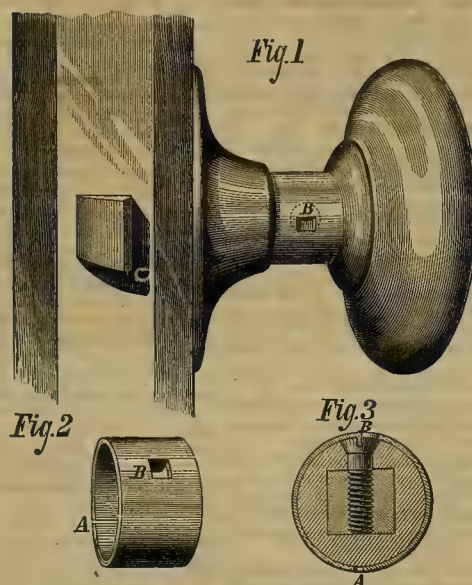
An explosion occurred in the nitro-glycerine department of the Hercules Powder Works, on the Central road, near Fourth avenue, a little past noon on Friday, resulting in a total destruction of the glycerine house. The hands, about twenty, mostly Chinamen, had just left for dinner, and no person was injured by the explosion, with the exception of one man, whose face was slightly cut by broken glass. About 500 pounds of glycerine exploded and the concussion was so great that windows were broken in houses nearly a mile distant. The Superintendent was absent at the time and cannot account for the explosion.

It is stated that contracts have been closed for the construction of six boats or dredgers, to be worked under the patents of the California Dredging and Mining Company.

Holding Door-Knob Screws.

Nearly every one has experienced the annoyance and inconvenience consequent upon door-knob screws becoming loose and falling out, especially in older houses; the screws are lost, the knob and spindle pulled from the door, and the knob on the other side falls and is often broken; a not uncommon occurrence, as many a person can testify, and very annoying, especially when it happens at night and in the dark.

The accompanying illustration shows a simple little device which can be applied to any knob

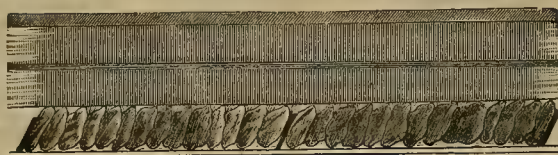


DEVICE FOR HOLDING DOOR KNOB SCREWS.

in a few moments, and which most effectually cures the evil; permanently securing the knob to the spindle and scarcely noticeable when in position.

It will be seen that it consists of an elastic band of metal, slitted at A, and provided with a small tongue, B, which enters the nick in the head of the screw. The device is applied in

causing the contact points of one or more telegraphic wires to traverse the surfaces in parallel and approximate lines, the inventor can automatically transmit the matter represented by said forms, to distant stations, where the letters or characters can be reproduced by a suitable recording instrument. The principle object of the invention is to permit the conversion of



SLUICE USED IN HYDRAULIC MINING.

the following manner: The screw being first screwed up hard, the position of the nick in its head noted, the tongue in the band is then punched in a corresponding position by a special pair of pincers; the band is then sprung open, passed over the shank of the knob, the tongue, B, introduced into the nick in the screw, and the band allowed to close. The parts then appear as in Figs. 1 and 3, the latter being a section through the shank. Once in position, neither the band nor the screw can turn. For further information, address DeC. May, 42 Mt. Vernon Place, Baltimore, Md.

The aggregate Internal Revenue receipts for the fiscal year to date have exceeded the total receipts for the same period during last year. The returns already foot up an excess of \$111,000,000, and the impression at the Department is that full receipts for the year will fall little, if any, below the estimate of \$120,000,000.

An important sale at auction, by Maurice Dore & Co., of Eureka Lake and Yuba canal company's stock, took place Tuesday, some 7,784 shares being sold, which realized \$176,004, an average of \$22.60 per share.

Typographical Transmitter for Automatic Telegraphs.

Mr. Loring Pickering, one of the editors and proprietors of the *Daily Evening Bulletin* and *Daily Morning Call* of this city, has just obtained a patent through the MINING AND SCIENTIFIC PRESS PATENT AGENCY, for a method of rapid telegraphing, which is of great value for the transmission of dispatches for newspapers. The patent covers a method for converting type forms and other raised or engraved characters, into transmitting plates, so that by

and operating the improved typographical transmitter, are both ingenious and simple. The invention can be applied to either curved or flat type forms.

A stereotype cast is taken from the ordinary newspaper form. The spaces between the types on the plate are filled with some non-conducting material, so as to insulate the faces of the type from each other and render the surface smooth and even. A filling of shellac, or any other non-conducting substance of the consistency of putty, such as can be applied readily, either warm or cold, will answer. After the filling and smoothing has been completed the faces of the types can be slightly sand-papered to free them from any adhering portion of the substance. The type plate can then be put in circuit by connecting one of the battery wires with it.

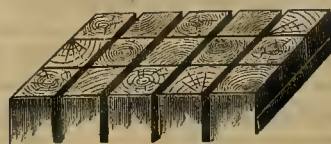
It will be evident that the inventor will now have a metallic type plate in which the surfaces of the type are exposed in regular order, just as the types were originally set up, and with which it is only necessary to make the proper connections to transmit a facsimile copy to the opposite end of the contact wire or wires.

The line over which the matter thus produced is to be transmitted is composed of several parallel wires. Each wire has a point or style at each end. The several points are then arranged in a spiral manner so that they will trace in lines close together, thus practically forming a brush which sweeps over the face of a cylinder or flat plate at each end of the line, according to the form of matter to be transmitted. The prepared plate is then mounted upon a suitable support—usually a cylinder—at one end of the line, and put in the electric circuit, while a similar cylinder at the opposite end of the line, around which sensitive paper has been wrapped, is also mounted so as to be swept by the other set of fingers.

The cylinders are then rotated synchronously by suitable means so that the fingers at one end will sweep over the surface of the types. Each time a finger comes in contact with a type face the electric circuit is completed and the corresponding finger at the opposite end of the wire makes a corresponding mark on the sensitive paper, but when the finger leaves the type face the contact is broken and the fingers are negative. Either the cylinders can be moved endwise by suitable means under the fingers or the fingers can be moved over the cylinders; in either case a few rotations of the cylinders completes the transmission and the entire newspaper or other form is reproduced in exact facsimile upon the sensitive paper at the other end of the line. This system is quite simple and a whole newspaper page can be transmitted by telegraph in from fifteen minutes to half an hour, delivering the copy ready for the printers, so that there is no necessity of copying it again.

THE LAVA BEDS.—We mentioned the fact in our issue of last week, that the Chinamen were at work in large numbers on the "lava beds," near Oroville, Butte county, and were making money. We did not know then exactly to what extent they were taking out gold, but the *Oroville Mercury* gives us the following information concerning the claims: The first claim on the right hand side of the river road, going down, yielded \$1,645 worth of gold last week. The claim bought of Robert Gordon yielded \$5,508 last week. There are five other large claims that have steam pumps at work on them, and we may safely conclude that they yield at least \$10,000 per week. There are also many other claims that are paying very well; but we have no means of knowing what they do pay. The figures of the two referred to came from the house where the dust was sold and are correct. They send their own dust to the mint themselves, thus making every cent that it is possible out of it.

FRUE CONCENTRATOR.—A trial of the Frue concentrator, which we illustrated and described in detail some time since, was had at Joshua Hendy's this week. As we have before stated, these concentrators are proving very successful with the gold sands of our northern coast, heretofore found very difficult to work. It is shortly to be tried on Comstock tailings.



Block Pavement for Sluices.

are usually quite small, when compared with the types heretofore used in automatic telegraphing, a peculiar arrangement or adjustment of the contact points is necessary where several wires are used, in order to permit the several points to trace in lines sufficiently close together to reproduce the outline of the letter.

Mr. Pickering's method of arranging these points in order to accomplish the object mentioned, together with the manner of preparing

CORRESPONDENCE.

Birds-eye View of Sierra County Mines.

[From Our Traveling Correspondent.]

The yield from the placer and hydraulic mines will be very materially affected by the light snow-fall of the past winter. Drifting will also be cut short in many localities from the same cause. The quartz claims are probably turning out fully as well as formerly. As the sequel will show, some new and valuable ground has been broken for gravel, and at least one recent very rich strike made in quartz. This may be expected to give a fresh impulse to prospecting, and, at the same time, turn the attention of capital a little more in this direction. In view of the many inviting fields offered here for its profitable investment, its magic power has, thus far, been but little felt. There are vast areas of comparatively unexplored ground in different parts of the county—full of promise both for quartz and gravel—that would seem to require only one touch of "its wizard wand" to bring forth from the smitten rocks many a gushing golden stream, giving new life, freshness and vigor, not only to mining operations, but to every other industrial pursuit. Beginning with

The Drift and Gravel Mines

In the northern part of the county; they may be said to be doing as well as could be expected, remembering that Pluvius, the rain-king of the valley, and hoary-headed Nix, of the higher altitudes, have both been less lavish than usual of their accustomed favors.

The North America, at Newark, is working a large force, and said to be doing better than its former years. At Whisky Diggings, a mile below, the Schofield Bros. have recently struck good pay gravel.

The Claims at Gibsonville

Are generally doing fairly. The Union is working 40 white men, and are cleaning up to the entire satisfaction of the company. The hotels are crowded, and the place is one of the liveliest in the county.

Between Port Wine and Scales Diggings there is an extensive scope of country, giving evidence of

Good Gravel Deposits.

That have lain thus far undeveloped, principally for want of capital. One company, the Iowa, has persevered, and after working for many years to little purpose, has at length reached good pay gravel. The company commenced in August last to sink an incline shaft, which has reached bedrock. Gangways are being opened, new and substantial hoisting works will soon take the place of those on the ground, and in the opinion of Mr. A. J. Rigby, the present Superintendent, the mine bids fair to be shortly put on a good paying basis.

The Cleveland Co.

At Scales Diggings, two miles below the Iowa shaft, having been working for several years at a considerable disadvantage, now propose to introduce the Burleigh drill and extend their tunnel into a similar rich deposit on the same channel. Mr. R. N. Williams, the Superintendent, who has been here for many years, has shown his confidence in the ground, although but partially developed, by recently purchasing a large interest.

The Fairplay,

Owned by Boyce Brothers, a mile below, has a bank with an average height of 200 feet, for the full face of 600 feet, 125 feet of which is pay gravel. Flume, 1,800 feet in length, three and one-half in width, eight dumps, and four under-currents. At the head of the flume, sawed riffles are put in lengthwise, instead of block bottoms, being much preferred at this point for saving gold.

The product of the mine, last year, reached \$32,000. Owing to scarcity of water, but little over one-half this amount is looked for the present season. For the same reason, most of the claims at Port Wine, St. Louis and Howland Flat will fall short of the usual amount.

The Empire,

Under the superintendence of Mr. J. P. De Noon, at Howland Flat, is working about 100 men, and is paying as usual. It is well known that it has furnished its regular monthly dividends for the past three years, and promises fair to continue them for some time to come. It is a drift claim, with a very large amount of ground yet to be worked.

In the southern part of the county some comparatively new enterprises have been inaugurated, and work is progressing favorably on most of the gravel claims. A few illustrations will be given before turning to quartz.

A Very Important Experiment

Is about to be tried, and should it prove a success, will revolutionize the gravel operations of the entire State. The progress of the work will be watched, from inception to termination, with more than usual interest. The undertaking is understood to be well backed by San Francisco capital, and the prime movers are full of confidence as to the final result.

The incorporation is known as the

Pliocene G. M. Co.

(E. S. Thurston, Supt.), and has been organized

for the prospecting and working of certain gravel deposits, situated between Downieville and Forest City, and supposed to be the extension of the famous Bald Mountain channel. The proposed new system of working will be by boring instead of tunneling, the object being to define the exact position of the channel before incurring the expense of sinking shafts and running tunnels, which too frequently strike wide of the mark intended, thereby causing long delays and heavy losses. The tools used are designed and manufactured by Mr. Chas. Oester, of San Francisco, and are in most respects similar to those employed in the oil wells of Pennsylvania. The auger is said to bore through clay at the rate of 70 feet in 24 hours, the drills averaging through ordinarily hard rock or boulders about one foot per hour. The channel is expected to be found at a depth of 500 feet from the surface. As soon as its position is determined by the drill a three-compartment working shaft will be lowered, and the requisite machinery erected.

The Bald Mountain

(H. Wallace, Supt.), at Forest City, has been in very successful operation for the past five years, during which it has yielded in the gross some things upwards of \$1,000,000, and paid in dividends more than half of the gross amount, distributing to the stockholders last year as much as \$165,000. The sum estimated for the present year is put at \$80,000, the falling off being attributable to the shortening of the water season. Average width of channel, 500 feet; length of claim, 8,500 feet; 2,200 feet worked out; average depth of pay gravel, three feet, and giving for the whole time an average of \$1 per superficial foot on the bedrock; entire length of tunnel, 4,400 feet. Track, T rail weighing 20 pounds to the yard; gauge, 20 inches; grade, one foot in 24. The power for moving the gravel is a locomotive, manufactured at the Baldwin locomotive works, Philadelphia, and believed to be the only one used for the purpose on the coast. Its entire length is 13 feet, height five and a half feet, width of bottom four feet, and two and one-half feet at top. Anthracite coal is used. No trouble is experienced from gas or steam. The system of ventilation is by shaft 2,000 feet from mouth of tunnel, from the foot of which an air-way extends to the face of the works, the air being accelerated by water-blast, and giving, by this means, to each workman 120 cubic feet of air per minute. The cost of transporting the dirt, some 3,800 feet, is only two and one-fourth cents per ton against 21 cents, as formerly by hand, including besides the hauling of all the material used in the mine, and the men to their point of operations, giving a large saving in both muscle and time, the gain in the latter being 30 minutes per day to each man.

The Mammoth Spring M. Co.,

Of Forest City, have recently struck in their claim, one and a half miles above Allegheny, one of the finest prospects for good permanent pay met with for many a day. The gravel was reached in the shaft 47 feet above a main tunnel of 600 feet in length. A drift has been run 100 feet on the pay streak, which has thus far yielded over half an ounce to the man, gold 950 fine.

There are several other fine locations around both last mentioned places, a detailed account of which must be omitted, as some attention must be given to

The Quartz Claims

Of the county. Fortunately a very natural transition from gravel to quartz is offered in the introduction to the reader of the next claim to be described, as both forms of mining are here happily combined with promise of very rich returns from each. Some rather wild and exaggerated statements, particularly as to the amount realized from the quartz, since its discovery, have made the rounds of the papers, but so far as the richness of the rock is concerned, no mere word-painting, however fine or glowing, could lead to a false impression. It cannot be described. It must be seen and handled to be truly realized. It is scarcely necessary to say that allusion is made to

The North Fork M. Co.'s Claim

At Forest City. An accident led to the discovery. After finding good pay gravel, worth from \$3 to \$10 to the car-load, the swelling of the serpentine, which is the bedrock of the gravel and the formation incasing the ledge, a change in the direction of the tunnel became necessary. This was the lucky tide in their affairs that promises "to lead on to fortune." It has been but a brief period since the tunnel struck what appears to be a true fissure vein from 2 to 6 feet in width, the developments already disclosing a length on its course of at least 800 feet, and a chimney from 75 to 100 feet of ore, that challenges comparison with the richest known. In some large choice specimens, the gold and quartz seem combined in about equal proportions. Bunches of solid sulphurets, with here and there a trace of gold visible, and weighing from 20 to 30 pounds, are represented to assay from \$18,000, to \$20,000 per ton. The gold is carried, largely in fact, in arsenical and iron sulphurets, accompanied with some galena. Near the surface they are often much decomposed, and many thousands have been cleaned up by running the rock and dirt from the ledge through the sluices. The harder rock, particularly the richer specimens, have in the meantime been turned to good account by means of the hand-mortar, two men having pounded out in a week nearly \$8,000. What is still better, it seems to hold out and grow more extensive.

Last night (May 31st,) another very large and rich body was struck in the face of the tunnel. The amount estimated as taken out within the past eight hours, (and the figures, after a close inspection, are fully believed to be within bounds,) will not fall short of \$5,000.

Owing to the prevailing rumors as to its richness, every point of interest about this wonderful mine was visited, under the guidance of the Superintendent, Mr. Watson Bayles, the tendency being to confirm impressions previously received as to the quantity and quality of the ore, as well as to settle more definitely and favorably the question as to its future permanency.

The Empire (B. B. Lewis, proprietor), situated on Kanaka creek, below Allegheny, has been opened by two tunnels running on the vein, the lower to the length of 200 feet, and reaching a depth of 150 feet from surface. It is a small fissure vein, cutting in its course the serpentine and talcose slate. The quartz taken from the upper tunnel, and from a 40-foot shaft from the same, has yielded by hand mortar \$100 per ton. It is at present worked, and all the quartz will pay to mill.

The Plumbago,

(Bovee & Haggerty), is a contact vein, from two to six feet wide, between the trap and the serpentine. It has been worked at intervals the past three years. The total estimated yield from its opening is put at about \$100,000, the most of the rock having been worked by hand mortar; and an instance is reported of two men taking out as much as \$5,000 in a single fortnight.

It is thought that the prospects of the mine would well justify the erection of a mill, if it were once systematically opened, there being no question as to the value of the ore.

The Brush Creek Mine,

At the Mountain house, four miles from Forest City, is also a contact vein, with slate as one wall and serpentine on the other; fissure from two to four feet in width. Although not at present paying, it is said to have yielded in the past not far from a round million. The company are now sinking, having already reached a depth of 520 feet, and hoping every day to strike into the same rich chimney encountered in the upper levels.

Little need be said about

The Celebrated Sierra Butte Mine,

Mr. Wm. John, Superintendent, at Sierra City. The country rock is syenite and greenstone; ledge varying from one to 15 feet; quartz averaging from \$6 to \$7 per ton. Such is the system and economy in the management, and the facilities for mining and milling, that it is understood to be paying a fair profit on the investment. The company have three mills, all run by water power, aggregating 86 stamps, and some 300 men employed directly or indirectly in connection with their mines and mill. This valuable property, including the Independent mine, is said to be now owned and controlled exclusively by English capital.

The Quartz Mines around Downieville,

While in many instances giving evidences of merit, have so far failed in attracting much attention from the outside world. The where-with is the great *sine qua non*, especially in most quartz operations. The want of the necessary means on the part of the owners for the proper development and advantageous working of their ledges, may be assigned as one of the chief causes of their not coming into notice, taken in connection with the fact that all eyes, both at home and abroad for the past four years, have been bewildered—almost blinded—by the more dazzling glare from our great silver bonanzas.

Owing to the inclemency of the weather, personal observation was out of the question, but the facts as gleaned from the citizens may be taken as substantially reliable.

The Good Hope

Is situated just above the town; general direction, north and south; dip, west; western wall, serpentine; eastern said to be a species of dark gray sandstone; average width, four feet; quartz—one stratum described as of a rusty, reddish cast; another, of a bluish white. The best rock paid by working process, \$23.86; the poorest, \$9.50, averaging \$12 per ton. The tunnel strikes the ledge at a depth of 140 feet from surface, making connection with the air shaft. There is good water power at hand for a 20-stamp mill. The mine has been recently bonded to Mr. H. K. Wilson, a fact understood here to mean business.

The Leonard,

South of the Good Hope, and opened by a tunnel, is represented as a large lode with four feet of good ore at present depth. It has given working tests of \$17 and upwards to the ton. In the neighborhood of \$300,000 is reported as realized from the mine, but a new tunnel will be required before more quartz can be profitably extracted. A 12-stamp mill, driven by water power, is connected with the property.

The Claim of the Oro Gold Quartz M. Co. Is situated in the suburbs of the town, only 1,200 feet from the river, where there is ample power for any required number of stamps. It lies in the slate range, but is bounded on one side by greenstone. The developments are by two tunnels, one of 425 feet in length and attaining a depth on the ledge of 300 feet. Width of main vein averages four feet; quartz, matrix, highly impregnated with gold-bearing arseniurets and sulphurets of iron, somewhat oxidized and decomposed near the surface.

From \$12,000 to \$13,000 have been worked by arastra, the quartz crushed coming princi-

pally from a feeder to the ledge, and averaging \$10 per ton, some of it running to \$15. The ore of the main ledge is estimated to work from five to six dollars per ton, and is considered sufficiently promising, in view of the water facilities, to demand the erection of a mill.

Work is said to be progressing on the Monte Cristo tunnel, four miles from Downieville. At the depth of 100 feet, the ledge is 10 feet wide and the ore taken from shaft has worked, mill process, \$22.60 per ton, the gold being well diffused through the rock.

The Dollyarden,

Seven miles southeast of Downieville and owned by citizens of the place, is represented to be from four five to feet in width; in a slate and granite formation; shaft 40 feet and drift on vein of 50 feet.

In addition to the working of \$2,500, principally by hand mortar, some 2,000 pounds were sent to Nevada City as a working test, that yielded \$275 per ton as per certificate of assayer, the tailings assaying at the rate of \$18 per ton.

Some very rich and beautiful specimens from the mine were seen in one of the principal saloons of Downieville, so that taken all in all, it looks like a prospect well worth following up.

The Gold Bluff quartz mine, situated within a mile of Downieville, has been worked somewhat spasmodically since 1856; opened by tunnels, the longest gaining a depth on ledge of 700 feet. It varies in width from two to 20 feet, one wall talcose slate, the other granite. The rock has averaged throughout eight dollars per ton. Above \$12,000 were taken out the past spring. It seems to need only "a strong pull, a long pull and a pull all together," to make it a steadily paying mine. A. C. K.

Calaveras County Mines.

[From Our Regular Correspondent.]

EDITORS PRESS:—Calaveras mines are generally being looked after, and here and there are some new developments being made by local and San Francisco capital. These movements are of the quiet order, and speak all the louder for real business.

The Sheep Ranch

Gets its name from being used in 1859 by Messrs. Simpson & Thompson as a sheep range. In 1868 quartz was discovered by Mr. Childers and son, but the bringing out of the camp is mostly due to the energy of Capt. Fergusson, now in San Andreas. It was first tested with arastra, which paid very well; now running by water power a five-stamp mill and a new 10-stamp mill is being erected. The mine employs 30 men—all white; ledge three to six feet thick, solid quartz mostly, average pay very encouraging. Working at depth of 200 feet. Water is easily kept out with six-inch pump, lifting about four inches water, which is used to good advantage for irrigation. The mill and mine are under the supervision of W. A. Wallace, of whose management all seem to speak in the highest praise. The air of honesty was quite refreshing, and, by contrast, very noticeable. No signs stuck up to warn off from the dump, where the gold glittered in and on the rock, yet no one uninvited would go near that dump, though not enclosed.

The city contains two or three stores, two saloons, a boarding house and hotel by Charles Anderson, an early settler. Some have desired to change the name, as Sheep Ranch City would not give glory to a great town; but then some think it bad luck to change the names of children, and are not willing to risk the rashness of changing Sheep Ranch for Andersonville, Goldopolis, or any other selected name. They are satisfied that the mineral they have in the vicinity, and only mine development will necessitate a town.

Railroad Flat,

Though only the quiet shadow of its former self, has several promising features of a future life. The Buena Vista, with water power hoisting and pumping machinery, are progressing finely; are down on the incline about 150 feet and drifts out on ledge 100 feet, each in opposite direction; ledge, 20 inches of average good ore; some hydraulic mining yet going on in the vicinity.

The Fern mine, two miles southwest of Railroad Flat, is being prospected by San Francisco parties, who are erecting a small mill and putting up one of Wilcox's latest improved single pumps, whose trial working was made while I was present, and seemed very satisfactory to all concerned.

This is an old mine, owned by Mr. Chapman and others, but had not been tested. Mr. Kimball, who is putting up the present machinery, and is down 125 feet, seems well satisfied with the assurances as now indicated of a good mine.

Woodhouse & Anderson Flat

Mines are also being prospected by San Francisco men, with direct reference to a purchase of same, in connection with the Harris mill—an excellent ten-stamp water mill, about two miles from Railroad Flat, situated in the midst of some very valuable small ranches, that enjoy some benefits from the water after it leaves the mill.

I would like to mention many prospecting op-

Continued on page 383.

MECHANICAL PROGRESS.

The New German Patent Law.

The new German Imperial patent law was passed by the Reichstag last month and will come into force on the 1st of July next. The new law puts an end to the disorder concerning patents in Germany, that has existed until now, there being at the present time 21 different States granting patents of their own. These will be embraced by one law after the 1st of July. Our English exchange, *Iron*, has had opportunity to examine the new law and gives the following abstract of its provisions: Pharmaceutical compounds, medicines, alimentary preparations, and chemical products cannot be patented under the new law; processes, however, by which these articles are obtained, can be patented. An invention must be novel and not have been introduced to the public, so that another person can imitate the same. Imported inventions are patentable only to the real inventor. Foreigners must be represented by a German citizen. It is unlawful to manufacture a patent article, to import the same from another country, or even to use without permission a patented machine, tool, apparatus, or process. Any one having an invention in use cannot be prevented from continuing to use the same. A patent remains good for 15 years; the duty is 50 marks (£2 10s.) for the first year; 50 marks (£2 10s.) for the second; 100 marks (£5) for the third, and so on, with an addition of 50 marks each year; thus a 15 years' patent costs 5,300 marks (£265). The duty may be paid three months after date. Patent rights may be withdrawn by the government after three years if the invention has not been carried into operation to a proper extent, or if the inventor has not taken the necessary steps to carry the patent into effect, if he refuses licenses to others who offer a fair royalty, or if it is advisable for the public good to grant such licenses. When the invention or improvement relates to purposes of war or marine, or affects the general welfare, a patent will not be granted, but the inventor will be recompensed by the State. The decision in this case will rest with the Imperial Chancellor. Any one having obtained a patent for improvements on a patented article, and wanting a license from the first inventor, is obliged to give the latter a license for his improvements. The applications will be examined by the Patent Commissioners and experts appointed for this purpose; an appeal can be made, in case of refusal, to a special commissioner, and from him to the Imperial Court at Leipzig. In the case of poor inventors, the payment of duty will be postponed for two years, or may be altogether remitted. Specifications and drawings can be inspected immediately after the application; on account of this, patents should be taken in other countries first. Patents being delivered, a short specification of the same will be published in the *Patent Journal*. Before the lapse of a patent, notice has to be given to the inventor, and a proper time allowed him to fulfil the requirements of the law. Infringements of patent right are punished with a fine up to 10,000 marks (£500), or imprisonment not exceeding one year. Marking articles as patented which are not so, is punished with a fine of 150 marks (£7 10s.) At the publication of the invention, any one thinking he has a prior right may enter an opposition, which is then examined in the presence of those concerned. Existing German patents may be transferred to the Empire, but cannot be prolonged.

ROLLING HOOP IRON.—To produce a superior finish and improved quality of hoop iron, and to save the labor in its manufacture, the *American Manufacturer* says that Messrs. Jones & Cook, of Rotherham, England, fix a pair of rolls at the back of the ordinary set of "strand" or grooved rolls, and revolving in the same direction as the middle and bottom strand rolls, with which they correspond in height. A guide is fixed from the back of the first pair of rolls, and passes between the middle and bottom strand rolls, curving round and upwards to the front and entrance of the top and middle rolls. The rolls of the first pair are speeded to suit the draw of the iron in passing through the top and middle strand rolls, so as to avoid forming a large loop of the iron between the two pairs of rolls. The iron, on passing through the first pair of rolls, is forced along the guide through the groove underneath the middle strand roll, and following the shape or curve of the guide is directed upwards to the proper groove between the top and middle strand rolls, thus dispensing with the services of a "turn-over," and finishing the iron in a much hotter state than is possible by the present slower process.

NEW FILE.—A rat-tail file, the teeth of which are cut on spiral ribs, with grooves between to facilitate clearing, is the subject of a recent patent. It is made by twisting a fluted bar of steel, and then cutting teeth on the spiral ribs so formed.

STEEL HAWSER.—A steel wire hawser, 150 fathoms long and 1½ tons in weight, has been supplied to the iron-clad frigate *Alexandra*. When coiled it occupies a space 4½ feet by 4½ feet. A hemp hawser would be double the weight and occupy six times the space.

How to Galvanize Iron.

Galvanizing iron sheets is quite an industry by itself and the product can be bought cheaper than it can be made on a small scale. There are, however, times when it is worth while to coat small articles of iron with zinc to prevent rust, etc., and the description of a way to do this may be valuable to some of our readers. The *Iron Age* has lately had occasion to examine the processes and gives the following: The articles are to be first cleansed by placing them in open wooden vessels, in water containing three-quarters to one per cent. of common sulphuric acid, and allowed to remain in it until the surface appears clean, or may be rendered so by scouring with a rag or wet sand. According to the amount of acid, this may require from six to 24 hours. Fresh acid must be added according to the extent of use and of the liquid. When this is saturated with sulphate of iron it must be renewed. After removal from this bath the articles are rinsed in fresh water, and scoured until they acquire a clean, metallic surface, and then kept in water in which a little slacked lime has been stirred until the next operation. When thus freed from rust, they are to be coated with a thin film of zinc while cold, by means of chloride of zinc, which may be made by filling a glazed earthen vessel of about two-thirds gallon capacity three-fourths full of muriatic acid, and adding zinc clippings until effervescence ceases. The liquid is then to be turned off from the undissolved zinc and preserved in a glass vessel. For use it is poured into a sheet zinc vessel of suitable size and shape for the objects, and about 1.30 per cent. of its weight of finely powdered sal ammoniac added. The articles are then immersed in it, a scum of fine bubbles forming on the surface in from one to two minutes, indicative of the completion of the operation. The articles are next drained, so that the excess may flow back into the vessel. The iron articles thus coated with a fine film of zinc are placed on clean sheet iron heated from beneath, and perfectly dried, and then dipped piece by piece, by means of tongs, into very hot (though not glowing) molten zinc for a short time, until they acquire the temperature of the zinc. They are then removed and beaten, to cause the excess of zinc to fall off.

A New Swiss Boring Tool.

An improved drill for iron and other metals, patented by Mr. Jacob Jaggi, at Frauenfeld, Switzerland, is constructed of all sizes, and made from best rolled and hardened cast-steel; it has two even or "cutting faces," and two hollow faces (concaves). The even face has for dimension the breadth of the radius, plus the half of the medium thickness of the drill, the other round face being as large as the radius. The stock for holding the drill consists of the stock or boring head block cast on the boring engine, or secured thereto. This stock or boring head is purchased or recessed on its lower end for introducing in it the different kinds and sizes of drills, the said boring head being supplied with two cheeks, the one placed opposite the face of the other, and around these cheeks is placed a band or hoop in which is turned side by side of the cheeks two eccentric openings, which correspond exactly with the cheek faces. On turning this hoop by means of a hook or key the cheeks will become fast on the hoop and the drill and hold the latter firmly in the boring head or stock. The advantages claimed to arise from the use of this improved boring tool are—that the entire length of the borer can be utilized without being dressed and hardened during use; that for about 15 sizes of drills one stock will suffice; that these drills may be arranged to be used on both ends; that the drill is quickly enclosed and immediately dressed in the right position; that the friction on the drill is reduced to a minimum; that these drills do not wear so rapidly as those now used; that they are comparatively strong in proportion to their weight; that they can be easily ground; that the boring chips leave the bored hole easily, whereby the boring of deep holes can be executed without heating the drill much, and the lubrication can be easily effected; that a round and smooth hole is produced; and that the tool is very cheap.

A NOVELTY IN RAILWAY CONSTRUCTION.—It was until recently the intention of the Boston, Winthrop and Point Shirley Railroad Company, to use 40 pound T rails, but the *Iron Age* says that after investigation and by indorsement and advice of several of the best railroad engineers it was decided to use 20 pound Angle rails, bolted to substantial wooden stringers, which are placed upon ordinary ties, and by which dangers proceeding from broken rails are avoided, and a large saving made in cost of construction. We believe the "Angle" rail is named after its inventor, Mr. Angle, of Chicago. The employment of the stringer or sleeper is a novelty in modern railway practice, we think. Formerly sleepers as well as ties were used, and some marked advantages were claimed for them over the plan of using cross ties alone. A new form of rail may develop the advantages of sleepers over ties, and give us a new method of construction which shall have the good points of each.

STEEL GRAIN CARS.—A statement is going the rounds of the papers that the Grand Trunk Company is having a number of grain cars built which are largely composed of steel. These cars, it is said, weigh six tons only and are to have a carrying capacity of 18 tons.

SCIENTIFIC PROGRESS.

DURABILITY OF ALUMINIUM.—At the late reception of the S. F. Microscopical Society a first-class instrument was shown of which the material used was aluminium. It was greatly admired and the fact calls to mind the fact that Dr. C. Winkler of Freiberg has recently made some interesting observations on the resistance of aluminium to atmospheric influences and chemical action. Aluminium has always been regarded as a metal possessing but little resistance to exterior influences of change, and that it would readily be attacked by both acids and alkalis. The relative cost of zinc, aluminium and silver are as 1: 200: 400; or, considering the weights of the metals named, as 1: 67: 530. To test in practice the comparative wearing qualities of aluminium, Herr Winkler has made a number of spoons respectively of silver, pure aluminium and German silver. A spoon of each material above named was accurately weighed on February 1st, 1876, and all were put into daily use under precisely similar conditions for the period of one year. The color of all the metals altered in the lapse of time. The aluminium lost its luster and became a dead, bluish-gray color; the German silver also degenerated to a grayish-yellow tint; the silver lost only in color, its luster was not impaired. As regards mechanical abrasion, no marked difference was perceptible, although after a year's use the aluminium spoon showed marked traces of wear at the edges. By accurately weighing the spoons at the end of the period named, Herr Winkler was enabled to establish the fact that the loss of weight suffered by the spoon of silver was 0.403 per cent.; by the aluminium spoon, 0.630 per cent.; and by the German silver, 1.006 per cent.

From this fact it appears that the assertion that aluminium is unsuited to sustain wear is not borne out. Upon the question of the adaptation of aluminium for coinage, Herr Winkler expresses a favorable opinion—so far as the wearing properties of the metal are concerned.

VELOCITY OF LIGHT.—The 13th volume of the "Annales de l'Observatoire de Paris," contains the memoir of M. Cornu on the determination of the velocity of light, embracing a complete recital of the experiments made in 1874 between the observatory of Paris and the tower of Montlhéry. Everything was done to obtain the greatest possible precision, by perfecting the method of the toothed wheel, which was devised by Fizeau in 1849. The method of observation, the construction of the various articles of apparatus and their mode of acting have been discussed in their most minute details, with a view to ascertain the causes of error, and to determine the most favorable conditions for their elimination. The agreement of results obtained under the most varied circumstances, shows the importance of this discussion. Care was taken in all cases to prove that the deviations followed the law of accidental errors, a verification which is commonly neglected, but without which the calculus of probabilities cannot be legitimately applied. The result of the experiments gives, for the velocity of light, 300,400 kilometers per second. This gives for the solar parallax, 8.88", if we adopt Delambre's equation of light, (493.2s) or Bradley's constant of aberration, (20.25"), 8.80", with Struve's constant, (20.445").

MOUND BUILDERS.—At the last meeting of the Philadelphia Academy of Sciences, Mr. John Ford described a group of eight burial mounds opened by him near Coup's creek, Macoupin county, Ill. Each of the graves was lined with stone slabs, and after the bodies were placed in position within, earth had been packed around them so as to fill the inclosure. All the skeletons found in these graves faced the east. In one of the graves four skeletons were found, seated in two pairs, the knees of one pair pressing against the backs of the other. The arms were crossed. In the right hand of each individual thus interred, a large marine shell (*Buccinum pernervum*, Linn.) had been so placed that the small end of the shell rested in the hand and the large end in the hollow above the left hip. Within each shell what appeared to be the bones of a child were found, whose skull had been crushed before burial, the skull protruding beyond the aperture of the shell. It is thought that these infants were sacrificed to the dead. In most of the graves the left side of the skulls of the adults appeared also to have been crushed by some blunt weapon.

SOURCE OF ELECTRICITY IN LIVING BODIES.—It is requisite that a few words should be said relative to the source from whence the electricity in the system is derived. With every breath of air which our lungs inhale, the venous blood is not only oxidized and transformed into arterial blood, but it is also charged with electricity, produced by the condensation of the air, which takes place by the pressure through the bronchial tubes of the lungs, during the act of exhalation. That this is actually the case is proved by the experiment of Dr. Kincke, of Berlin, showing that currents of electricity are engendered by pressing an aqueous liquid or damp air through a membrane of bladder, or silk, or even through a diaphragm of sulphur in a powdered state; the greatest quantity of electricity, equal to that generated by a Daniell element, being yielded by the latter.

POINT OF FUSION.—A new method for determining exactly the point of fusion of bodies has lately been described by M. Himly. The *English Mechanic* says: The principal part of the apparatus is a thermometer, whose reservoir, of elongated form, is silvered by means of tartrate of silver and ammonia. A copper wire, connected with this layer of silver, permits of placing the thermometer in an electric circuit. For good conducting bodies this layer is strengthened by a deposit of galvanic copper. The substance to be examined is placed in the form of small bars in one of the branches of a tube. A metallic wire is inserted in this branch. In the other is the thermometer. The apparatus and an electric bell are placed in the circuit of a battery. You heat slowly, by means of a bath of mercury or any alloy, and note the temperature when the bell begins to ring. For substances which fuse at a high temperature, a little fusible tube is taken, and a suitable pyrometer. Badly conducting bodies are first fused, then the bulb of the thermometer is immersed in them once or oftener, so that it is covered with a thin layer. You then introduce the thermometer into a tube, placed in the circuit, containing mercury, and heated in a bath of glycerine, or a mixture of glycerine and chloride of calcium. The bell again indicates the commencement of fusion.

RESURRECTION OF ILMENIUM.—In a recent issue of *Nature* we find some interesting facts concerning two new metals, Ilmenium and Neptunium, which may be summarized as follows: About 30 years ago, R. Hermann announced the discovery of a new metal, ilmenium, accompanying tantalum and niobium in various minerals, and closely allied to them in its general characters. Several years later he relinquished his claims to the discovery in consequence of researches by Marignac in the same field leading to entirely different results. Later investigations have, however, strengthened his belief in the existence of ilmenium, and in the February number of Kolbe's *Journal für praktische Chemie* he not only brings forward results tending to establish the individual character of ilmenium, but describes a new metal, neptunium, belonging to the same group and occurring in tantalite from Haddam, Connecticut. As the quantities obtained are small, the characteristic reactions limited, and as the spectral properties cannot be made use of, chemists will naturally reserve their opinion till confirmatory observations have been made by some other well-known investigator.

CURIOUS PHENOMENON WITH PALLADIUM.—In the year 1824, says *Nature*, M. Wohler made the observation that palladium, whether in the form of sponge or of polished sheet, has the property of becoming sooty in a spirit flame, and gradually coated with a thick layer of carbon. A piece of spongy palladium will thus be enlarged to several times its original volume. The same phenomenon occurs if the metal is made to glow in a coal-gas flame. If the deposited carbon be burnt, there always remains a fine skeleton of palladium, which is then found to be penetrated with the carbon and quite brittle. By more recent experiments M. Wohler convinced himself that the phenomenon is not due to a special affinity of palladium for carbon. He is rather of opinion that the strong absorption power of this metal for hydrogen is the reason why ethylene gas and the gases of the spirit flame, which themselves are not absorbed by palladium, are decomposed under the influence of this metal, as the experiments show, with separation of carbon.

SUN SPOT CYCLES.—In attempting to establish connection between sun spots, cyclones and rain-fall in India, Mr. Henry Jeula, a resident of that country, says that it is pretty well known that the maximum and minimum of sun spots alternate in cycles of about eleven years; and the figures given establish that about the minimum periods there have been droughts in India, followed by famine. Although the losses of ships do not exhibit the same regularity, there are indications that the periods of minimum disturbance on the sun's atmosphere are reflected in that portion of the world in destructive cyclones.

MARINE SOUNDING-LINE.—Mr. Ch. Tardieu employs a spherical envelope of caoutchouc, communicating with an iron reservoir by means of a small tube which is provided with a valve. The envelope being filled with mercury, any increase of external pressure forces into the reservoir some of the mercury, which cannot return on account of the valve. The weight of the mercury determines the pressure, and consequently the depth of the water.

SPECTRUM OF ELECTRIC LIGHT.—M. P. Desains finds that the spectra of electric light are very similar to those of the solar rays. They are less extensive, particularly on the side of the violet; but the curves of intensity exhibit but slight differences in the region of greatest heat.

PROGRESS IN ENGLAND.—In 1853-54 the estimate for education, science and art in Great Britain was £378,000; this year the estimate reaches £3,546,000.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 24.	Week Ending May 31.	Week Ending June 7.	Week Ending June 14.
Alpha.....	94	8	92	8
Andes.....	11	1	90	5
Baltimore Con.....	50c	30c	40c	30c
Belcher.....	40c	3	4	3
Belmont.....	50c	3	4	3
Best & Belcher.....	11 1/2	11 1/2	11 1/2	11 1/2
Bullion.....	4	2 1/2	4	3
California.....	1 1/2	1 1/2	1 1/2	1 1/2
Chollar.....	2 1/2	3 1/2	2 1/2	3 1/2
Chollar & Potosi.....	25	19 1/2	25 1/2	25 1/2
Confidence.....	3	2 1/2	4	3 1/2
Con Imperial.....	55c	35c	45c	35c
Con Virginia.....	27	25	23 1/2	23 1/2
Crown Point.....	4	4	4	4
Coso Con.....	75c	75c	75c	75c
Dayton.....	18	16	15 1/2	15 1/2
Eureka Con.....	1 1/2	1 1/2	1 1/2	1 1/2
Exchequer.....	2 1/2	2 1/2	2 1/2	2 1/2
Geddes & Bertrand.....	4 1/2	4 1/2	4 1/2	4 1/2
Grand Prize.....	20c	15c	10c	10c
Gila.....	3 1/2	3 1/2	3 1/2	3 1/2
Golden Chariot.....	3 1/2	3 1/2	3 1/2	3 1/2
Gould & Curry.....	5 1/2	5 1/2	5 1/2	5 1/2
Hale & Norcross.....	1 1/2	1 1/2	1 1/2	1 1/2
Hessy.....	1 1/2	1 1/2	1 1/2	1 1/2
Julia.....	1 1/2	1 1/2	1 1/2	1 1/2
Justice.....	4 1/2	4 1/2	4 1/2	4 1/2
Kentuck.....	2 1/2	2 1/2	2 1/2	2 1/2
K K Con.....	3 1/2	3 1/2	3 1/2	3 1/2
Kickerbocker.....	20c	15c	10c	10c
Kosuth.....	20c	15c	10c	10c
Lady Bryan.....	75c	75c	75c	75c
Lady Wash.....	1 1/2	1 1/2	1 1/2	1 1/2
Leopard.....	35c	30c	30c	30c
Leviathan.....	80c	50c	70c	70c
Leeds.....	3 1/2	3 1/2	3 1/2	3 1/2
Modoc.....	3 1/2	3 1/2	3 1/2	3 1/2
Manhattan.....	1 1/2	1 1/2	1 1/2	1 1/2
Mansfield.....	10c	25c	10c	25c
Meadow Valley.....	5 1/2	5 1/2	5 1/2	5 1/2
Mexican.....	5 1/2	5 1/2	5 1/2	5 1/2
New York.....	25c	15c	25c	10c
Niagara.....	16	15	16 1/2	15 1/2
Northern Belle.....	3 1/2	3 1/2	3 1/2	3 1/2
New Coso.....	3 1/2	3 1/2	3 1/2	3 1/2
Ophir.....	9 1/2	8 1/2	9 1/2	8 1/2
Overman.....	14	9	12	10 1/2
Phil Sheridan.....	10c	10c	15c	40c
Potosi.....	40c	35c	25c	40c
Prospect.....	40c	35c	25c	40c
Raymond & Ely.....	6 1/2	4 1/2	5 1/2	5 1/2
Rock Island.....	3 50	2 1/2	2 1/2	2 1/2
Sage.....	19	15	18	15
Sierra Nevada.....	1 1/2	1 1/2	1 1/2	1 1/2
Silver Hill.....	1 1/2	1 1/2	1 1/2	1 1/2
South Chariot.....	50c	50c	50c	50c
Sucor.....	1 1/2	1 1/2	1 1/2	1 1/2
Trojan.....	1 1/2	1 1/2	1 1/2	1 1/2
Union Con.....	3 1/2	3 1/2	3 1/2	3 1/2
Utah.....	9	7	11 1/2	10 1/2
Wells Fargo.....	40c	40c	40c	40c
Woodville.....	5 1/2	4 1/2	5 1/2	5 1/2
Yellow Jacket.....	5 1/2	4 1/2	5 1/2	5 1/2

Sales at S. F. Stock Exchange.

FRIDAY, A. M. JUNE 8.	540 Hussey.....	20 1/2
30 Alpha.....	94 1/2	1 1/2
50 Andes.....	40 1/2	1 1/2
120 North Canon.....	100	1 1/2
920 Best & Belcher.....	15 1/2	1 1/2
340 Belcher.....	40 1/2	1 1/2
570 Bullion.....	4 1/2	1 1/2
250 Benton.....	50c	1 1/2
350 Con Imperial.....	50c	1 1/2
550 Crown Point.....	3 1/2	1 1/2
870 California.....	3 1/2	1 1/2
850 Con Virginia.....	30 1/2	1 1/2
350 Chollar.....	2 1/2	1 1/2
20 Confidence.....	2 1/2	1 1/2
700 Caledonia.....	2 1/2	1 1/2
50 Challenge.....	75c	1 1/2
500 Dayton.....	55c	1 1/2
1320 Exchequer.....	3 1/2	1 1/2
2380 Gould & Curry.....	7 1/2	1 1/2
1065 Hale & Norcross.....	3 1/2	1 1/2
90 Julia.....	1 1/2	1 1/2
180 Justice.....	4 1/2	1 1/2
200 Kentuck.....	2 1/2	1 1/2
100 Lady Washington.....	75c	1 1/2
50 Leviathan.....	30c	1 1/2
700 Mexican.....	7 1/2	1 1/2
30 North Canon.....	30c	1 1/2
540 Ophir.....	12 1/2	1 1/2
450 Overman.....	14 1/2	1 1/2
700 Prospect.....	40c	1 1/2
1130 Sierra Nevada.....	4 1/2	1 1/2
100 Seg Belcher.....	19	1 1/2
650 Silver Hill.....	1 1/2	1 1/2
500 Trojan.....	1 1/2	1 1/2
140 Union Con.....	3 1/2	1 1/2
1350 Utah.....	9 1/2	1 1/2
175 Yellow Jacket.....	5 1/2	1 1/2
AFTERNOON SESSION.		
720 Alpha.....	10 1/2	1 1/2
100 A K.....	1 1/2	1 1/2
685 Best & Belcher.....	16 1/2	1 1/2
680 Bullion.....	4 1/2	1 1/2
30 Belcher.....	40 1/2	1 1/2
250 Caledonia.....	3 1/2	1 1/2
230 Con Virginia.....	31 1/2	1 1/2
540 California.....	3 1/2	1 1/2
260 Crown Point.....	3 1/2	1 1/2
2550 Con Imperial.....	50c	1 1/2
190 Chollar.....	2 1/2	1 1/2
200 Empire Id.....	1 1/2	1 1/2
300 Exchequer.....	3 1/2	1 1/2
1325 Grand Prize.....	6 1/2	1 1/2
250 Gould & Curry.....	7 1/2	1 1/2
100 General Horn.....	10c	1 1/2
1280 Hale & Norcross.....	3 1/2	1 1/2
1050 Hussey.....	25 1/2	1 1/2
1050 Julia.....	1 1/2	1 1/2
820 Jackson.....	3 1/2	1 1/2
825 Justice.....	5 1/2	1 1/2
870 Leopard.....	3 1/2	1 1/2
500 Leeds.....	1 1/2	1 1/2
50 Manhattan.....	1 1/2	1 1/2
350 Mexican.....	8 1/2	1 1/2
135 Northern Belle.....	18 1/2	1 1/2
500 New Coso.....	30 1/2	1 1/2
50 Ophir.....	9 1/2	1 1/2
105 Overman.....	14 1/2	1 1/2
630 Savage.....	5 1/2	1 1/2
735 Sierra Nevada.....	4 1/2	1 1/2
800 Utah.....	9 1/2	1 1/2
300 Yellow Jacket.....	5 1/2	1 1/2
SATURDAY, A. M. JUNE 9.		
80 Alpha.....	75c	1 1/2
100 Andes.....	40 1/2	1 1/2
120 North Canon.....	100	1 1/2
920 Best & Belcher.....	15 1/2	1 1/2
340 Belcher.....	40 1/2	1 1/2
570 Bullion.....	4 1/2	1 1/2
250 Benton.....	50c	1 1/2
350 Con Imperial.....	50c	1 1/2
550 Crown Point.....	3 1/2	1 1/2
870 California.....	3 1/2	1 1/2
850 Con Virginia.....	30 1/2	1 1/2
350 Chollar.....	2 1/2	1 1/2
20 Confidence.....	2 1/2	1 1/2
700 Caledonia.....	2 1/2	1 1/2
50 Challenge.....	75c	1 1/2
500 Dayton.....	55c	1 1/2
1320 Exchequer.....	3 1/2	1 1/2
2380 Gould & Curry.....	7 1/2	1 1/2
1065 Hale & Norcross.....	3 1/2	1 1/2
90 Julia.....	1 1/2	1 1/2
180 Justice.....	4 1/2	1 1/2
200 Kentuck.....	2 1/2	1 1/2
100 Lady Washington.....	75c	1 1/2
50 Leviathan.....	30c	1 1/2
700 Mexican.....	7 1/2	1 1/2
30 North Canon.....	30c	1 1/2
540 Ophir.....	12 1/2	1 1/2
450 Overman.....	14 1/2	1 1/2
700 Prospect.....	40c	1 1/2
1130 Sierra Nevada.....	4 1/2	1 1/2
100 Seg Belcher.....	19	1 1/2
650 Silver Hill.....	1 1/2	1 1/2
500 Trojan.....	1 1/2	1 1/2
140 Union Con.....	3 1/2	1 1/2
1350 Utah.....	9 1/2	1 1/2
175 Yellow Jacket.....	5 1/2	1 1/2
AFTERNOON SESSION.		
720 Alpha.....	10 1/2	1 1/2
100 A K.....	1 1/2	1 1/2
685 Best & Belcher.....	16 1/2	1 1/2
680 Bullion.....	4 1/2	1 1/2
30 Belcher.....	40 1/2	1 1/2
250 Caledonia.....	3 1/2	1 1/2
230 Con Virginia.....	31 1/2	1 1/2
540 California.....	3 1/2	1 1/2
260 Crown Point.....	3 1/2	1 1/2
2550 Con Imperial.....	50c	1 1/2
190 Chollar.....	2 1/2	1 1/2
200 Empire Id.....	1 1/2	1 1/2
300 Exchequer.....	3 1/2	1 1/2
1325 Grand Prize.....	6 1/2	1 1/2
250 Gould & Curry.....	7 1/2	1 1/2
100 General Horn.....	10c	1 1/2
1280 Hale & Norcross.....	3 1/2	1 1/2
1050 Hussey.....	25 1/2	1 1/2
1050 Julia.....	1 1/2	1 1/2
820 Jackson.....	3 1/2	1 1/2
825 Justice.....	5 1/2	1 1/2
870 Leopard.....	3 1/2	1 1/2
500 Leeds.....	1 1/2	1 1/2
50 Manhattan.....	1 1/2	1 1/2
350 Mexican.....	8 1/2	1 1/2
135 Northern Belle.....	18 1/2	1 1/2
500 New Coso.....	30 1/2	1 1/2
50 Ophir.....	9 1/2	1 1/2
105 Overman.....	14 1/2	1 1/2
630 Savage.....	5 1/2	1 1/2
735 Sierra Nevada.....	4 1/2	1 1/2
800 Utah.....	9 1/2	1 1/2
300 Yellow Jacket.....	5 1/2	1 1/2

105 Ophir.....	12 1/2	1 1/2
420 Raymond & Ely.....	6 1/2	1 1/2
250 R Patch.....	2 1/2	1 1/2
50 Silver Hill.....	1 1/2	1 1/2
340 Savage.....	5 1/2	1 1/2
1060 Sierra Nevada.....	4 1/2	1 1/2
155 Utah.....	9 1/2	1 1/2
1570 Union Con.....	3 1/2	1 1/2
130 Yellow Jacket.....	5 1/2	1 1/2
TUESDAY, A. M. JUNE 12.		
1430 Alpha.....	11 1/2	1 1/2
1065 Best & Belcher.....	17 1/2	1 1/2
540 Benton.....	50c	1 1/2
820 Bullion.....	4 1/2	1 1/2
1055 Crown Point.....	4 1/2	1 1/2
855 Con Imperial.....	50c	1 1/2
2035 Caledonia.....	3 1/2	1 1/2
600 California.....	3 1/2	1 1/2
500 Chollar.....	30 1/2	1 1/2
620 Confidence.....	5 1/2	1 1/2
1105 Exchequer.....	3 1/2	1 1/2
880 Gould & Curry.....	7 1/2	1 1/2
1680 Hale & Norcross.....	3 1/2	1 1/2
1410 Justice.....	4 1/2	1 1/2
320 Kentuck.....	2 1/2	1 1/2
520 Mexican.....	8 1/2	1 1/2
590 Ophir.....	15 1/2	1 1/2
325 Overman.....	14 1/2	1 1/2
820 Sierra Nevada.....	4 1/2	1 1/2
10 Seg Belcher.....	19	1 1/2
995 Union Con.....	3 1/2	1 1/2
1205 Utah.....	9 1/2	1 1/2
AFTERNOON SESSION.		
450 Alpha.....	75c	1 1/2
720 Andes.....	40 1/2	1 1/2
50 Bullion.....	4 1/2	1 1/2
325 Belcher.....	40 1/2	1 1/2
590 Best & Belcher.....	17 1/2	1 1/2
375 Belmont.....	50 1/2	1 1/2
270 Baltimore Con.....	75c	1 1/2
200 Baruka Con.....	33 1/2	1 1/2
605 Con Virginia.....	33 1/2	1 1/2
480 Crown Point.....	4 1/2	1 1/2
100 Challenge.....	1 30	1 1/2
30 Chollar.....	3 1/2	1 1/2
670 Caledonia.....	3 1/2	1 1/2
85 California.....	3 1/2	1 1/2
4720 Con Imperial.....	90 1/2	1 1/2
700 Dayton.....	50 1/2	1 1/2
200 Empire Id.....	1 30	1 1/2
1285 Exchequer.....	3 1/2	1 1/2
100 Empire Id.....	1 30	1 1/2
600 Golden Chariot.....	10 1/2	1 1/2
144 Grand Prize.....	6 1/2	1 1/2
445 Gould & Curry.....	7 1/2	1 1/2
500 Hussey.....	20 1/2	1 1/2
285 Hale & Norcross.....	3 1/2	1 1/2
1040 Justice.....	4 1/2	1 1/2
400 Leeds.....	1 50	1 1/2
165 Leopard.....	3 1/2	1 1/2
50 Lady Wash.....	80c	1 1/2
200 Leviathan.....	30c	1 1/2
600 Modoc.....	3 1/2	1 1/2
100 Meadow Valley.....	15 1/2	1 1/2
1425 Modoc.....	2 1/2	1 1/2
270 Mexican.....	8 1/2	1 1/2
200 North Con Vir.....	30c	1 1/2
100 New Coso.....	30c	1 1/2
180 Northern Belle.....	17 1/2	1 1/2
200 New York.....	10 1/2	1 1/2
150 Overman.....	18 1/2	1 1/2
445 Ophir.....	14 1/2	1 1/2
200 Prospect.....	3 1/2	1 1/2
Raymond & Ely.....	6 1/2	1 1/2
705 Silver Hill.....	1 1/2	1 1/2
555 Sierra Nevada.....	4 1/2	1 1/2
1200 Savage.....	20 1/2	1 1/2
5055 Trojan.....	5 1/2	1 1/2
490 Union Con.....	3 1/2	1 1/2

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M. JUNE 7.		
180 Alpha.....	9 1/2	1 1/2
30 Andes.....	40 1/2	1 1/2
145 Alpha.....	60 1/2	1 1/2
50 Bullion.....	4 1/2	1 1/2
435 Best & Belcher.....	15 1/2	1 1/2
250 Belcher.....	40 1/2	1 1/2
335 Crown Point.....	3 1/2	1 1/2
2410 Con Imperial.....	45 1/2	1 1/2
125 California.....	3 1/2	1 1/2
560 Con Virginia.....	29 1/2	1 1/2
255 Chollar.....	25 1/2	1 1/2
1330 Caledonia.....	2 1/2	1 1/2
200 Dayton.....	50 1/2	1 1/2
425 Exchequer.....	3 1/2	1 1/2
590 Gould & Curry.....	7 1/2	1 1/2
1410 Hale & Norcross.....	3 1/2	1 1/2
910 Justice.....	4 1/2	1 1/2
700 Julia.....	1 1/2	1 1/2
300 Kentuck.....	2 1/2	1 1/2
500 Kossuth.....	15 1/2	1 1/2
200 Morning Star.....	2 1/2	1 1/2
445 Ophir.....	14 1/2	1 1/2
385 Ophir.....	12 1/2	1 1/2
340 Overman.....	14 1/2	1 1/2
350 Prospect.....	40 1/2	

Cutting Uncle Sam's Timber.

A few days ago the telegraph brought news of a heavy verdict gained by Uncle Sam against parties who had been cutting timber on public lands in Louisiana contrary to the law. We have information that similar encroachment has been practiced in several parts of this State, and we are advised that the United States Land Office at Washington will take charge of the prosecution of those guilty of the depredation. An official circular from J. A. Williamson, Commissioner at Washington, gives the Land Offices in this State the following instructions in the matter. Whether the department at Washington think its men can be sharper in pursuit of the depredators than the local land officers, we do not know, but it is evident that the department means business in the premises.

For the information of all we quote from the circular, alluded to above, as follows: The Secretary of the Interior has concluded to change the method formerly adopted for protecting the timber on the public lands, by which you were made agents for that purpose within the limits of your respective land districts as per circular of December 24th, 1855. Pursuant to the directions from him of the 5th ultimo, the instructions of that circular are hereby revoked.

Hereafter, as it may be found advisable, from time to time, for the end in view, clerks or employees will be detailed from this office to act under instructions of the Commissioner in ascertaining when, where and by whom depredations have been committed upon the public lands, and to report to him the facts in each case.

If, upon an examination of the reports so obtained, the Commissioner finds that the facts elicited in any case warrant the commencement of legal proceedings to punish the trespassers, or to collect damages for the waste already committed, or both, he will report the same to the Secretary of the Interior, with his opinion thereon, in order that such further proceedings may be had in the premises as the case may require.

The clerks or employees detailed as aforesaid will not be permitted to make any compromise for depredations committed on the public lands. If any propositions are submitted to them with that object, they will be required to report the same to this office, with a full statement of the facts in the case, showing the nature and extent of said depredations, when and by whom committed, the amount and value of the timber when cut, and the value of the land in its present and former condition, all of which, together with the opinion of the Commissioner, will be submitted to the head of the department for further consideration.

If, in any case, the emergencies should seem to require more prompt action than is contemplated in the rules above indicated, in order to arrest the offender, or to secure the Government for the damages suffered, it will be the duty of the clerk or employee detailed to act in the matter to make direct application to the United States District Attorney for the district in which the waste was committed to institute the proper legal proceedings for that purpose. This course, however, must be taken only in cases where the evidence is clear and indisputable.

The foregoing is communicated for your information. You will observe therefrom that you are not hereafter to act as agents for the protection of the public timber, although your co-operation is expected whenever you may be called on to render assistance to officials charged with the duty.

The Fish-Crow.

The fish-crow (*Corvus ossifraga*) is confined almost entirely to the maritime districts of the Southern States, where it abounds at all seasons. This species is gregarious; yet, as flocks of it sail high above the water, they appear to be paired off. These aerial excursions last for hours of a fine morning, after which the whole descend near the surface of the water, and fish for half an hour, when they alight on trees near the shore, and keep up their gabble, pluming themselves for hours. Again repairing to the water, they fish until sunset, and then fly off thirty or forty miles to roost on the loblolly pine, uttering scarcely a single note as they retreat; but on the approach of the day, the woods echo to their matin cries of gratulation; and they promptly return to the sea-shore noisy and happy, and are soon employed over the bays, rivers, wharves, salt-ponds and marshes, searching for any sort of garbage to appease the appetite. They do not scruple to rob other birds of their eggs and young; even watching the departure of the cormorant and white ibis from their nests, which they rob at the first opportunity. In the salt-marshes they catch and eat the small fiddler crab. They pursue with alacrity the smaller gulls and terns, which they compel to disgorge the small fish caught by them within sight of their oppressors. But the fleet wings of the gulls often enable them to escape. They are able to catch fish alive with considerable dexterity; but cannot feed upon the wing, and are obliged to retire to some tree, stake, or sand-bank. They also seek on the backs of cattle for the larvae of the "bot fly," which frequently are generated in their skin. In the winter and spring, they are fond of many kinds of berries,

such as the cassena, (*Ilex cassena*), holly, (*Ilex opaca*), and the tallow-tree, (*Stillingia sebifera*), a South Carolina tree of Chinese origin. As the mulberry ripens, they flock to it, and the fig-trees sometimes require to be guarded from their depredations. They are also fond of pears, and have been seen feeding on at least one species of smilax.

In Florida, Georgia, and the Carolinas, the fish-crow breeds on moderately-sized loblolly pines, (*Pinus taeda*), making its nest about thirty feet from the ground, and towards the extremities of the branches. In New Jersey, where they are frequently killed in the company of the larger crow, they are more careful, and place their nests in the interior of the deepest and most secluded swamps. The nest is smaller and more neatly finished than that of the common crow, and is composed of sticks, moss and grass, neatly finished or lined with fibrous roots. The eggs are from four to six, resembling those of the crow, but are smaller. It probably raises but one brood of young in a year.

The cry of this species, *ha, ha, ha*, is like a faint mimicry of the common crow; at other times, it is more like an interrupted or half-



THE FISH-CROW.

stified expression of pain. During the breeding season, the notes are much varied, and not disagreeable. The flight is strong and protracted, and at times very high. They also move gracefully on the ground, frequently expanding and contracting their wings. They may be approached and shot very easily; and when one is brought to the ground in this manner, its companions sail over it in numbers, and may be readily killed.

A RUSSIAN INVESTIGATION.—A party of Russian mining engineers visited Castlemaine recently, for the purpose of investigating and reporting to parties in Russia. The thing was done in great secrecy. They expressed astonishment at the Town Reef, which employs about two men only, stating that there was, from their experience in the Ural mountains, room for 2,000 or 3,000 men. At other lines they were astonished at the lethargy of the miners leaving such treasures under foot. This party of gentlemen intend to visit, as members of a Russian school of mines, other gold fields, and so far as could be seen, they are reticent as to what they are about.

RICHARD B. CONNOLLY, of the Tammany Ring, has opened negotiations looking to a restoration of a part of his plunder, now held in the name of his son-in-law.

The Salmon Fisheries on the Columbia.

EDITORS PRESS:—I doubt if the extent of the salmon fisheries on the Columbia river, or the magnitude of this suddenly developed interest to our State, is generally understood.

To visit some friends engaged in this business I last week went down the river to Brookfield, W. T., the site of one of our largest canneries, and on this trip learned much of this industry that was a surprise to me. Owing the PRESS a great good will, I will tender for the benefit of its readers, some of my observations.

To make my statements more easily understood by all, I will observe, in the outstart, that much the greater part of the fish taken here are put up in tin cans of one pound weight, and that each establishment manufactures its own cans; hence they are spoken of and known as "canneries." The most approved and quite expensive machinery is employed, with Chinese

ballast, the fisherman, about sunset, moves out into the river and drops his net on a line across the current, by which it is borne down many miles, as is often happens, before the coming morn. The fisherman during the night passes back and forth along the line to release his net from snags and remove to his boat the fish he may find entangled in its meshes. At day light the nets are hauled aboard, and all the boats belonging to each cannery assemble and, with their bowlines attached to a steamer, are towed up to their respective quarters, where they now discharge the catch of the night. The fish, on reaching the cannery, are, by a process of butchery and cooking, which I shall not now attempt to describe, quickly transferred to cans, hermetically sealed, and packed in four dozen can cases, ready for shipment to any part of the globe.

Wheat has been the great staple of Oregon, and the main dependence of her people for revenue, but the salmon fisheries on the Columbia, it is shown, in product, last year, exceeded in value, by far, her entire wheat crop. So large has the demand abroad for Oregon salmon become to be, and so profitable its supply, that not a few of the men engaged in the business found themselves suddenly worth hundreds of thousands. The discovery of this fact has served to so stimulate the business, that the run of 1877 finds the facilities for taking fish in the Columbia nearly, if not quite, double. No less than 1,000 fishing smacks are now on its waters, and the river from the lower cascades to the bar at its mouth, a distance of 150 miles, is said to be a maze of floating nets. The amount of capital required to prosecute this business on the scale attempted this year, is immense, which, to make appear, I will give a few figures kindly furnished by my friend Mr. Truman Tyrel, Superintendent of the Brookfield cannery.

The cost of buildings and machinery was not given, but I think it cannot fall short of \$70,000; 50 fishing-smacks, rigged complete, \$300 each; 50 nets, costing the sum total, boats and nets, \$30,000; steam tug *Edna*, of Brookfield, just built, \$18,000. Then passing over the heavy outlay for plate-tin, packing-cases, salt, etc., we note the wages, at \$1 per day, of 35 Chinamen can-makers, 250 Chinamen, employed in the packing-house, at \$2.50 per day; also 100 white laborers employed, including fishermen.

The above relates to but one establishment of the 29 on the river, a carefully prepared statement of the working capacity of each of which I will now give.

The capacity of each cannery is measured by the number of cases they are prepared to pack this season, if the fish can be taken. It must be remembered a case, as here given, comprises 48 one-pound cans:

Proprietors and locations.	Capacity, in cases.
F. M. Warren & Co., Cascades.....	20,000
Jackson, Myers & Co., Rainier.....	30,000
Quinn & Co., Quins.....	15,000
John West, Westport.....	30,000
Watson & Bannan, Manhattan.....	25,000
J. W. & V. Cook, Clinton.....	50,000
Hepburn & Co., Woody Island.....	15,000
Watson & Co., Tongue Point.....	20,000
Bradly, Davis & Co., Upper Astoria.....	25,000
Anglo-American Packing Co., Upper Astoria.....	30,000
J. A. Hawthorn & Co., Upper Astoria.....	25,000
Fisherman's Packing Company, Upper Astoria.....	20,000
Bradoll & Co., Upper Astoria.....	35,000
A. Booth & Co., Upper Astoria.....	50,000
John A. Delsin & Co., Astoria.....	30,000
Geo. W. Hume, Astoria.....	25,000
Sternberger & Co., Astoria.....	20,000
Kinney & Co., Astoria.....	50,000
T. M. Warren & Co., Brown'sport.....	20,000

WASHINGTON SIDE.	
Wm. Hume, Eagle Cliff.....	20,000
Cutting & Co., Eagle Cliff.....	35,000
Joseph Hume, Eagle Cliff.....	50,000
Hapgood & Co., Waterford.....	25,000
Warren & Co., Cathlamet.....	30,000
Leuridge & Prindle, Bay View.....	30,000
Columbia River Salmon Company, Glen Ella.....	20,000
Fitzpatrick, Davis & Co., Fisherton.....	30,000
J. G. Megler & Co., Brookfield.....	50,000
Pillar Rock Packing Company, Pillar Rock.....	20,000

Total, in cases..... 1,135,000

Should the catch of salmon this year enable all of these establishments to run to the full limit of their capacity, as above given, 1,135,000 cases, or 54,480,000 cans, of fish will be the product, aside from barreled fish, which are put up in considerable quantity. These canned goods, at \$6 per case (the price generally obtained last year), will represent \$6,810,000 in gold coin, quite a clever sum for an infant industry, and a handsome fruitage for our beautiful Columbia. It is estimated that an average fish will fill 16 cans; hence, to meet this year's lay-out of these canneries, 378,333 salmon will be required, and the pay to the fishermen, for catching them, will be \$189,166. The fishing season is now fairly in, and will probably continue till about the 15th of August.

I want to say, in conclusion, to your readers, that for many facts in this brief of our piscatorial bonanza up here, they are indebted to Mr. Truman Tyrel, of Brookfield, a gentleman every way trustworthy, and to him and his talented lady, the writer is under obligations for the cordial hospitality of their pleasant home during his sojourn in that place.

N. W. GARRETSON.
Albany, Oregon, May 1st, 1877.

GENERALS Sheridan and Crook are fitting out a small expedition to start from Green river, on the Union Pacific, and march north through Camp Brown and around the Big Horn river to the Yellowstone. After locating two military stations north of the Big Horn country, for which Congress has appropriated \$200,000, the expedition will return by steamer down the Yellowstone and Missouri rivers.

Continued from page 378.

erations that are going on in different directions very quietly, to test the value of old claims by a small mill operation, and then to open claims for more permanent business. These are the efforts that help keep up and encourage every true interest.

The Gwin Mine.—Near the Mokelumne river, the dividing line from Amador county, and about five miles from Jackson, and three miles from Mokelumne hill, is considered the great high chief of Calaveras county mines. Common report says that recently a single blast exposed \$100,000 worth of specimen gold quartz. But I have been there recently, and Wm. M. Gwin, Jr. made no blow of any such occurrence, and though very hospitable, seemed less inclined to talk of rock than the topics of the day. His venerable father, Senator Gwin, carried out a few samples of pay ledge rock that glittered with streaks and spots of the pure metal, and yet we were told that the sulphureted part was really richer than that showing the metallic gold. A little sample of 30 ounces, sent as a present to San Francisco, was pounded up, and yielded \$66.66, making a yield of over \$70,000 per ton. That must have been over average rock, of course. The mine is worked to 1300-foot level. Drifts run off from shaft there, north and south. In north drift, about 90 feet from shaft, struck the rich ore, and have run about 90 feet in the ledge of good ore, giving six stopes to run upon to the 1200-foot level.

The hoisting and pumping machinery are very complete, and 60 stamps are run by water power. When running to full capacity they hoist and crush daily 120 tons. Now they are only running a small force and 28 stamps. The huge timbers for the mine are now hauled about 20 miles, but will soon be floated down the river to the mouth of the canyon, one mile below the mill, and thereby save very much cost. The desulphurizing works below the mill are of the first class roasting and chloridizing. The ample and luxurious mansion has upper and lower verandas, all hanging as it were on the steep hillside, which by terraces, walls and steps is made very elegant, and highly adorned with the choicest trees and flowers. One cannot blame the venerable Senator for choosing this as his summer retreat from city life. Whoever views the situation and all the difficulties of building up such an extensive and very expensive enterprise, must admire the courage and ability of Wm. M. Gwin, Jr., planner and director of the entire business from the beginning. The outlook from this mine is at present very favorable for an immediate future of successful working. I could give many interesting facts, but the parties seem averse to too much publicity of even the simple facts, for fear they may be construed as "blow," or publicity sought by them. But if they continue such retortings as I witnessed, the facts will out, and all will rejoice and say, "We knew old Calaveras had a branch of the true Mother lode, if not the entire trunk."

Calaveras county, June 9th, 1877.

BELL'S MINE.—We understand there are many who read the account of Bell's very rich strike, made near Auburn about two weeks ago, that are inclined to discredit the story. It is a matter of little difference whether anybody else believes it or not, so long as those most interested know and realize the happy fact. Rich rock had been taken out from the surface down, but the main strike was made on Monday, two weeks ago. From that time until the Wednesday evening following, there was taken out, as near as we can learn, between \$20,000 and \$30,000. The last three pans taken out that day contained nearly, or about \$10,000, and he was that evening offered \$20,000 for the mine, provided he would take out no more. He accepted the offer and quit at once; tore away his hoisting apparatus and put a man on the ground to watch the claim until the bargain was consummated. The party who made the offer did so in the interest of others, which others have not come to time, and the trade has fallen through. Bell is perfectly indifferent as to whether he sells or whether he don't. He left plenty of gold in sight and, as he says, while there may be only ten or fifteen thousand left that is easily obtainable, there may be a hundred thousand, or even more. He commenced on Thursday to get things in readiness for working again, expecting to start in next Monday, and we will soon know whether the mine contains much or little gold. —*Placer Herald.*

FIRING WITH PETROLEUM.—Experiments have recently been successfully made in Italy on a method of burning petroleum under steam boilers, which consists simply in pouring the oil over a thin layer of asbestos. The petroleum burns with intense heat, while the asbestos, being incombustible, is not affected, but serves as a means of retaining the oil and acting as a wick. During the experiments sheets of paper placed beneath the furnace were not injured, although the heat from the oil above was most intense.

CUTTING CAST IRON TUBES OF LARGE CALIBER.—An apparatus for this purpose, invented by Reishauer and Bluntschli, of Zurich, is described in the *Schweizerisches Gewerbeblatt* for 1876, p. 130. It is constructed of three cutting wheels, resting in stirrups which are pressed upon the tube by a connecting vice-screw. A cutting iron, between two of the cutting wheels, is pressed against the tube by a second screw, and the whole apparatus is turned around the tube by hand.

USEFUL INFORMATION.

Hints to Flour Millers.

We recently gave some notes on balancing buhrs from a practical miller. Our flour mill-reading readers will be interested in reading what John M. Truax, a prominent and practical New England miller, in a recent communication to the *Millstone* has to say upon the subject of fast and slow grinding:

To my mind, the reasons given for fast or slow grinding have not been shown. The quantity to be ground must depend upon the texture or density of the stone, the draft, the number and depth of furrows, and the grinding without heating. No more grinding should be done than can be done without heating. The heating is the stopping spot. The quantity that every mill ought to grind is that quantity that can be ground and not heat, whether it is five, 10, or 20 bushels per hour. If every miller will observe this as his guide, he will do the best work that he is able to do.

In speaking of heating, I mean to say that the grain should not be so heated by pressure or rubbing, as will start the juice or essential oils of the grain. If the grain oil is started by friction, that friction produces heat, and that heat dries and evaporates the grain juice, and the virtue of the flour is impaired. Any amount of cooling will not repair the damage done by heating. The steam that rises from the hot running mill is the vapor from out of the essential oils of the grain, and is lost in the bread. To recommend the grinding of 10, 15, or 25 bushels of wheat per hour is bad advice, imprudent. Millers differ in the selection of stones, and differ about their dress, and the motion of their mill. One will have one kind and way, and another another kind and way; but whatever way they select, when they go to grinding, their quantity per hour should be that which they can grind and not heat, whether it is three, five, 10, or 20 bushels per hour. Do not impair the substance for the bulk per hour. Blood heat is as high as can be warranted without impairing the product. It may be an ambition to grind fast, but an old adage is "haste makes waste." If millers are ambitious, let that ambition be applied to the making of a perfect running mill. Select the very best buhrs, and put in a thoroughly common sense dress; a dress that will granulate the whole kernel as nearly as possible. Keep the stones as far apart as possible, and keep the texture or grain of the stones clean. Let this be the miller's ambition. But stop adding to quantity when the mill is at blood heat, and as much less heat as they are able to, and let the bread makers and eaters have in the flour all the virtue that Mother Earth has produced.

WOOD PRESERVED BY INJECTING TANNATE OF IRON.—We read in the *Journal of the Franklin Institute* that M. Boris recommends Hatzfeld's process, which is based on an ingenious idea. The tannate of the protoxide of iron, which is soluble, absorbs oxygen rapidly from the air, and is transformed into insoluble tannate of peroxide. The operation is two-fold: first, injection of tannic acid; second, injection of a protoxide of iron. For this purpose pyrolignite is used, which combines the advantage of cheapness with that of not injuring the woody fibers. The injection is made in close vessels, with the same apparatus as for creosote. The inventor claims the following advantages: first, the complete insolubility of the tannate of peroxide, seems to give a complete guarantee of durability; second, the injection is so made as to yield a great excess of tannic acid, which, being free, coagulates the albumen of the wood, tanning it, so to speak, and transforming all woods into a kind of oak, very rich in tannic acid.

OBLIGATION TO STOP TRAIN TO PREVENT ACCIDENT.—In the case of Morgan against the Pennsylvania Railroad Company, the Pennsylvania Supreme Court held: "A failure to stop a train, when a child is seen on the track in front thereof, is not necessarily and in all cases negligence on the part of the railway employees. Where a child, on the track in front of an approaching train, evidently saw its danger in time to escape, and attempted to run off the track: Held, that the engineer had a right to presume that it would succeed, and to run his train accordingly. Held, further, that where the child, in such case, was prevented from escaping by an unavoidable accident, occurring too late for the engineer to stop his train, the railroad company was not responsible for running over it."

MAKING CRACKED WHEAT.—*Millstone* replies to a query as follows: "Cracked wheat is usually made on small buhrs, portable mills, of sharp porous French buhr stone, being best adapted for the purpose. The mills most generally used will crack about 10 to 15 bushels per hour, and the cracked wheat is then passed through a reel, or series of reels, covered with different numbers of wire to grade it. The apparatus required, of the capacity referred to, will cost about \$400, including the mill; or it can be furnished of a less capacity for less price."

Success with Mineral Oils.

Inasmuch as our State has begun to develop its resources of mineral lubricating oils, it is well to examine their value as compared with the organic oils largely in use. At the late meeting of the Railway Master Mechanics' Association, there was rendered a report of a committee appointed to examine into and report on the subject of lubricants. They recommended a good quality of natural earth oils as the best to use for lubricating machinery and journal boxes. It was less expensive and of a better quality than other oils. When treated so as to reach 28° of gravity it was found to work with perfect success, even on so sandy a road as the Lake Shore. It had been reported on favorably from Canada in the North to Kentucky in the South. A test of various oils had been made with the oil-tester on the Lake Shore road; sperm, lard and tallow were used, and none of them found to possess qualities which render their use advisable. In their experiments the committee used a machine the size of a regular axle-box, and 50 drops were poured in at a temperature of 60°, and the wheel was allowed to revolve at a rate of speed equaling 35 miles per hour until a temperature of 200° was reached. The length of time, number of revolutions and amount of friction were all noted and placed in the form of a table. He called their attention to the result obtained from tests with paraffine, which costs from 25 to 30 cents per gallon, and which has been used on the railroads in preference to lard oil. Paraffine costing 25 cents, with which six experiments had been made, showed 24 minutes required to reach the maximum temperature, during which time it gave 11,685 revolutions; castor oil, costing \$1.25, which required 28 minutes to reach the temperature allowed, gave 12,946 revolutions; manufactured oils A, B and C, costing 35 cents, 90 cents and 25 cents respectively, required 19½ minutes, giving from 9,285 to 9,653 revolutions; sperm and tallow required only 17 minutes to reach 200° temperature, with less than 8,000 revolutions.

FLY PAPER.—The hot weather last week brought us flies by thousands, if not more. We meet them thus, getting the hint from an exchange: "Powdered black pepper is mixed with syrup to a thick paste, which is spread by means of a broad brush upon coarse blotting paper. Common brown syrup will answer, but syrup made from sugar is preferable, as it dries quicker. For use, a piece of this paper is laid upon a plate and dampened with water. The paper may also be made directly at the mill by adding sugar to the pulp, and afterwards one-quarter to one-third of powdered black pepper, and rapidly working it into a porous absorbent paper."

GOOD HEALTH.

Sugar as Food.

The action of sugar upon the system has long been a matter of controversy. With this, as with most other things we eat, much good or evil depends upon the times and quantities, etc., of the partaking. The ruinous effect of sugar upon the teeth has long been an orthodox belief among parents. *Hall's Journal of Health* takes occasion to renew the whole subject and we quote a few paragraphs:

Harm has been done by propagating the notion that sugar is injurious to the teeth, by diverting attention from real causes of destruction or decay. The eating of any amount of pure sugar cannot injure the teeth directly, because it has no residue, it is wholly dissolved and passes into the stomach.

But let it be remembered that the practice of eating sugars or candies or any other sweet-meats largely, will inevitably cause a disorder of the stomach and generate gases there, which will speedily undermine the health of the teeth.

By insisting too much on the fact that sugars and candies destroy the teeth, an impression will grow that if these are mainly avoided, the person so doing will have good teeth, and this leads the mind away from the necessity of keeping the mouth clean and the stomach healthful. If these things are well done, and the teeth are kept plugged in a finished style, teeth naturally or hereditarily "poor," may be kept in a good state of preservation for many years.

All forms of dyspepsia have a direct tendency to destroy the teeth. Whatever causes acidity of the stomach is ruinous to the teeth. A tablespoonful of the purest syrup of loaf-sugar, taken three times a day before meals, will destroy the tone of the healthiest stomach in a very short time. And when it is remembered how many patent medicines are made up in the form of syrups and sweet lozenges, and how common the use of them has become, it need not be wondered at that every second or third person met on the street knows the meaning of "sour stomach" or dyspepsia.

So far from sugars and pure candies injuring the teeth or the health, they would, if used wisely and in moderation, as sole desserts, be actual preventatives of both; especially if alternated, as desserts, with fruits and berries in their natural, raw, ripe, fresh, perfect state, by banishing from our tables the pestiferous pie, the leaden pudding, and pastries and cakes of every name, which, as desserts, always tempt to excesses which lay the foundation for dis-

eases which torture for a lifetime, or bring speedily to the grave.

Let the spirit of this article be distinctly understood. Pure sugars and candies do not injure the teeth, except indirectly, by their injudicious use in exciting acidity of stomach or dyspepsia, as will any other kind of food, or drink, or beverage, if extravagantly used.

At seasons of the year when fruits and berries may not be had, ripe, fresh, and perfect, as desserts, pure sugars and candies may be used as such in their stead to great advantage, because they are healthful, being warming, nutritious, and agreeable; hence, as a table article, they are very valuable, while the almost universal love of them shows that they were intended to be eaten. If a child is not allowed to eat anything containing sugar it will sicken and die in a very short time. Children need the carbon, the fuel contained in sugar to keep them warm; without it they would perish from cold; hence the love of sweet things is an instinct, implanted by the kind and wise Maker of us all for the child's preservation.

The Effect of Tobacco on the Human System.

In the fourth annual report of the Michigan State Board of Health, Dr. Scott relates something new in the influence of tobacco on the human system, as follows: "There has come under my notice for several years, but more particularly during the last two years, a kind of rheumatic condition of the walls of the chest. The patient complains of a dull, heavy pain in the chest walls. The disease in a large majority of cases is confined to the left side. The pain is circumscribed and limited to a space of not more than two inches in diameter, just below and a little to the left of the left nipple. At times the pain is very severe and always constant day and night, when the patient is awake. I have investigated the disease to some extent, and find it to be more common among tobacco users, especially those who use the weed to excess. Patients suffering from this complaint invariably come to their physician with the belief that they have heart trouble. I have not found signs of organic lesion in any of the cases that I have examined, but there does exist in some of them what might be called 'irritable heart.' I am convinced that the greater number of the cases are the result of intemperance, either in the use of tobacco or other stimulants, for the reason that when the patient abstains from the use of them for a short time, his pain ceases and his condition improves. In one case, where the patient abstained from the use of tobacco for 13 months, the pain entirely ceased; but at the end of this period the gentleman recommenced the use of tobacco, and after three weeks' use the old pain returned with all its severity. I am certain that quite a number in this vicinity are receiving treatment for heart disease, when if they would reform in tobacco using they would speedily recover."

SLEEPING ROOMS.—The air which passes out of the lungs is wholly innoxious. If re-breathed without any admixture of other air, it would induce instant suffocation. It contains a large amount of carbonic acid gas. This gas is condensed by cold, and falls to the floor; heat carries it to the ceiling; hence the practical fact, that in warm weather those who sleep on the floor breathe the purest air; while in very cold weather the higher one sleeps above the floor, the better is the atmosphere. Hence, in a warm room, sleep as near the floor as possible; in a cold room, the higher the bed is, the better. A striking illustration of one branch of the statement is found in Dr. Hall's new book on "Sleep." When the jail-fever was raging in England, it was the custom to hand the food and water to the prisoners through a hole in the floor above them. A case is mentioned where the jailer and his wife died in one night in consequence of the effluvia of the prisoners' cell below; while the prisoners themselves continued to live, showing conclusively the concentrated malignity of the air at the ceiling, as compared with that on the floor. The same principle has an illustration in the narration in the same pages, of the terrible incidents in connection with the "Black Hole of Calcutta," where it was speedily noticed that relief was given by sitting down on the floor. From these statements, it is clear that it is better to have a fire in the fireplace in a close room in winter than to have no fire; and for two philosophical reasons—the fire rarefies the carbonic acid gas, and compels it to seek the ceiling; besides, it creates a draft up the chimney, thus causing cold air to come in more copiously.

DON'T RUN AFTER A MEAL.—We do not mean that a man should not exercise due haste in pursuit of a meal, but he should be calm after he has caught it. A gentleman and his son the other morning were a little late for their customary town train on the South Western, and had "to make a run for it." They were successful in their attempt, and caught the train. But the younger gentleman gasped for breath, made a few motions with his hand, and would have fallen if he had not been caught. Before the train arrived at the next station he was dead. The verdict of the coroner's jury, following the opinion of the medical witness, was to the effect: "That death arose from syncope of the heart, brought on by running, after a hearty meal." Such was the end of a gentleman only 30 years of age.



W. B. EWER.....SENIOR EDITOR.

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ADDRESS all letters to the firm, and not to individual members, or others, who may at any time be absent.

Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, June 16, 1877.

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The Week.

The feature of the week past has been the extremely warm weather, which has lasted so much longer than our usual hot spells at this time of year. Its principal effect on the mining interests is that it will materially lessen the quantity of water in the ditches to the gravel mines, and, by rapidly melting the remaining snow, shorten the already brief water season. The weather has been the hottest ever experienced in California. The whole State has had a broil. The hottest coal was at Soledad, where Fahrenheit was 120°. Through the interior there were varying heats, from 106° to 113°. In the city the highest point was 99°; but this comparatively moderate heat is greater than we have had in June for the last five years. The most notable fact of the heating was its long duration. Instead of yielding at the end of a three-days' lease of power, the burning sun clung to us for full five days; but now the spell is past and the city breathes again. The warmth seems to have had the effect of a hot-house on mining stocks, for they have started ahead at a lively rate. Everything shows an advance over prices which have prevailed so long, and now the brokers are happy. News from the mines continues favorable from nearly all quarters, as a glance at our Mining Summary will show.

THE Carson mint coined \$301,220 in May, of which \$30,000 was in trade dollars.

California Mines.

At the anniversary of the Pacific Stock Exchange last week, considerable champagne was drank and a good many speeches made. Most of the remarks made were of a congratulatory nature over the success of the enterprise and the business done. One member who had been talking about the price of stocks, and expressing an opinion that they had gone low enough, said: "What we go by is the Comstock. There is nothing outside of that that amounts to a row of pins for speculation or anything else. There is merit in it. There is a chance of striking something there. It has been the place of the greatest mines in the world."

No one doubts in the least that the Comstock is the place of the richest mines in the world, for its bullion product is the best proof of that; nor does any one doubt that there is a chance of striking something almost anywhere there. This will be conceded by all; but the statement "that there is nothing outside of that that amounts to a row of pins for speculation or anything else" is pretty sweeping. Of course the gentleman making the remark didn't know much about the subject, taking his ideas of mining entirely from Stock Board Associations, but it shows the general feeling among that class of persons who mine entirely with certificates of stock. Without in the slightest degree desiring to detract from the merits of the Comstock as a mining center, which no one familiar with it could do, we still object to such remarks as the above being passed around in the press of the coast without comment. There are hundreds of places where people have invested their money in mining operations which amount to a good deal for legitimate mining purposes. True, these places do not amount to much to the brokers, for there is little speculation with them; but for square, honest mining, many may be ahead even of the Comstock. The remark quoted would lead any one not familiar with the subject to believe that there was nothing going on in mining except on the Comstock, and that that was the only place looked at by capitalists.

This is far from being the case. California, particularly, is in a prosperous condition as to its mining interests, very few of its mines being known to brokers, while for some time the Comstock and other Nevada mines, the favorites of the brokers, have been in a very much depressed condition. This state of affairs is probably due to the brokers as much as to the mines, in both cases, and though not complimentary to them, a moral might be pointed out if necessary. To show that there is some activity outside the Comstock, and leaving aside the other States and Territories entirely as not necessary to prove the position, a hasty glance over the mining news of this week from California alone will convince any one. The following items, of the many that might be quoted, the details of which are in our "Mining Summary," will be sufficient.

The Hinckley mine, Amador county, from the old 40-foot shaft of which \$18,000 was taken out, is to be started up again in search of more rich pockets. The Potosi, in the same county, is about to be started up, as is the Wildman. A feature this year in mining is that carried on in the river beds, where the low stage of the water admits of operations which have not been carried on of late years. We notice that in one place on the South Fork of the Feather river, a man named Price has struck a rich spot and is taking out gold at the rate of \$500 to the man. The old French lead, near Rich Gulch Flat, Calaveras Co., has been sold to a company who are going to put up a water power mill upon it. A good many abandoned mines are being re-opened throughout the country. A nugget weighing one and three-quarter pounds was found in one of these claims near Mokelumne Hill last week. An important development has been made on "the ridge" in Nevada county, between the Middle and South Yuba rivers. The tunnel run by S. B. Hunt, proves that the old river channel traverses this ridge under the lava formation, and that from Snow Point to Bloomfield, a distance of nine miles, it lies as yet untouched. This leaves a vast amount of rich new mining ground in that county yet to be worked, and which has been heretofore unknown. The Yuba River mine, which consists of a drift under the river so as to get at the rich gravel in a new way, has struck dirt which is pretty rich, besides proving the project to be practicable. The drift seems to be low enough down, and no water has interfered. The ultimate success of this enterprise will have the effect of inducing others also to try this system of mining. The twenty-stamp mill of the Republic mine, Eureka township, Nevada Co., will be at work in a month. Rich rock has been struck in the Providence mine in the same county, at least 500 feet south of any yet worked in the mine. A rich ledge was struck last week on Emigrant hill, above Elizabethtown, Plumas Co. In the same county a new company has been formed to sink a shaft in the old channel which crosses the bed of Jamison creek. A shaft 140 feet deep was sunk there once before, but when they struck the washed boulders the water drove them out. This time, the company is composed of working miners, who have a good pump and will set at work in earnest. The lava beds at Oroville, Butte Co., which are worked entirely by Chinamen, are said to be yielding in the aggregate \$10,000 per week.

Our Patent Department.

As illustrative of the estimation in which the MINING AND SCIENTIFIC PRESS Patent Agency is held, and of the success attendant on properly directed efforts to obtain patents, we call the attention of our readers to the fact that of the seventeen patents granted last week to Pacific coast inventors, fifteen were obtained through our patent department. We give elsewhere in this issue an abbreviated description of these patents, which are of varied character. Our patent department has now been in operation so long that its conductors are thoroughly conversant with all the intricacies of patent business, and the patronage extended to it is sufficient guarantee of the estimation in which it is held by Pacific coast inventors. This position has been obtained by attention to the interests of clients, promptness in transaction of business, energy in "pushing" applications, skill in drawing up specifications, knowledge of the details of the patent office work, and upright dealings.

This department is organized in the best possible manner for quickness in obtaining patents, as active and reliable agents in Washington are employed to give personal attention to cases which are prepared here; and when necessary telegraphic instructions may be sent. The experience gained by many years' labor in this particular field has resulted in an accurate knowledge of mechanical details and familiarity with inventions of every class. As for a number of years by far the greater number of Pacific coast patents have been obtained through our agency, the managers are naturally well acquainted with what has been done here, and understand perfectly the requirements of Pacific coast inventors.

The Mechanics' Institute.

The annual meeting of the Mechanics' Institute was held on Saturday evening last. President Hallidie in his annual report stated that the alterations made in the building have involved considerable outlay, but have likewise largely increased the revenue from rentals, and provided room for valuable books. The very great value of the works of reference, among them being many sets of books which it would be impossible to replace, and which have taken years to complete and place on the shelves, has compelled the Trustees to recognize the fact that like all valuable property liable to removal, they must be carefully protected against careless handling, thoughtless abuse, and possible theft. Some of the most valuable books, despite the rules and precautions against removal, have been carried off and not returned. In every respect the accommodations for the requirements of the Society are inadequate, and for some time past the Trustees and members have felt the necessity of a more capacious building, containing rooms of sufficient dimensions for the library, the reading-rooms, lecture hall, class-rooms, museum, etc.

The report also discusses generally the depressed condition of business from the labor standpoint, and opposes Chinese immigration. The aim of the manufacturer is not so much to employ human beings for the sake of the number employed, as to employ those who in the individual capacity tend to the greater happiness of society and to the moral and intellectual advancement of the people.

We need some such man among us as Sir Titus Salt, of Saltaire, England, who died quite recently, and who by his patient perseverance, indomitable energy and true benevolence, built up a new industry and established in employment and homes a community possessing many of the best elements of promise and progress. For the benefit of San Francisco, if any of our capitalists are disposed to emulate the noble example of Sir Titus, a biographical sketch of the Yorkshire manufacturer is incorporated in the report. Salt, with proper discrimination, gave away hundreds of thousands of pounds in benefactions; he founded the alpaca manufacture in England; employed thousands of work people; built the considerable town that is named after him; remained autocrat of its control until his death; endowed it with baths, library, lecture halls, etc., and departed this life leaving a fortune of some millions sterling, all of which had been honorably amassed by industry.

During the past year there have been added to the library 2,310 volumes, as per the following classification: Science and art, 396; fiction, 1,080; general literature and essays, 174; biography, 74; history, 103; poetry and drama, 33; travel, 92; law and political economy, 12; theology and religion, 1; encyclopedias and dictionaries, 54; philosophy, 3; sundries, 9; bound newspapers, 46, and donations, 258. The total number of volumes on the shelves at this time is 29,516. During the year 799 ordinary members and 4 life members have joined the Institute. The financial condition shows a balance in favor of the society, of \$158,936.

The present revenue from rents is \$875 per month, and from membership dues \$862.10 per month; total, \$1,737.10. The current disbursements, including cost of alterations, are \$1,558.10 per month.

After the meeting the new board of directors organized as follows:—President, A. S. Hallidie; Vice President, P. B. Cornwall; Secretary, James Duffy; Treasurer, H. L. Davis; Corresponding Secretary, Ernest L. Ransome.

Nevada County Reunion.

Nevada county residents and ex-residents turned out in large numbers, on Saturday of last week, to celebrate their annual reunion. The gathering took place at Badger's Park, in Oakland. In the absence of Hon. Robert Watt, President, Hon. E. G. Waite, one of the Executive Committee, presided over the exercises, which were of the most interesting and enjoyable character. About one thousand persons were present, and the number would have been larger had it not been for the extreme heat which prevailed during that and several preceding days.

The literary exercises, which took place in the pavilion, were opened by a poem, written for the occasion by Mrs. Nellie Chapman, of Virginia City, formerly from Nevada county, and read by the author. This was followed by another poem, written by Mrs. E. K. Waters, but read by Miss Nellie Holbrook. Both poems were of a high literary character, eminently appropriate to the occasion, and were well read and received. The elocutionary effort of Miss Holbrook received much applause.

The oration of the occasion was pronounced by Hon. John Barber, in which he briefly reviewed the pioneer history of Nevada county, and paid an eloquent tribute to the worth and heroic death of the lamented Meredith. Blum's band was in attendance, and discoursed most excellent music. Dancing preceded the literary exercises for about an hour, but the extreme heat which prevailed prevented a very large participation in that portion of the exercises.

The company adjourned from the pavilion about one o'clock—the most of them to take lunch, *a la picnic*, in the grove, where tables were placed for the convenience of those who brought their own luncheon. A number of tables were also spread upon a platform near the center of the grove, to which invited guests and speakers were invited, and to which others had access who chose to purchase tickets at the low figure of 50 cents—thus making them practically open to all. When the speaking commenced, the canvas which had previously surrounded the tables was thrown down, and all were admitted to hear the speaking.

The tables were presided over by Judge A. C. Niles, who announced the regular toasts as follows:

First regular toast—"The Gravel Banks of Nevada"—they never repudiated legitimate drafts." This sentiment was most appropriately responded to by Hon. Wm. H. Sears, of San Francisco.

Second—"The Bar of Nevada County." Hon. Senator Sargent was called upon to respond. The Senator's remarks were fitting and appropriate. He paid a merited tribute to the uprightness, the learning and the eloquence of the bar of Nevada county. Among other incidents and facts presented was the statement illustrative of the intelligence, learning, and persevering energy of early Nevadans; that he once stood upon the floor of the Senate Chamber in Washington, and saw no less than five persons who were then members of that body who had formerly been residents of Nevada county.

Third—"Our Educational Institutions." This toast was responded to by Professor Martin Kellogg, of the State University at Berkeley, in his usual happy and effective manner.

Fourth—"The Ladies of Nevada County."—The audience missed the rich and racy speech which ought to have been heard in response to this toast by the necessary absence of A. B. Dibble, Esq., of Grass Valley, who was expected to reply, but was compelled to retire from the ground at an early hour.

Fifth—"The Pioneer Press of Nevada County." was responded to by W. B. Ewer, of the SCIENTIFIC PRESS of San Francisco, who started the first newspaper ever published in Nevada county. Numerous incidents connected with the establishment and continuance of the pioneer press of the county were rehearsed and listened to with much apparent interest by the many present, who well recollected the scenes and occurrences referred to, and which took place from twenty to twenty-five years ago—a long time back in the history of a California city.

The re-union throughout was a most pleasant and enjoyable affair, and will doubtless lead to a still more general attendance of future gatherings of old Nevadans. We understand that it is the intention to collect and publish in book form, a full report of the proceedings of this gathering, as well as the one held last year, in Nevada. Such publications will be of much historical interest and importance to the future historian who will some day write a history of California.

A "Great Register"

Was opened and received the signatures of a large number of old Nevadans, whose autographs it is proposed to thus hand down to posterity with record of date of arrival in the county, and address at time of signature.

The Executive Committee which had the re-union in charge, comprised Robert Watt, Chairman; Chas. C. Leavitt, Secretary; George D. Dornin, E. G. Waite and John M. Days.

The following gentlemen were elected as officers of the society for the ensuing year: President, Hon. John Garber; Vice President, Hon. A. C. Niles; Secretary and Treasurer, C. C.

GRASS VALLEY, NEVADA COUNTY, CAL. AND SURROUNDING COUNTRY IN THE YEAR 1853



Leavitt; Executive Committee, H. W. Sears, A. D. Dibble, H. H. Pearson, W. P. Maguire and A. W. Potter.

Our Illustration
Is from an original wood engraving prepared in this city from a drawing taken of Grass Valley as it appeared in the fall of 1853. Old residents will readily recall to mind many of the buildings shown, and recognize the general correctness of the view of the town as it appeared at that time, in the second or third year of its existence. The construction and appearance of the buildings furnishes a very correct idea of the architecture and general mode of building towns in those pioneer days of California life. The Congregational church and the Methodist Church South, are the only buildings shown in the engraving which our recollection can call to mind as now standing. This engraving has been carefully preserved by the writer and is the only relic left of the *Telegraph*, the pioneer paper of Grass Valley, the materials of which were destroyed by fire in the summer of 1862.
A similar engraving was also prepared about the same time of Nevada City, but the block has been lost. A print from each of these engravings was neatly framed and exhibited at the pavilion during the day by Mr. C. Voy. The pictures attracted much attention from those who were familiar with the two places a quarter of a century ago.

Pacific Coast Coinage.

Probably as good an indication of the result of mining operations on this coast, for the past year, as could possibly be shown, is the report of the United States branch mint in this city. During the fiscal year ending June 30th, 1877, (the mint now being closed for annual repairs), the amount coined was \$46,101,500, or \$10,112,000 in excess of last year, when the work was considered extraordinary. There were 28,529,000 pieces of different denominations coined, as follows:

GOLD.		
DENOMINATION.		VALUE.
Double eagles.....		\$32,400,000
Eagles.....		66,000
Half eagles.....		32,500
Quarter eagles.....		5,000
Total gold.....		\$32,552,500
SILVER.		
Trade dollars.....		\$3,042,000
Half dollars.....		2,825,000
Quarter dollars.....		2,270,000
Dimes.....		412,000
Total silver.....		\$13,549,000
Grand total.....		\$46,101,500

This statement shows the largest coinage of any mint in the world during the same space of time. Since the organization of the branch mint at San Francisco, in 1854, the total output has been \$430,532,553 gold, and \$26,049,712 silver, or a grand total of \$456,582,265. This is indeed a most remarkable showing, and must stand unparalleled in the history of coining operations. The three mints of the United States, in order to meet the demands upon them for subsidiary coins to displace paper fractions, have been run to their utmost capacity, and this has resulted in the extraordinary coinage as shown in the case of the San Francisco mint.

The following table will show the relative coinage of gold and silver at this mint for the past few years, and shows, also, that although the silver coinage has increased materially, the great bulk is still in gold, although the popular impression is to the contrary:

	GOLD.	SILVER.	TOTALS.
1876-7.....	\$32,552,500	\$13,549,000	\$46,101,500
1875-6.....	27,036,500	8,053,000	35,089,500
1874-5.....	26,200,000	4,327,000	30,527,000
1873-4.....	22,302,500	2,550,500	24,853,000
1872-3.....	16,907,000	94,500	17,001,500

These figures alone are sufficient argument in favor of mining as a business, and show, moreover, that although that interest is temporarily depressed at present, it has added wonderfully to the finances of the country during the past year. An interest that can produce in hard coin upwards of forty-six millions of dollars in a year is not to be put aside because a few men have made bad speculations in stock gambling. It must be recollected, moreover, that this is not all; as the Carson mint product is not counted here, nor is the bullion shipped east and coined there.

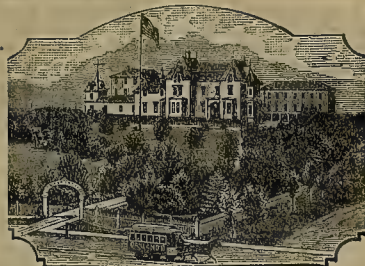
The San Francisco mint is now the most complete in the world. Many very great improvements have been added of late, and the capacity increased. The coin is now made better than ever before. The old process of passing the ingots through the rolling mills from nine to thirteen times in order to reduce them to the proper thickness for the die punch, caused such a hardening of the metal that they had to be annealed twice so as to soften them. Mr. Cicott now passes them under a diminished pressure from fourteen to eighteen times without annealing, and the strips are in better condition than those annealed and pressed by the former process. This has had the effect of lessening the labor in the annealing room, as there are less canisters used, and the coiner introduced a larger canister, which holds an entire melt, which is subjected to a slow fire for forty-five minutes. By these and other improvements Mr. Cicott, it is claimed, has been enabled to increase the capacity of the mint from thirty to forty per cent., and this, too, in the face of a greatly reduced appropriation.

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MOUSTACHE PROTECTOR.

Will fit any Cup.



Gents' Delight. Boss Novelty for Agents. Big to sell. Gents must have it. Ladies buy it for them. Only 25c by mail. Circulars free as air. Storekeepers, let me whisper to you. C. H. BARROWS, Patent tee, Willimantic, Conn.

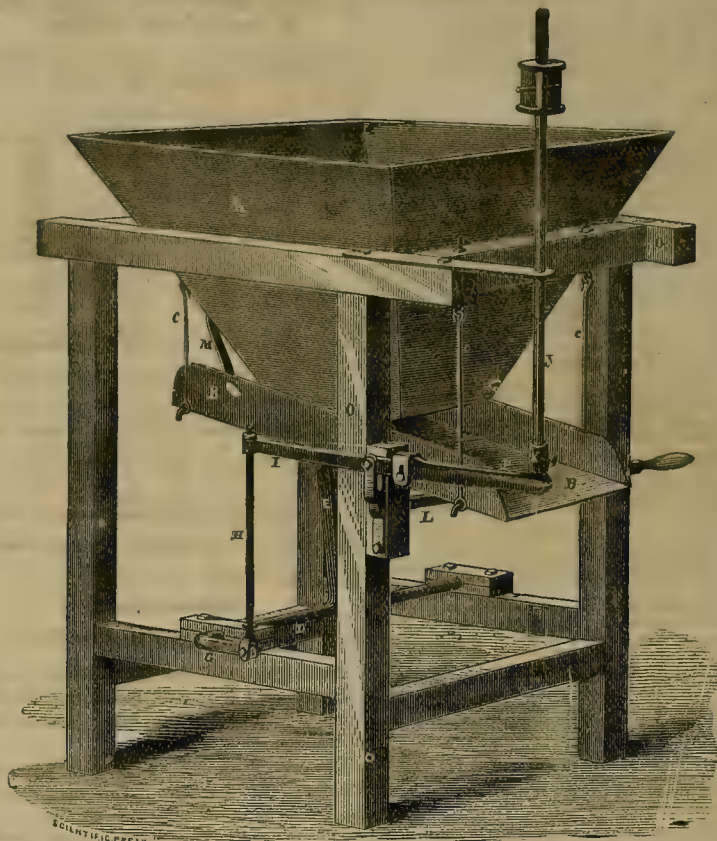
GUIDO KUSTEL,

MINING ENGINEER and METALLURGIST.

P. O. Address: ALAMEDA, CAL.

TULLOCH'S AUTOMATIC ORE FEEDER,

Awarded the Centennial Medal.



The TULLOCH AUTOMATIC ORE FEEDERS have been practically tested during the last year and a half in 40 mills, of from five to 80 stamps each, and have, in every case, given perfect satisfaction. The Tulloch machine is so constructed that the drop of the stamp feeds the ore in just such quantities as the stamps require. Each drop regulates the supply required for the next drop, whether it be more or less, and this is the true principle of an automatic feeder. The tray moves longitudinally, and a stationary scraper forces the material forward at each backward movement of the tray, thus insuring the perfect feeding of all classes of ore, whether it be dry or wet.

We append a few extracts from the many testimonials which we have received from mill men and practical mining men, of the effectiveness and positive action of the Tulloch Feeder. We do not depend solely upon these testimonials, as we are aware that testimonials are easily secured for almost any machine, but the high character of the parties certifying to those herewith given, will establish their value and genuineness.

Mr. Jos. G. Fair has 28 in use; says: I regard them superior to any Feeder with which I am acquainted; I consider no mill perfect without them. Mr. E. R. Burke, Sumner mine, Kern county, has 16; They never get tired; no man living can feed a battery as well; they save us in labor alone \$48 a day. Mr. Green, of the Phoenix mill (12), Amador, writes: The first machine we had is working away; is as good as ever; have not spent a dime on it; in use 14 months; you need fear no competition on wet ores. Mr. W. H. Armstrong, of Consolidated Virginia mill; We are running 60 stamps with your Feeders; they give unbounded satisfaction; they have not cost the company one dollar since starting up. Mr. H. C. Bidwell, Supt. Green Mountain and Gold Stripe companies, Plumas county, writes: From the start they have done splendidly; no trouble whatever; requiring but little attention; a boy can manage them; the saving in both labor and castings is fully one-half over the old style of feeding by hand. Mr. Preston writes: I have four of your Automatic Self Feeders, and my mill men each and all say they are the best they have ever used. They are an improvement on all I have ever seen, being simple in construction, and good for either wet or dry crushing; refer to over 40 mills using them; they are guaranteed to give perfect satisfaction. Send for circulars.

F. OGDEN, 413 California Street, S. F.

PATENTED

CAST STEEL SHOES AND DIES.

Guaranteed Cheaper than the Best Iron.

IMPORTANT NOTICE.

Reduction in Price from 16 Cents
to 12 Cents Per Pound.

Owing to our largely increased business, the present low price of iron from which our Steel is manufactured, and the improved facilities for casting and forging, we take great pleasure in announcing that from and after this date we will supply our IMPROVED CAST AND FORGED STEEL SHOES AND DIES FOR QUARTZ MILLS at twelve cents per pound, delivered at San Francisco or Sacramento, instead of sixteen cents, as heretofore.

We also furnish Steel Plates for Blake and other Ore Crushers, Steel Gut Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

Address all orders, with dimensions or drawings, to

CAST STEEL SHOE & DIE CO.,

59 Nevada Block, S. F.



GOLD, SILVER AND COPPER MINING.



Address, FRASER, CHALMERS & CO., Chicago, Ill.

Hoisting Engines, Diamond Pointed R. C. Drills. Manufactured by M. C. BULLOCK.

Continued from page 381.

from \$50 to \$5,000 per ton in silver. The ledge, which is situated near the Eagle mine, is called the Vandewater, and is owned by L. F. Dunn, L. A. Moore and V. Smith. A shaft has been sunk on it to the depth of 20 feet, at which depth the vein carries four feet of ore that assays on an average \$75 per ton. The course of the vein is nearly due north and south, and some of the ore shown resembles that produced by the Moonlight, which worked \$400 per ton. We are informed that old miners pronounce the Vandewater ore of the best prospects for a good mine ever discovered in the county.

OSCEOLA DISTRICT.

THE NEW CAMP.—Pioche Record, June 9: On Sunday evening Dr. S. L. Lee and Jim Mattson returned here. After their return an account was given of that camp, and what was doing. Dr. Lee showed some specimens of coarse gold that he had washed from three panfuls of dirt—the gold amounting to about one dollar—and also some specimens of gold quartz taken from the Golden Eagle ledge, owned by Jim Mattson. The ardor of most of our prospectors was considerably dampened when told that all the claims to the placer diggings had been located. Preparations are being made to receive the mill which is to run on Golden Eagle ore. The water to run the mill will be brought a distance of about five miles, from some small lakes on Jeff Davis peak, which are accessible, and there will be no difficulty in getting the water to Osceola. A small dam has been built, and a good one, but there is no necessity of running wild over it.

WHITE PINE DISTRICT.

THE JENNIE A.—White Pine News, June 9: Superintendent Ford, accompanied by Messrs. Kendall and Williams, of San Francisco, arrived here the fore part of the week, and have since been engaged in examining the Jennie A. mine. These gentlemen seem to be well pleased with the prospects of their property, and they have reason to be, for we learn the mine looks splendid. By late assays it has been discovered that the ore carries \$10 to \$15 per ton in gold. This, we believe, is the first instance in which gold has been found in the ores of this section.

Arizona.

MINERAL PARK.—Arizona Enterprise, June 6: The Mineral Park mill was closed down after a most successful run of about five months, and must have "panned out" during that time not less than \$50,000. I have no means of estimating the average working value of the rock consumed during the run, but have it from good authority that rock has been worked which went as high as \$2,380 per ton. This is the highest pulp value of any ore worked in the mill since it has been running. I believe that one or two lots of ore have been worked that brought the owners in debt to the company, but that was before it was generally known that it took rock worth at least \$100 per ton to pay the millage and percentage. Since then we have not heard of assays giving less than \$105 per ton, and I have no doubt that the average assays of ore worked during the last five months has reached \$300. The greatest quantity of ore from any one mine was about 300 tons, taken out of the Lone Star. The balance was in lots of from one to twenty tons, and it is likely that 25 or more mines were represented. We feel quite confident that the mill will be started again soon. In the meantime work is being done, and ore taken out on many a claim, and prospecting is developing new mines all the time.

HACKBERRY.—From Hackberry reports come in very favorably in the shape of silver bullion; five large bars came in last Sunday morning. Only about 10 days before that, as much arrived, and was shipped to San Francisco. Material is being provided for the new mill, and before many weeks the machinery will be in place and at work.

PIMA.—The people of the southern part of the Territory expect much from the results to be achieved by the Pima company, and are anxiously waiting developments. This is in the Pima range. It is 10 feet wide and has been developed to a depth of about 100 feet.

In Arivaca district, upon the McCafferty lode, several locations have been developed to a depth of 30 or 50 feet. This ledge and some 13 other locations in the same vicinity will supply ore for the Sierra Colorado mill, which is soon to be erected upon the Arivaca ranch. The miners in the vicinity are anxiously awaiting the arrival of this mill, and have a lot of ore which will run up from \$200 up into the thousands, awaiting reduction.

REPORTS bordering upon the marvelous come to us from the Aztec district, which is newly discovered, and is in the neighborhood of the Santa Rita. Some wonderfully rich ore has been found and the surface indications are said to be excellent.

The Santa Rita placers, the most extensive in the Territory, are still being worked. Something over 400 men are at work there, and some of them are doing very well. The great trouble with this, as with all other placer mines in Arizona, is the scarcity of water.

In Maynard district, work is still being prosecuted upon the Bean mine, and the tunnel is being pushed in rapidly by two shifts. We understand that the controlling interest in this mine has recently been sold to parties in San Francisco.

The Silver Glance mining company have been very successful with their operations at Montezuma. They went into possession of the mine about a year ago, and since that time have made 21 miles of road, and built their smelter, which has since operated very successfully. It is a 30-inch water jacket with a Baker blower, and is of 12 tons capacity. There is a Corliss engine, and it is a first-class outfit. They have also a small reverberatory furnace, used for reducing ferris to copper matte. The mine has been developed by means of a tunnel, which is now in 130 feet, and the mine has been opened by crosscuts and drifts on the surface about 3,000 feet. About 50 tons of bullion and copper matte have been made. The bullion is high grade.

Work is still going on upon the McCracken, which is now down to a depth of 525 feet. The ore-dumps are full, and there is ore enough out to supply the new 20-stamp mill.

In this county the Tip-Top, in Humburg district, makes a fine showing. Some of the ore taken out at a depth of 90 feet is marvelous—solid chunks of horn silver.

PECK DISTRICT.—Things are coming to look bright once more in the Peck district. There are some 30 men employed in the Peck mine, and tons of very rich ore are being taken out from the mine daily.

In Turkey Creek district, Hamilton & Co. are sinking on the Trinity, and taking out very rich rock.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

MINEBATH BELLE S. M. Co.—June 8th. Location: Look-out District, Inyo county. Directors—Wm. F. Cashman, Jas. B. Peck, J. H. Jacobs, Robt. Sheehy and Chas. M. Blair.

KING M. & SMELTING Co.—June 8th. Location: Nevada. Capital stock, \$10,000,000. Directors—John O. Earl, F. L. Weaver, A. R. Baldwin, Joseph Tyson and N. C. Fasset.

ALTA PETROLEUM Co.—June 11th. Object: To work and manufacture asphaltum, coal tar and all products of asphaltum and petroleum. Directors—C. E. Convis, T. E. Atkinson, Giles H. Gray, J. D. Hooker, Dorville Libbey, S. N. Putnam and Henry Kimball. Capital stock, \$500,000.

PAULADES G. & S. M. Co.—June 10th. Location: Nevada. Capital stock, \$1,000,000. Directors—T. J. Bell, T. B. Ludlum, J. J. Dunne, W. P. Willard and E. W. Sawyer.

PAULADES G. & S. M. Co.—June 13th. Location: Ward district, Nevada. Capital stock, \$700,000. Directors—T. J. Bell, T. B. Ludlum, J. J. Dunne, W. P. Willard and E. W. Sawyer.

EDWIN M. Co.—June 13th. Location: Butte county, Cal. Capital stock, \$2,500,000. Trustees—J. W. Wesson, Geo. McDonald, C. M. Claves, A. B. Paul and T. E. Wingard.

PATENTS AND INVENTIONS.**A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.**

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

- FOR WEEK ENDING MAY 22d, 1877.
101,022. PLOW.—J. D. Bowen, Roseburg, Ogn.
101,072. FRUIT DRIER.—W. S. Plummer, Portland, Ogn.
101,101. CULTIVATOR.—N. T. Brewster and A. D. Neher, Roseville, Cal.
101,194. WOOD PAVEMENT.—H. M. Stow, S. F. TRADE-MARK.
4,658. ZEPHYR WOOL.—Bauer, Tobriner & Co., S. F. LABELS.
1,065. STEELE'S PAIN ERADICATOR.—Crane & Brigham, S. F.
FOR WEEK ENDING MAY 20th, 1877.
101,271. PUMP PLUNGER.—H. H. Tuttle, San Jose, Cal.
101,301. WASHING MACHINE.—Daniel Best, Auburn, Oregon.
101,303. FRUIT DRIER.—R. B. Blowers, Woodland, Cal.
101,315. SCREW THREAD COUNTER.—C. C. Coleman, Honolulu, Hawaii.
101,331. PEN RACK.—H. W. Foreman, Golden City, Cal.
101,332. ROTARY PLOW.—W. Freeborn, S. F.
101,342. SULKY PLOW.—F. A. Hill, San Leandro, Cal.
101,347. CULTIVATORS.—J. Jones, Stony Point, Cal.
101,351. ORE ROASTING FURNACE.—H. G. Livermore, S. F.
101,354. RAWHIDE BELTING ROPE.—H. Royer, S. F.
101,378. PROCESS OF PREPARING COFFEE.—F. Silver, S. F.
101,380. OIL AND FILTER CUP.—A. J. Stevens, Sacramento, Cal.
101,383. SASH FASTENER.—T. Stewart, S. F.
101,384. IMPLEMENT FOR OPENING OYSTERS.—T. W. Temple, Los Angeles, Cal.
101,391. CUBE SUGAR MACHINE.—F. Westerman and O. Mursch, S. F.
101,394. STUD FASTENER.—M. Zacharias, S. F.
101,404. COPYING TELEGRAPH.—L. Pickering, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

ROTARY PLOW OR CULTIVATOR.—William Freeborn, San Francisco. This invention relates to an improved cultivator or rotary plow for digging and turning the soil, and it consists of a series of concave-convex flanges or mold boards, arranged spirally around a horizontal shaft in such a manner that when the shaft is rotated the mold-board will cut and turn the soil in furrow slices. The curve and overhang of the spiral are so arranged that while rotating the soil will be turned in the same manner as by an ordinary plow. Successive furrows of the same length are cut diagonally across a strip of ground in width equal to the length of the hub of the rotating mold-boards. This rotary plow can be mounted in any suitably constructed frame and can be operated by animal, steam or other power. The advantages gained by the use of this plow as claimed by the inventor are as follows: 1. Economy; as a much greater surface of ground can be plowed over in the same time with the same expenditure of power, than by the present mode. 2. Better work; this manner of plowing avoids sole friction and leaves the ground under the furrow in the same condition as it was previously. 3. Equal twisting and cracking of furrow slice and as complete inversion of the same as by the present mode. 4. The whole field can be plowed without leaving head lands in any part of it. 5. This plow can be operated more economically by steam than any other, as the motion of the revolving mold-boards is in the line of direction; consequently the lightest engine consistent with requisite steam capacity can be used. 6. In consequence of the compact form of this plow when operated by steam, harrowing and seeding can be done at the same time as the plowing.

OIL AND FILTER CUP.—Andrew J. Stevens, Sacramento. This invention relates to a novel construction for oil cups, such as are employed to supply lubricating material to machinery, and it consists in the employment of a double cup, in which the lubricant is first filtered and purified, and secondly passed to a receptacle, from whence by suitable adjustment it is allowed to flow in the necessary quantities to the part to be lubricated.

OYSTER KNIFE.—T. W. Temple, Los Angeles. The patent covers an improved implement for opening oyster shells, after they have been split or serrated by a splitting machine invented by the same patentee. It consists of a handle in which are secured two blades, one of which is fixed and the other adjustable. The implement is simple and easily handled and is quite effective as an oyster opener.

STUD FASTENING.—M. Zacharias, S. F. This improved fastening is intended more especially to fasten into minute holes in the shirt front, such as have heretofore been used in connection with a spiral fastening. This fastening is very simple and effective, as it can be inserted and fastened without trouble and without rumpling the shirt front.

WASHING MACHINE.—Daniel Best, Auburn, Oregon. The improvement in this washing machine consists in combining an endless rubbing belt with two or more pressing rollers which are arranged above the belt. This machine will wash articles of all sizes from the smallest pieces of lace to the largest blankets.

BELTING ROPE.—Hermann Royer, S. F. The object of this invention is to provide an improved article of belting rope, which shall be free from the fault of stretching too much or being too stiff to move freely around small pulleys, and a liability to crack and break off by use. Round rope, of various kinds, is largely employed for the purpose of driving groove pulleys, and it is very difficult to obtain an article which will work well and be durable. When these ropes are made of leather, which has undergone the ordinary process of chemical tanning, they are inferior in tensile strength from the effects of the tanning. When made of pure rawhide these ropes are too stiff to run well on small pulleys; they will stretch too much, and from their stiffness, will eventually cut and break, and wear out. This invention consists in making ropes of fulled or mechanically prepared rawhide, and it is done by first preparing the hide mechanically, by a method previously patented by the same inventor, or by any other means for rendering rawhide pliable without tanning or other chemical process. After the hide is made pliable it is cut around in long threads and these threads are cemented together and wound upon spools or bobbins, and twisted or plaited into rope. The rope made of this prepared rawhide possesses all the strength of the original hard rawhide, and it has the elasticity necessary for belts without the tendency to stretch. It is unaffected by time or atmospheric changes. The advantages are its pliancy and elasticity without the fault of continuous stretching, its greater adhesion to the groove pulleys, and the ease with which splices can be made without making unsightly enlargements at the point of junction.

FRUIT DRIER.—Russell B. Blowers, Woodland, Yolo county. This patent covers certain improvements on a former invention of the patentee. In the previous patent he claimed a heating chamber surrounded by drying rooms with doors and a draft chimney to produce a laterally and downward moving current of air for the purpose of drying fruit and other substances. The present improvements consist in the employment of reversible air currents and a mechanism by which this is accomplished, and also in a means for admitting large quantities of air and bringing them into contact with the heaters so that it will all be heated before passing into the chambers. In order to dry economically by artificial means, it is necessary that any apparatus built for the purpose should be able to dispose of large quantities of the material to be dried in a short time; and as the capacity of air for carrying off moisture is limited, it is necessary to pass it through the apparatus rapidly and in large volumes without the use of expensive blowers or other machinery for producing a draft. This is accomplished by Mr. Blowers by means of the draft chimney and passages described in the previous patent, and he has found that with certain additions the apparatus may be made useful in drying lumber, fish, hops, chicory and various other substances.

COMPRESSED COFFEE.—Frank Silver, S. F. This invention differs from other preparations in which a combination of coffee and sugar is used in this: that the inventor does not employ the sugar for the purpose of utilizing its sweet principle; but he puts it through a preparatory treatment which destroys the sweet principle and imparts to it a quality very nearly resembling coffee both in color and taste. Ground coffee soon loses its flavor, and as it is very inconvenient in many cases for persons to roast and grind coffee, as fast only as it is required for use, any process which will supply the market with a coffee fit for immediate use, and one which will not lose its flavor or deteriorate with age, will be of value, especially to travelers and persons living at a distance from market. Ground coffee can be easily preserved by being consolidated into blocks or cakes, if a suitable ingredient is employed to cement or conglomerate the grains together, and at the same time not affect the decoction after it is prepared for drinking. Melted sugar has been used for this purpose, but the deliquescent quality of such sugar caused the blocks or cakes to liquify and melt down. This invention overcomes this difficulty, by making the preparation of burnt sugar and coffee mixed in a certain manner and compressed in cakes or blocks.

CUBE SUGAR MACHINE.—Francis Westerman and Otto Mursch, S. F. The object of this invention is to provide an improvement in that class of apparatus which is designed for the conversion of granular sugar into solid cubes for market, and it consists in the employment of molds which have a reciprocating motion, alternately beneath a hopper containing the loose sugar, and beneath a series of stationary punches. At the end of each movement these molds are forced upwards, first into a mass of sugar, which has been cut off from the filled hopper by a slide, so that the molds are filled, and then beneath the stationary punches, which thus extract the sugar from the molds and leave it upon a surface for removal. These operations are carried out by means of suitable cams and levers. These molds can be easily removed bodily for cleaning and others substituted without delaying the work and the molds are easily washed ready for replacement, thus avoiding one of the most troublesome features of cylindrical or other shaped machines where the

molds are stationary and the punches movable; or where springs are used, as all the parts become speedily gummed up and rendered useless unless they can be easily cleaned without stopping the operation for any great length of time.

ORE ROASTING FURNACE.—H. G. Livermore, S. F. The improvements in this patent are especially useful in connection with furnaces which are intended to extract quicksilver from its ores. It consists in the employment of a secondary or supplemental fire, which heats the ore from below the floor over which it passes, and in the employment of the waste heat from the furnaces for drying the moisture out of the pulverized ore which is spread in thin layers upon pans over the condensers and furnace. A blast of hot air may also be introduced above the body of ore in the furnace at some point between the feed and discharge openings so as to assist in roasting the ore more effectually. As the construction of Mr. Livermore's furnace necessitates the pulverizing or breaking of all the ore into small pieces, it will only be necessary to provide machinery for this purpose; but most of the cinnabar mines produce from one-half to two-thirds and often more of the ore in this fine condition, so that the expense will be comparatively small, and the inventor is thus enabled to avoid all the expense of mechanical furnaces, or elevating devices for bringing the ore to the furnace, and even the vacuum or blast apparatus, generally necessary, can be dispensed with.

SULKY PLOW.—Frank A. Hill, San Leandro. Mr. Hill's latest improvement in sulky plows consists in mounting the crank axles upon which the bearing wheels of the plow are mounted, in reverse positions, so as to throw one of the wheels in advance of the other for convenience in turning the plow at the end of the furrow. This arrangement also provides a more convenient disposition of the levers by which the crank axles are adjusted. Mr. Hill also provides a novel arrangement for attaching the rear plow to the plow-beam where two plows are to be used, and detaching it therefrom when it is desired to use it as a single plow. These improvements render the sulky plow much more convenient and easily operated.

SCREW THREAD COUNTER.—Chas. C. Coleman, Honolulu, Hawaiian islands. The object of this invention is to provide a ready and convenient means for determining the number of threads or taps, dies, bolts, nuts, and other articles, and it consists of a series of plates riveted together and having their edges serrated to represent the different threads usual to screws. Either of these plates may be turned out from the others and by trying its serrated edge upon the threads of the screw a glance will show whether it is the gauge sought. With this mechanism the necessary counterpart for a bolt or nut is expeditiously determined.

CULTIVATOR.—John Jones, Stony Point, Sonoma Co. This invention relates more particularly to that class of plows or cultivators in which the plows or cultivator teeth are attached to the two diverging timbers of a V-shaped frame, which frame is mounted upon two rear wheels and a front swivel or steering wheel. The improvement consists in a novel combination of levers for enabling the driver to raise and lower the frame and plows without leaving his seat. The arrangement of levers is very simple and convenient, and the power of the driver is applied to the best possible advantage.

SASH LOCK AND FASTENER.—Thomas Stuart, S. F. This improvement consists in constructing a sash lock and fastener with two bolts, one of which serves to lock the two sashes together, while the other locks into suitable notches in the window casing. It also consists in providing bolt sockets in the sashes, which also serve as finger sockets to permit the introduction of the end of the finger for convenience in raising and lowering the sash. This fastener and lock will secure the sashes firmly together and to the casing at whatever position the sashes are moved to, corresponding with the position of the sockets.

AMERICAN MANUFACTURES IN ENGLAND.—The following significant paragraph is from a Birmingham letter in the London Times: "In addition to locks and hardware of various kinds, the Americans are now sending into this district large quantities of machine-made boots and shoes, which find a ready sale, owing to their cheapness and neatness of appearance." The New York Bulletin adds: "It will be the turn next, perhaps, of machine-made ready-made clothing, machine-made hats and caps, etc. There is scarcely any limit to American ingenuity in machine-work, and in times like these it is only ingenuity that can obtain a footing in the European manufacturing markets."

The California mining company, on Monday, paid \$77,914 to the county, and Consolidated Virginia \$14,476, being the bullion tax due for the quarter ending March 31st. The other mines also paid, the total aggregating \$97,921. The Consolidated Virginia shipped, on Monday, \$335,621, and the California, on the new month account, \$208,759, and has in the office \$160,000. The California mill reduced 8,500 tons of ore from the 1450-foot level of the Consolidated Virginia, producing \$629,856; netting \$109.40 per ton.

Free Reading Room in Oakland.

The public spirited people of Oakland have done a thing for the good of the young men which we think could be done in other towns to advantage. They have furnished and equipped a free reading room and it was opened formally on Friday evening of last week. Of the opening, the *Oakland Transcript* says: "Henry Vrooman, President of the Association, very greatly to his regret and that of the audience, was unable to be present. The substitute, Dr. Dio Lewis, unanimously selected as Chairman for the evening, worthily filled his place. Speeches were made by Rev. L. Hamilton, Charles N. Fox, and D. L. Emerson. By far the finest off-hand speech of the evening was made by Daniel Kilpatrick. Although an humble journeyman tailor, he fairly eclipsed the doctor, the lawyer, and the clergyman in his speech. It was witty, fitting, and pertinent to the occasion, and was rapturously applauded."

The Musical Club, at intervals during the evening, discoursed most delicious music. A solo by the wife of Prof. Ogilby, of the State University, was received with tumultuous applause. At the suggestion of Mr. A. T. Dewey, who, by the way, has been the grand moving spirit of this enterprise, blank notices were circulated among the audience, asking subscriptions for the permanent support of the enterprise.

In order that our readers in other parts of the State may know some of the objects of the enterprise we quote from a circular as follows:

The association is designed to promote greater unity of feeling and action in the community for the accomplishment of literary and other good works. It will endeavor to properly maintain a place where the young and the old, the rich and the poor, the representatives of every trade and calling may meet upon terms of social equality; a place to which strangers may come, and in which they can engage their unemployed hours pleasantly to themselves and profitably to each other.

The society differs, in some respects, from all other organizations, and its members hope to increase its strength and wisdom until enabled to introduce new benefits for the patrons of the institution. It will be a constant effort to make the work of the association such as will be an unfading honor to the fair fame of our city, at home and abroad.

In California, more perhaps than in older portions of the country, are needed, especially for the young, places of this character in which the attractions shall be even stronger than the temptations of other places of resort which are often the starting points of a career to ruin. Our aim is to refine and to improve. Our motto is to do as much good as possible with as little harm as possible.

Officers of the Association.

President, Henry Vrooman; First Vice President, W. H. Jordan; Second Vice President, Mrs. J. M. Selfridge; Secretary, J. R. Porter; Treasurer, Mrs. J. I. Spear. [Ex-officio members Board of Directors.]

Directors—L. L. Alexander, Mrs. C. H. Chamberlain, Mrs. C. M. Shepard, Mrs. Jos. McGillivray, Mrs. C. L. Pierson, Mrs. E. J. Grayson, Dr. Dio Lewis, G. W. Armes, A. I. Gladding, David Kilpatrick, A. W. Swett, A. T. Dewey, E. W. Playter.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

The station at the 1900-foot level of the Ophir is now opened and they will soon commence drifting. Lots of water on the 1700-foot level.

The southeast drift on the 1150-foot level of the Utah has reached the east wall.

They have started drifting west from the upraise of the 1465-foot level of the Mexican.

In the Justice the south lateral drift, 1050-foot level, is found to contain a very fine character of quartz with metal more evenly disseminated throughout; this drift is being pushed ahead with all due diligence.

Chollar ore averages \$24 per ton. The south drift, 1100-foot level of the Overman, is in quartz showing small bunches of good ore.

Eureka (G. V.) cleaned up last week 200 ounces of amalgam.

In the Eureka Con. the ore body on the fifth level is still holding out strong. Have sunk winze in ore body to the depth of 50 feet and still in ore. In drifting on the sixth level cut through a streak of ore, from four to six feet in width, which assays well. Have also come upon ore in seventh level. The furnace is putting out over 10 tons of bullion daily, average assay value \$210.62 per ton; five tons of ore to make one of bullion. Shipment of bullion for the last eight days has been 80 tons. Will soon start up another furnace.

The strong flow of water in the Hale & Norcross continues.

At the C. & C. shaft they have lined the south compartment from the surface to the bottom to receive a downcast of air.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Pond and Skating Rink.

Dine at the Palace Restaurant, 218 Sansome St., S. F.

Signal Service Meteorological Report.

Week Ending June 12, 1877, S. F.							
HIGHEST AND LOWEST BAROMETER.							
June 6	June 7	June 8	June 9	June 10	June 11	June 12	
29.88	29.84	29.93	30.02	30.01	29.91	29.81	
29.81	29.78	29.85	29.98	29.95	29.80	29.76	
-MINIMUM AND MAXIMUM THERMOMETER.							
67	73	87	88	80	92	88	
53	54	65	62	63	62	64	
MEAN DAILY HUMIDITY.							
57	54	28	41	46	39	56	
PREVAILING WIND.							
W	W	NW	W	W	W	W	
WIND—MILES TRAVELED.							
221	224	330	176	190	180	206	
STATE OF WEATHER.							
Clear.	Clear.	Clear.	Clear.	Clear.	Clear.	Clear.	
RAINFALL IN TWENTY-FOUR HOURS.							
Total rain during the season, from July 1, 1876, 11.03 in.							

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Booth Gold Mining Company.—Location

of works, Auburn, Placer County, California. Notice.—There are delinquent upon the following described stock, on account of assessment No. 2, levied on the thirtieth day of April, 1877, the several amounts set opposite the names of the respective shareholders:

Names.	No. Certificate.	No. Shares.	Amount.
Chenery, R., trustee.....	12	100	5 00
Chenery, R., trustee.....	14	100	5 00
Chenery, R., trustee.....	15	100	5 00
Chenery, R., trustee.....	168	50	2 50
Thos. Thos. trustee.....	148	500	25 00
Fry, E. M., trustee.....	88	750	37 50
Gordon, R. N., trustee.....	25	250	12 50
Gillman, Henry.....	38	300	15 00
Gordon, Thos H., trustee.....	52	100	5 00
Gordon, Thos H., trustee.....	68	1000	50 00
Gordon, Thos H., trustee.....	112	100	5 00
Gordon, Thos H., trustee.....	114	100	5 00
Gordon, Thos H., trustee.....	116	100	5 00
Gordon, Thos H., trustee.....	117	100	5 00
Gordon, Thos H., trustee.....	118	100	5 00
Gordon, A. C., trustee.....	122	1000	50 00
Gordon, A. C., trustee.....	123	100	5 00
Gordon, A. C., trustee.....	124	100	5 00
Gordon, A. C., trustee.....	125	100	5 00
Gordon, A. C., trustee.....	126	100	5 00
Miller, G. A., trustee.....	43	50	2 50
Richardson, E. A., trustee.....	150	100	5 00
Spinney, Geo R., trustee.....	28	100	5 00
Spinney, Geo R., trustee.....	82	312	15 60
Spinney, Geo R., trustee.....	95	1000	50 00
Spinney, Geo R., trustee.....	99	500	25 00
Spinney, Geo R., trustee.....	100	100	5 00
Spinney, Geo R., trustee.....	101	100	5 00
Spinney, Geo R., trustee.....	102	100	5 00
Spinney, Geo R., trustee.....	103	50	2 50
Spinney, Geo R., trustee.....	104	50	2 50
Spinney, Geo R., trustee.....	105	50	2 50
Spinney, Geo R., trustee.....	106	50	2 50
Spinney, Geo R., trustee.....	149	500	25 00
Van Brunt, R. N., trustee.....	7	100	5 00
Van Brunt, R. N., trustee.....	8	100	5 00
Van Brunt, R. N., trustee.....	9	100	5 00
Van Brunt, R. N., trustee.....	10	100	5 00
Van Brunt, R. N., trustee.....	11	100	5 00

And in accordance with law and an order of the Board of Directors, made on the thirtieth day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the salesroom of J. Middleton & Son, No. 310 Montgomery Street, San Francisco, Cal., on the twenty-fifth day of June, 1877, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office, No. 320 California Street, Room No. 5, San Francisco, Cal.

Consolidated Bonanza Gold and Silver Min-

ing Co.—Location of principal place of business, San Francisco, California. Location of works in Eagle and Washoe Valley Mining District, Ormsby county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the fourth day of June, 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Tuesday, the tenth day of July, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the thirty-first day of July, 1877, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Directors.

WM. MARTIN, Secretary.

Office No. 19 First Street, San Francisco, Cal.

Empire Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, Silver City, Owyhee County, Idaho Territory.

Notice.—There are delinquent upon the following described stock, on account of assessment No. 13, levied on the 26th day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Balcom, C. F., trustee.....	243	100	\$100 00
Miner, A. P., trustee.....	490	100	100 00
Miner, A. P., trustee.....	578	20	20 00
Schmiedell, Hochstadter & Co., trustee.....	607	100	100 00
Fisher, E., trustee.....	608	25	25 00
Warren, J. B., trustee.....	986	5	5 00
Schmiedell, Hochstadter & Co., trustee.....	1007	100	100 00
Schmiedell, Hochstadter & Co., trustee.....	1116	10	10 00
Schmidt, C. A., trustee.....	1125	10	10 00
Woods & Froehner, trustee.....	1205	20	20 00
Fisher, E., trustee.....	1234	100	100 00
Noble & Co., H. H., trustee.....	1315	5	5 00
Noble & Co., H. H., trustee.....	1348	25	25 00
Dixon, T. H., trustee.....	1433	150	150 00
Noble & Co., H. H., trustee.....	1445	100	100 00
Noble & Co., H. H., trustee.....	1446	100	100 00
Noble & Co., H. H., trustee.....	1457	100	100 00
Johnson, J. M., trustee.....	1511	50	50 00
Swift, J. M., trustee.....	1512	40	40 00
Johnson, J. M., trustee.....	1533	5	5 00
Dodge, Geo S., trustee.....	1539	2	2 00
Classen, J. M., trustee.....	1540	2	2 00
Noble & Co., H. H., trustee.....	1544	20	20 00
Willis, William, trustee.....	1552	100	100 00
Callaghan, Lynch & Co., trustee.....	1677	20	20 00
Brooks & Lee, trustee.....	1706	50	50 00
Schmitt, C. A., trustee.....	1736	20	20 00
Hickox, Kuhl & Co., trustee.....	1746	50	50 00
Noble & Co., H. H., trustee.....	1748	100	100 00

Names.	No. Certificate.	No. Shares.	Amount.
Hosmer & Bourne, trustee.....	1753	35	35 00
Major, D. G., trustee.....	1769	400	400 00
Hall & Charles, trustee.....	1783	100	100 00
Gordon, C. P., trustee.....	1796	50	50 00
Carroll, James, trustee.....	1806	25	25 00
Willis, William, trustee.....	1830	50	50 00
Willis, William, trustee.....	1831	50	50 00
Willis, William, trustee.....	1833	50	50 00
Willis, William, trustee.....	1834	100	100 00
Willis, William, trustee.....	1835	50	50 00
Willis, William, trustee.....	1840	100	100 00
Willis, William, trustee.....	1841	100	100 00
Willis, William, trustee.....	1842	100	100 00
Willis, William, trustee.....	1843	100	100 00
Willis, William, trustee.....	1844	100	100 00
Willis, William, trustee.....	1845	100	100 00
Willis, William, trustee.....	1846	100	100 00
Willis, William, trustee.....	1847	100	100 00
Hubbard & Co., trustee.....	1855	50	50 00
Willis, William, trustee.....	1856	50	50 00
Hill & Kilgour, trustee.....	1894	50	50 00
Wakelield, S. B., trustee.....	1895	50	50 00
Taylor, A. C., trustee.....	1902	25	25 00
Taylor, A. C., trustee.....	1903	25	25 00
Hagrin, L. T., trustee.....	1907	50	50 00
Noble & Co., H. H., trustee.....	1908	100	100 00
Noble & Co., H. H., trustee.....	1909	50	50 00
Willis, William, trustee.....	1910	50	50 00
Willis, William, trustee.....	1920	100	100 00
Willis, William, trustee.....	1923	100	100 00
Willis, William, trustee.....	1924	100	100 00
Willis, William, trustee.....	1925	100	100 00
Willis, William, trustee.....	1926	100	100 00
Willis, William, trustee.....	1930	100	100 00
Willis, William, trustee.....	1933	100	100 00
Willis, William, trustee.....	1940	100	100 00
Willis, William, trustee.....	1944	100	100 00
Willis, William, trustee.....	2014	100	100 00
Willis, William, trustee.....	2017	100	100 00
Willis, William, trustee.....	2019	100	100 00
Burtell, J. M., trustee.....	2022	100	100 00
Wolf, F., trustee.....	2023	50	50 00
Varum, Tolent, trustee.....	2030	50	50 00
Higgins & Conkling, trustee.....	2039	100	100 00
Callaghan, Lynch & Co., trustee.....	2057	50	50 00
Crocker & Gunnett, trustee.....	2062	100	100 00
Crocker & Gunnett, trustee.....	2063	50	50 00
Crocker & Gunnett, trustee.....	2064	50	50 00
Willis, William, trustee.....	2068	100	100 00
Willis, William, trustee.....	2068	100	100 00
Hubbard & Co., trustee.....	2072	50	50 00
Hubbard & Co., trustee.....	2073	10	10 00
McClintock, Wm H., trustee.....	2092	50	50 00
McClintock, Wm H., trustee.....	2095	50	50 00
McClintock, Wm H., trustee.....	2097	50	50 00
Wakelield, S. B., trustee.....	2104	50	50 00
Hale, W. E., trustee.....	2106	35	35 00
Fry, Neal & Co., trustee.....	2108	500	500 00
Quinn, J. A., trustee.....	2114	100	100 00
Fry, Neal & Co., trustee.....	2187	100	100 00
Fry, Neal & Co., trustee.....	2197	100	100 00
Fry, Neal & Co., trustee.....	2198	100	100 00
Fry, Neal & Co., trustee.....	2199	100	100 00
Fry, Neal & Co., trustee.....	2200	100	100 00
Fry, Neal & Co., trustee.....	2201	100	100 00
Fry, Neal & Co., trustee.....	2204	100	100 00
McClintock, Wm H., trustee.....	2249	100	100 00
McClintock, Wm H., trustee.....	2252	100	100 00
McClintock, Wm H., trustee.....	2254	250	250 00
Crocker & Suydam, trustee.....	2258	100	100 00
Crocker & Suydam, trustee.....	2259	50	50 00

And in accordance with law, and an order of the Board of Directors, made on the twenty-sixth day of April, 1877, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the salesrooms of Maurice Dore & Co., No. 410 Pine Street, San Francisco, California, on Tuesday, the twenty-sixth day of June, 1877, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

WM. H. MCCLINTOCK, Sec'y.

Office, No. 330 Pine Street, Room No. 5, San Francisco, Cal.

Excelsior Silver Mining Company.—Loca-

tion of principal place of business, San Francisco, Cal. Location of works, Lincoln County, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 4) levied on the twenty-fourth day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,

SAN FRANCISCO, CAL.

Established for the Manufacture of

RAILROAD AND OTHER IRON

Every Variety of Shafting,

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

—ALSO—

Hammered Iron of Every Description and Size.

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. Box 2032, San Francisco, Cal., will receive prompt attention. Office: 16 First Street.
The highest price paid for Scrap Iron.

THE RISDON

Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,

SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure), All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

Directors:

Joseph Moore, C. E. McLane,
Wm. Norris, Wm. H. Taylor, J. B. Haggitt,
James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

THOS. PENDERGAST.....HENRY S. SMITH

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, Bet. Howard and Folsom

SAN FRANCISCO.

FULTON

FOUNDRY AND IRON WORKS.

HINCKLEY & CO.,

Manufacturers of

STEAM ENGINES,

Quartz, Flour and Saw Mills,

Hayes' Improved Steam Pump, Brodie's Improved Crusher, Mining Pumps, Amalgamators, and all kinds of Machinery.

N. E. corner of Tehama and Fremont streets, above Howard, San Francisco.

SHEET IRON PIPE.

Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make SHEET IRON and ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.
Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

SACRAMENTO BOILER WORKS,

37 Fremont St., cor. Mission, S. F.

HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

PACIFIC IRON WORKS,

First and Fremont Streets, between Mission and Howard, San Francisco, Cal.,

RANKIN, BRAYTON & CO.,

MANUFACTURERS OF

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING AND MINING MACHINERY, INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS, CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES, FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES, RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES, SUGAR MILL MACHINERY, WATER WHEELS, ETC., ALL OF THE LATEST AND MOST IMPROVED CONSTRUCTION.

Agents for the Allen Engine Governor, Cook's Boiler Feeder and Heater, Buckminster Rock Drills and Air Compressors, Wheeler's Ore Breaker, Etc.

GEO. W. FOGG, Supt.

HAWKINS & CANTRELL, MACHINE WORKS,

210 and 212 Beale Street, bet. Howard and Folsom Sts., - - San Francisco.

Manufacturers of

IMPROVED PORTABLE

Hoisting Engines,

For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

PHELPS

MANUFACTURING COMPANY.

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,

SAN FRANCISCO, CAL.

THOMPSON BROTHERS, EUREKA FOUNDRY,

Light and Heavy Castings of Every Description Manufactured.

Sole Proprietors and Manufacturers of

Lynch's Ventilating and Illuminating Tile, The Only Illuminating Tile Manufactured for Lighting Cellars, Basements and Dark Rooms which provides proper ventilation for such places.

129 and 131 Beale Street, BET. MISSION & HOWARD, SAN FRANCISCO

CALIFORNIA BRASS FOUNDRY,

No. 125 First Street, Opposite Minna,

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch.
J. H. WEED. PRICES MODERATE. V. KINGWELL.

California Machine Works,

119 BEALE STREET, SAN FRANCISCO.

BIRCH, ARGALL & CO.,

Builders of QUARTZ, SAW AND FLOUR MILLS,

Keating's Sack Printing Presses,

THE ECONOMY HYDRAULIC HOIST FOR STORES,

And General Machinists.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

Miners' Foundry and Machine Works,

CO-OPERATIVE,

First Street, bet. Howard and Folsom, San Francisco

Machinery and Castings of all kinds.

McAFEE, SPIERS & CO.,

BOILER MAKERS AND

GENERAL MACHINISTS,

Howard between Fremont and Beale Sts., San Francisco

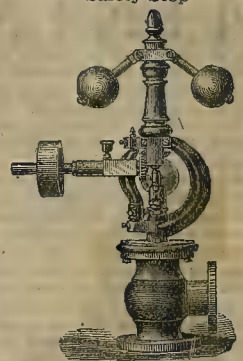
San Francisco Pioneer Screen Works,

J. W. QUICK, MANUFACTURER.

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.
32 Fremont Street, San Francisco.

The Gardner Automatic Safety-Stop Governor.

MORE THAN TEN THOUSAND NOW IN USE EVERY ONE WARRANTED.



SEND FOR DESCRIPTIVE CIRCULAR AND PRICE LIST

When all others fail, buy a "Gardner." We have all sizes of these celebrated Steam Governors on hand at all times.

BERRY & PLACE,

Selling Agents for the Pacific States,

Cor. Market & Fremont Sts., S. F.

THE VICTOR ROCK DRILL.

This machine is so simple in its construction that any person can understand and run it. The DOUBLE GOUGE BIT, patented with this Drill only, is one of its specialties, as it feeds and cleans itself. The machine is a hand Drill and can be operated by two men, who will do the work of ten in the ordinary way. In a word, it is a labor-saving machine which has no parallel, and as such we offer it to the public. For State or Territorial rights, or machines, apply to

MacDOWELL, KINZER & CO.,

216 Sansome street, San Francisco, Cal.

BLACK DIAMOND FILE WORKS.



G. & H. BARNETT,

Manufacturers of Files of every Description,

Nos 39, 41 and 43 Richmond street,

PHILADELPHIA, PA.

Sold by all the principal hardware stores on the Pacific Coast. LINFORTH, KELLOGG & CO., General Agents for the Pacific Coast.

HUNT, DOUGLAS & STEWART Process,

Used in Connection With PURVINE

Wooden Amalgamating Pans and Settler.

This is a complete, perfect and economical adaptation of the humid method to the treatment of Gold or Silver ores, associated with

COPPER

And other base metals, or to ores free from base metals. It can be adapted to any first-class Gold or Silver mill, at a reasonable additional expense.

For further information, address

J. O. STEWART,

Georgetown, Colorado.

Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING and TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 320 Sansome street, Room 10.



HYATT'S LIFE BALSAM.

As a conqueror of Rheumatism, Gout, Neuralgia, and cure for Scrofula and all diseases arising from impurity of blood, the old and reliable Family Medicine, Hyatt's Life Balsam, stands unequalled, as proven by over 300,000 great cures during the past 30 years. It is a radical vegetable compound of Sarsaparilla, Dock, Guaiacum, etc., and a permanent cure. Sold by all druggists and country grocers. Take nothing else, and if they haven't it we will send by express, boxed, everywhere, at \$1 and \$1.25 per bottle; \$5 and \$6.50 half doz. HYATT & HYATT, 246 Grand street, New York.

Don't trifle with a poor watch when you can buy a good one of Dewey & Jordan, 433 Montgomery street, San Francisco, at prices according to the times.

Machinery.

The Ingersoll Rock Drill



Is Extensively Used in the East and

TAKES THE PLACE OF ALL OTHERS,

Wherever introduced, because it can be run with less power, labor and repairs, and do more work than any other Drill in the market. It has but few parts, is easily handled, being light, and has AUTOMATIC FEED, which saves labor. WE ASK FOR TRIAL AGAINST ANY COMPETITOR. For particular information regarding Drills or Air Compressors, send for circular to

J. B. REYNOLDS,

320 Sansome Street

(Room 10.)

THE O'HARRA CHLORIDIZING FURNACE

Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing 20 Tons in 24 Hours by this Process:

One man.....	8 00
One ton.....	3 00
Wood—24 cords at \$3 per cord.....	6 25
Salt—1,600 lbs at 2 1/2 cents.....	40 00

Cost of 20 tons.....	\$52 25
Cost of one ton.....	2 61 1/2

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Consolidated Co.'s mines, in Peavine District, Nev., and at the Exchequer mill, Alpine Co., Cal. For further information, apply to

D. J. O'HARRA,

Reno, Nevada.

THE

LANE & BODLEY COMPANY,

John and Water Sts., Cincinnati, O.,

Sole Manufacturers of

BRUCKNER'S PATENT

REVOLVING FURNACE,

For Chloridizing, Desulphurizing and Roasting Ores.

—ALSO—

STEAM ENGINES, SAWMILLS, SHAFTING, GEARING AND MINING MACHINERY.

Send for our Illustrated catalogue.

BALANCE SLIDE VALVE.

THE ONLY PERFECT BALANCE SLIDE VALVE THAT IS MADE. Applied without extra charge to Engines manufactured by us.

PRESCOTT, SCOTT & CO.,

Cor. First & Mission Streets, San Francisco

MINING MACHINERY DEPOT,

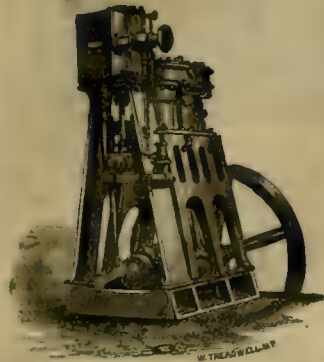
PARKE & LACY, 417 Market Street, S. F.

WALKER'S PATENT

Compound Steam Pump.

ECONOMY IN COST.
ECONOMY IN FUEL.

POSITIVELY UNEQUALLED FOR
SIMPLICITY AND DURABILITY.



Air Compressors,

ROCK DRILLS

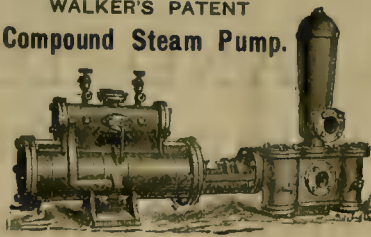
Tunneling Machinery.

COMPOUND STEAM PUMPS—WALKER'S.

Plunger Steam Pumps—Cope & Maxwell's.

BUCKET PLUNGER PUMPS—WRIGHT'S.

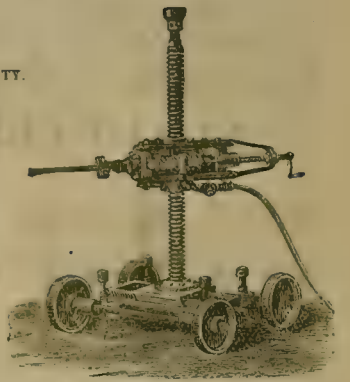
Centrifugal Pumps—Heald & Sisco's.



Machinists' Tools,

Planers & Matchers.

Putnam's.



Vertical Steam Engines, All Sizes—Haskin's.

Emery Wheels—Cosmopolitan.

TWIST DRILLS—MORSE'S.

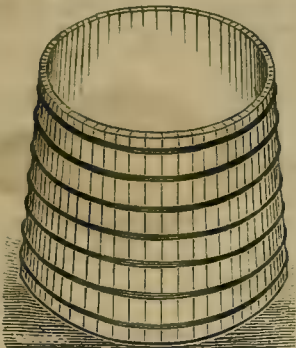
BATTERY FOR BLASTING—FARMER'S

EXPLODERS—HILL'S.

Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

VILLAGE HOOK AND LADDER TRUCKS,

Chemical Engines Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.



WATER TANKS of any capacity made entirely by machinery. Materials the best in use; construction not excelled. **Pan Staves, Tubs and Oak Guides** for mining purposes a specialty.

WELLS, RUSSELL & CO.,
Mechanics' Mills, Cor Mission and Fremont Streets

Really Important.

Dr. Noon's combined Electro-Magnetic Sudatorium Baths cleanse the system from Lead, Arsenical, Mercurial and other poisons. Will cure Rheumatism, Torpid Liver and Chronic Disorders. Our system is the most effective in the world, combining with all needed medicines, Hygiene-Oxygen Inhalations, Electric and Hydro-pathic treatment, all skillfully used as necessary. Often cures where others fail, and always in less time.

Dr. Noon has had much special, practical experience in the treatment of the disorders incidental to mining life. Consultations free.

HYGIENIC MEDICAL INSTITUTE,
635 California St., San Francisco.

MINERS, ATTENTION.

THE NEW ALMADEN MINES,
Santa Clara County, California.

Contracts for the Month of July, '77.

SHAFTS, DRIFTS AND WINZES.

Contracts given for one month. The Company reserve the right to reject any and all bids.

Bids will be opened on the last day of each month, at three o'clock P. M., at the Mine Office.

J. B. RANDOL, Manager.



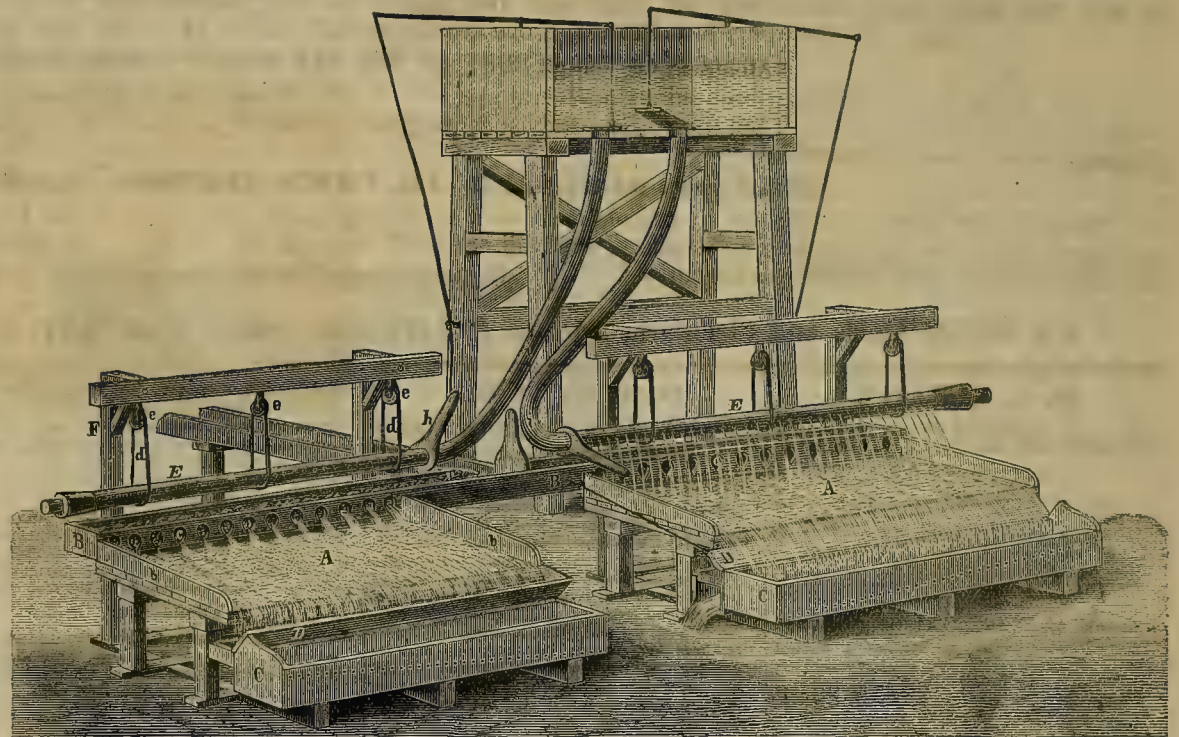
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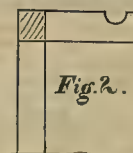
TOLLES IMPROVED CONCENTRATING TABLES.

Improved Concentrating Tables.

The illustration on this page represents an improvement in concentrating tables for ores recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by J. U. Tolles, of Virginia City, Nevada, who has been using the apparatus very successfully in several places. In the engraving, *A* represents a flat inclined table provided with a surfacing of cloth or other suitable material of any kind, and with the ledges *b*, to prevent the material from passing over the ends. *B* represents a peculiarly constructed feed box extending along the upper edge of the table and provided in its front side with a row of discharge openings, *c*, of the form shown, each narrowing down to its lower end and of such a size as the nature of the material requires. *C* represents a receiving box or trough, extending along below the lower edge of the table. *D* represents a leaf or board hinged to the rear side of the trough or box *C*, in such a manner that it may be turned under the edge of the table to conduct the valuable material therefrom into the box, the refuse passing over the edge of the table and discharged upon the ground, or into the box in the rear of the box *C*. *E* represents a rotating tube or pipe suspended lengthwise above the upper edge of the table by endless belts *d*, passing over pulleys *e*, supported in the rigid frame *F*, or by brackets fastened to the frame and extending out the proper distance over the table, the tube resting and rotating upon them as shown in Fig. 2. The tube is provided from end to end with a row of perforations, and with a hand lever, *h*, at one end, and is connected by a hose *i*, to a tank, pump or reservoir, delivering water at a pressure of from eight to 12 feet of head, as the nature of the case requires.

In operating the machine the feed box is narrowed to about one inch at its further end, or has a strip of board set edgewise in the bottom, and running obliquely across the same from the rear to the front side, causing the material to gradually be brought to the front and discharged through the feed holes *c*, upon the table, thereby insuring an even distribution and steady flow of the material to be treated; a steady and copious supply of water is maintained in the box, and the ores, sands or tailings introduced therein. The water escaping through the openings, *c*, flows down in a thin light stream over the face of the table. The mineral particles are deposited upon and retained by cloth or other surfacing material on the face or bed of the table, while the light refuse matter is discharged over the lower edge and discharged outside of the box *C*. After the collection of a suitable amount of metal upon the

table, the supply of water, etc., to the feed box is stopped by the gate and turned upon the other table. Clear water is now supplied to the fine pipe, *E*, and allowed to run down over the table, (for a moment) washing off the remaining refuse sands, and at the proper time the hinged leaf *D*, is drawn (by the rod) under the edge of the table, the pipe being rotated or turned and the water thrown through the perforations upon the table in a row of fine jets, forming an almost continuous sheet or film. By means of the lever *h*, (which should be fastened on the pipe at right angles to the line of perforations), the tube is turned and the sheet of water swept over the table from the top to the bottom so as to drive all adhering particles therefrom and wash them down into the box *C*. After this operation the jets are stopped from the tube, the leaf

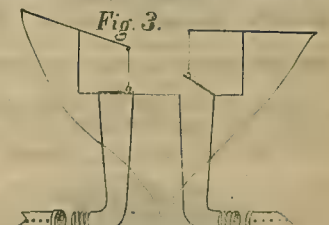


thrown back, and the gate shipped to the other feed box, the feed water coming back on the first table, the operation being repeated as often as it is seen the tables are charged with the sulphurets or other valuable metals.

By employing the proper kind of cloth, grooves, riffles, or copper plating, or all of them combined, and giving the tables the proper grade, and properly regulating the flow of water, the inventor finds that he can effect a very rapid and thorough separation without agitating the table, and without power of any kind except the manual labor requisite to change the feed from one table to another, and washing them off by means of the water used in the pipes; he also finds by the employment of the fixed table he can separate particles which cannot be retained in machines which vibrate. By use of the feed openings, *c*, of the form shown, the discharge of the sand, ore or other fine material is rendered very steady and gradual, as it will be carried through the narrower portion of the openings, while the lighter water will pass over the same through the upper large end of the openings, taking up the material very gradually and distributing it very evenly upon the table. It is obvious that the rotating tube may be sustained in any other manner, and that it may be connected in any suitable manner with the source of the water

The object in arranging the perforated pipe so that it can rotate is to permit a gradual change in the direction of the jets, so that their point of impact upon the table can be advanced from its upper to its lower edge, and thereby every portion of the surface subjected in turn to the direct impact of the jets, in order to effectually loosen and drive forward the particles therefrom.

The flow of water can be regulated by the valves operated by the cords. The gate shown in the feed trough, *G*, will throw the water into either feed trough as desired.



The plugs in the ends of the pipes, *E*, are for the purpose of freeing them of any obstructions.

Fig. 3 represents the most convenient form of erecting the tank or reservoir which supplies the tubes with water, it usually being placed directly overhead with water shed underneath.

Mr. Tolles with this apparatus does not profess to do what many others claim to do, but he is running many of them where everything else has failed. He has been running several of these tables on the Comstock for nearly two years and is now building more. By using the proper kind of sizing apparatus in connection with the tables, the inventor is doing some close work with them at a nominal expense of constructing, running and keeping in order. He states that any person using anything of like nature, or any portion of the same for like purposes, without first obtaining license for so doing, will be prosecuted for damages for such use. Persons at a distance can build and run them by first obtaining license and instructions from the inventor, John U. Tolles, at Eureka, Humboldt county, California, or W. S. Tolles, his authorized agent at Virginia, Nevada.

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SAN FRANCISCO, SATURDAY, JUNE 23, 1877.

VOLUME XXXIV.
Number 25.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Science was held on Monday evening last, R. E. C. Stearns in the chair. From J. A. Hosmer a skull and stone mortar were presented. They were found on Anacapa island, at the base of an artificial shell mound, the mound one of a number, and the shells chiefly those of abalone and mussel. Fragments of flint were scattered around, evidently left there by arrow-makers. Fossils of leaves from Blue Tent, Nevada County. Mr. J. R. Scupham, presented two bottled specimens of the *Gordius*, or hair snake, which is not uncommonly found in railway station tanks. One of the specimens, Mr. Scupham said, illustrates the readiness with which a mistaken opinion may be formed on the growth of these filamentous creatures. The two specimens exhibited were placed in a bottle and kept there two or three days, when it was discovered that a long white substance had been developed, apparently a progeny of young *Gordius*. In a little while there was a further increase, and the parties brought the bottle to him for examination. The real history of the animal's development is, that it lays eggs in the water, and these eggs require to be taken up by some insect, such as the cricket or the spider. From the egg they pass into the larva state, and then the insect has to die before the *Gordius* can be developed and come to perfection. The chances are one in 200,000 that all this will not occur, so that 200,000 eggs fail for one that reaches maturity. The creature provides for this by depositing more than this number of eggs. He had examined the specimen with the microscope, and found that in a very small part there is a multitude of ova, probably upwards of 200,000.

Mr. Stearns read a sketch of the life of Col. Ezekiel Jewett, a soldier and scientist, who died at Santa Barbara last May, at the age of 86 years. Deceased served with General Scott in the Canadian campaign of the war of 1812, afterward under the flag of Chile in the revolution from the domination of Spain, and in latter years became a scientist of note and high repute in the field of geology and paleontology. He was also an eager student of conchology.

Mr. S. B. Christy, of the University of California, read some "Notes on the Mt. Diablo Coal Mines." It was valuable as giving an analysis of the various grades of coal in the Mt. Diablo field, and in those of Livermore and Washington Territory. In the Mt. Diablo beds coal is chiefly taken from two veins, the Clarke and the Black Diamond. These lie about 400 feet apart, though sometimes at a greater distance. They are nearly parallel and have a strike northeast and west, with a dip of from 20° to 30° to the north. As usual, they lie between beds of sandstone, which change into bituminous shale as they approach the veins. The roof frequently shows impressions of leaves. Between these larger beds are numerous thin streaks of coal, most of which disappear; but one of them, the so-called middle vein, increases in size to the east until nearly as large as the Clarke vein itself. At the Black Diamond mine the Clarke vein is three feet thick, and at the other mines from two feet to two feet six inches. The Black Diamond vein is eight feet thick, but only four feet are workable, the rest being bone. Difference in brightness, color and luster make it only a matter of eyesight to separate the two coals when mixed on the dump. It is said the Clarke coal takes fire more readily, whilst the other gives more heat. Both crumble readily and are sulphurous. The acid sulphates they contain render the coals unsuited for use in boilers. The ligneous qualities of the deposit were pointed out, and the results of analysis given in connection with specimens from Livermore and the north. The Livermore coal, it was stated, has too much water and ash in its composition to be valuable, while some of the coal north is of fine quality.

THERE is a flurry in New York over the fact that Judge Hilton, head of the house of A. T. Stewart & Co., and proprietor of the Grand Union Hotel at Saratoga, has excluded Joseph Seligman, the well-known banker, from the hotel because he is a Jew.

The Hydraulic Mining Season.

Nearly all the gravel mines will soon be compelled to shut down until the rains come in the fall, and in the meantime the claims will be put in shape for advantageous working when the water is more abundant. Although the water season has been pretty short this year, owing to the scarcity of snow in the mountains, the work done has generally been pretty successful. A good many claims have been compelled to run with less water than they could have used advantageously, but still a general view of the gravel mining field shows a successful season's work, but now the pleasant work of final cleaning up is being done in a good many places, though in others they are still piping away at the banks and utilizing the water as long as possible.

Probably more attention has been called to

Improved Steam Engine Cut-off.

We illustrate herewith a new and simple cut-off, which is positive in its action, has few parts, has no springs or other appliances requiring constant attention and delicate adjustment, and is controlled by the governor so as to cut off steam, we are informed, at from 1-16th to 7-10ths of the stroke. Fig. 1 is a horizontal section through valve chest and cylinder, and Fig. 2 a view of the cut-off mechanism, all of which, it will be noticed, is easily accessible.

The cut-off valve, A, Fig. 1, works on the back of the main slide valve, so that, when either end of the cut-off is down, the steam is shut off from that end of the slide, which moves freely under the cover of the cut-off valve. The shaft of the cut-off valve, it will be observed, is squared in order to admit of the firm attachment of the valve. Where the shaft passes

Fig. 1

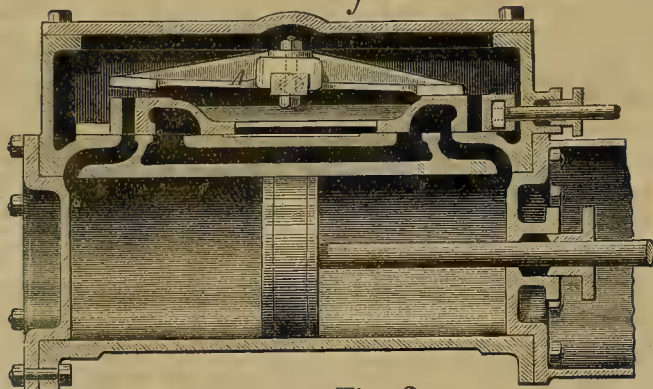
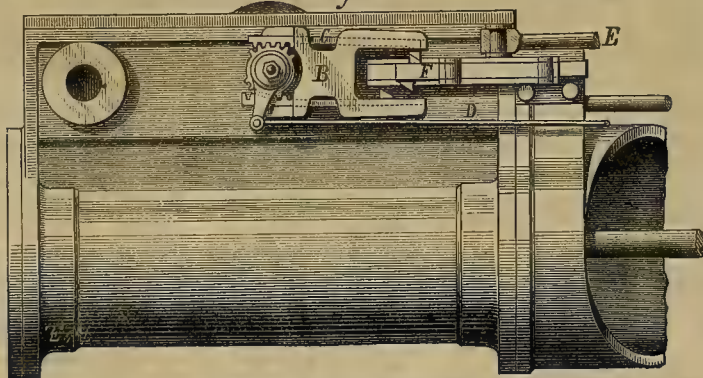


Fig. 2



FISH'S VARIABLE CUT-OFF.

the gravel mines of California this year than ever before; and capitalists seem readier to invest in this class of property than they have been heretofore. The depression in stocks in the city no doubt has worked favorably to both the quartz and gravel mining interests of this State. People who have been investing in silver mines have begun to think that perhaps there is something nearer home worthy of their attention in gold mines, and a great many sales of California mines have lately been made. Some of the big gravel mines which have been doing "dead work" for a long time, such as the North Bloomfield, are now in a shape to pay right along and the success of claims of this character does much to draw attention to this sort of mining. There is no prettier work in the world than hydraulic mining when the gravel is good and water and fall plenty; but as the big enterprises need a great deal of money to develop them, poor men cannot always take hold of ground that they are sure will pay. Capitalists have been too shy of this kind of property heretofore, but now they are beginning to have their eyes opened and next year we will no doubt see considerable more money invested in the gravel mines of California.

through the steam chest it fits into a simple bushing, next to which and within the chest there is a collar. The pressure of steam on the chest then forces the shaft outward, making a steam-tight joint between the collar and inside end of the bushing. The use of a stuffing box is thus avoided, and friction is greatly reduced.

Outside the valve chest, and rigidly attached to the rock shaft, is the rock lever, B. In this are guides (dotted lines) for rack bars, C, upon which bars are formed stops, as shown in Fig. 2. D is the governor rod, which, by a short lever, is connected with a pinion which is loose upon the valve rock shaft, and which engages the rack bars, C. It will be evident that any motion communicated to the pinion from the governor will cause the rack bars to advance and recede, and in this way the stops will be moved either nearer together or further apart, in horizontal direction. E is a rod which connects with a bell crank, which is vibrated by an eccentric on the main shaft. This rod moves a sliding bar, F, upon which toes or stops are attached. Inspection of Fig. 2 will show that as this bar reciprocates, the beveled sides of its stops will come in contact with the stops on the rock lever, B. And as one or the other pair of

stops come in contact, the result will be, as the sliding bar continues its motion, that the rock lever will be pushed to the right or left; the valve shaft will thus be vibrated, and consequently the cut-off valve itself will be brought down upon one or the other end of the slide. Now it is clear that the time when this vibration of the cut-off shall occur depends upon the time, sooner or later, when the stops on the sliding bar come in contact with the stops on the rock lever; and if the horizontal distance between the latter is decreased, then this contact will occur sooner, and steam will be cut off earlier in the stroke; while, if it be increased, just the reverse will obtain.

But the distance between the stops on the rock bar depends upon the relative position of the rack bars, C. By slightly converging their guides toward the end of the rock bar, the contact of these stops with those on the sliding bar tends to give the same angular movement to the lever, whether the former are at the outer or inner end of their travel. Then the governor, as already explained, regulates the position of the rack bars, C, and thus controls the action of the device. The inventor points out that the lift of the cut-off valve is very small and need not be more than half the width of the induction port. The outside lap of the cut-off valve is so proportioned in relation to the steam ports in the main slide valve that, when one end of the cut-off valve is down on the back of the main slide, shutting steam off from that end of the cylinder, the pressure on the back of the cut-off valve is equal to the difference of the pressure of the steam in the steam chest and the expanding steam in the cylinder. When the piston has arrived at the end of its stroke the main slide valve has moved back half its stroke, plus the lap and lead, to admit steam to that end of the cylinder; at the same time the main slide has closed the cylinder port at the other end of the cylinder; and its induction port has traveled past the end of the cut-off valve, admitting live steam to the under side of the plate, thus putting the cut-off valve in equilibrium. Consequently the sliding bar, which gives motion to the rock shaft lever, through the toes in the bar and the stops in the lever, has no other resistance to overcome than simply the inertia of the valve, when called upon to move it so as to cut off the steam. The device, we are informed, can be applied cheaply to engines that are now built or running, and requires but slight alteration to existing patterns.

For further particulars address the inventor, Mr. J. Fish, Summit, Union county, N. J.

LADY BRYAN.—The prospects for resuming work at an early day in this famous old mine are now favorable. The new management have made arrangement with the creditors to fund the entire indebtedness, amounting to about \$100,000. This is to be done by issuing bonds to each creditor to the amount of each one's claim. These bonds are to bear interest at the rate of 10 per cent. a year, and a reserve or sinking fund of 25 per cent. of all moneys received from assessments or bullion is to be devoted to paying the interest and redeeming these bonds.

The Treasury Department has issued a circular saying that it will exact from Steamboat Inspectors strict fidelity to the true intent and meaning of the 78th rule and the statute on which it is founded. The duty is enjoined upon Inspectors of frequent visits to excursion steamers in order to have personal knowledge that the equipments are kept up to the original requirements.

A DISPATCH from St. Johns, New Brunswick, received as we go to press, states that a terrible fire is raging at that place. The loss is estimated at between \$10,000,000 and \$15,000,000. Several lives are also reported lost. St. Johns has been peculiarly unfortunate in this respect, having passed through several similar disasters.

JUSTICE WORKMEN.—There are at present 639 men employed at the Justice mine, on the Comstock. This makes the daily expense for labor \$2,556, and for the month of June the pay roll will amount to \$76,680.

CORRESPONDENCE.

The Water Supply of Philadelphia.

R. L. M. Camden, Jr., a California boy who recently graduated in the East, in a letter to his father in this city, gives the following interesting facts concerning the water supply of Philadelphia:

In one of your recent letters you requested me to give you some facts and figures about the works which supply this city with what Paul Danton called "heaven's beverage, pure, cold water;" and in compliance with your request, I have gathered up a few items relating to the works referred to, and now present them to you, and hope they may prove interesting, if not instructive.

Philadelphia is supplied with water by five principal works, all located within the built-up portions of the city. On the east side of the Schuylkill river there are the Fairmount, Spring Garden, Kensington and Roxborough water works, each with a capacity, respectively, of 35,000,000, 43,000,000, 15,000,000 and 13,000,000 gallons in 24 hours; and on the west side of the Schuylkill is the Belmont water works, with a capacity of 18,000,000 gallons in 24 hours. Hence, if each set of pumps were worked up to their full capacity, the city would receive 124,000,000 gallons each day; but the actual amount taken from the reservoirs and distributed through the city is on an average only 41,362,082 gallons per day, or say 15,097,160,069 gallons in a year. The number of gallons actually used in a day or year looks very large, and is, in fact, very large; but it must be remembered that fully a million of people, with all their varied occupations, are the recipients of this water, and that it is spread over 120 square miles of territory.

The water is supplied through about 600 miles of street service mains, and the length of the small pipes which conduct the water from the mains to the stores, houses, factories and other buildings, would reach well on to the Queen City of our Occident. Were all these pipes, large and small, which intersect and interlace the city in every direction, raised from their sunless beds, and hung up over the city, they would resemble the web of some gigantic monster which had been spun out to entrap or menace the puny mortals beneath.

Among a host of other purposes for which water is required and supplied, are 5,363 plugs, 6,000 bath-tubs, 20,000 wash-stands and about 100 public drinking fountains.

The water rents vary from \$3 per year for ordinary dwellings, to \$25 per year for large houses. Factories, and establishments requiring large quantities of water, are supplied at lower rates.

The entire assessment for 1876 amounted to \$1,025,278.50, which was at the rate of about one cent for every 147 gallons. And this, I believe, as low as water can be had in any city in our country.

For many years the Fairmount works possessed greater capacity than any other, but within the last three years the Spring Garden works have had their capacity increased, until they are now able to supply more water than the Fairmount works, and almost as much as the other three works put together.

The Spring Garden works now consist of four large engines, and I was courteously furnished with information concerning them by the engineer, Joshua Bartley, Esq. The engines used at these works have been frequently changed, and were numbered, as put up, thus giving to those now in use the numbers 4, 5, 6 and 7, which have a capacity, respectively, of 5,000,000, 8,000,000, 10,000,000 and 20,000,000 gallons per day. Two of these engines are Cornish, one of which is a side lever, designed by Fred. Graeff, Esq. The steam pressure carried by these engines is 40 and 45 pounds to the square inch.

The Fairmount water works formerly consisted of pumps driven by eight undershot water wheels, but these are now replaced by turbines, and the number of pumps increased. In fact, the old wheels, pumps and building, and the very foundations, have been all swept away by the ruthless hands of innovation and improvement, and the place so altered and changed that I should think even the sweet-faced Naiads would hardly recognize their former home. The place on which the long, low wheel-house stood, is now covered over with flagstones, and near the center is erected a sort of temple, dedicated, for aught I know, to the beautiful nymphs of the fountain.

And here I will say a word about the Centennial water works, though they have, for the most part, passed into the realm of the "have beens." They were situated just outside the exhibition grounds, and consisted of two Worthington duplex engines. They raised, during the exhibition, 383,865,497 gallons to an average height of 200 feet, being on an average of 2,181,053 gallons per day, which ought to have kept the crowd clean and supplied them with ample drink.

The water supplied by the works to the city has been often complained of, and justly so. The analysis of the Schuylkill water which is furnished the city, shows it to contain inorganic materials, 2,763 grains in the gallon; or-

ganic materials, 1.442; total solids, 4.207.

The water of the Delaware river contains inorganic materials, 3.479 grains to the gallon; organic materials, .756; total solids, 4.235.

At high water, the Schuylkill and Delaware both furnish good water, but at low water the former is so contaminated by sewers, the refuse of print works, and other abominations, that the proportions of organic materials is so enormously increased that the water is entirely unfit for drinking purposes. And yet, thirsty thousands have to gulp it down, and with, or by it, too often take in disease, which ends in laying the victims beneath the shades of Laurel hill, close by the fetid waters that sent them there.

And yet Schuylkill water, even at its worst, possesses one redeeming quality. The greater portion of the house service pipes in the city are lead, and if the water was pure, there would be, consequently, frequent cases of lead poisoning. But as the water contains, among other "solids," considerable quantities of the carbonate of lime, the lead pipe, in a very short time, becomes lined with carbonate of lead, which entirely prevents any ill effect arising from the use of the pipes.

Cinnabar Deposits.

EDITORS PRESS:—Having, through your agent, Mr. Joseph Dimmick, become a subscriber to the MINING AND SCIENTIFIC PRESS and also the RURAL PRESS, I feel more entitled to the position of a correspondent than heretofore, and undoubtedly shall use that privilege more or less, from time to time, as occasion might seem to justify. At this time I will say that my motive is to try and obtain some information regarding the cinnabar deposits of the Coast range of mountains and the character and peculiarities of the croppings. I have endeavored to obtain such information from mineralogical works, but the most that I have come in contact with have little or no knowledge of that mineral, being gotten up by parties having no experience in the practical mining or prospecting developments for that mineral. I believe I am safe in saying that if some one of our practical working mineralogists would get up some sort of an essay or treatise on cinnabar, embodying the principal characteristics and peculiarities of the croppings and paying ores of the principal mines in successful operation in this State, giving also a short outline of the quicksilver mines of the Old World, that it would supply a demand that has for several years been felt among prospectors for that mineral in this State. It would not necessitate a very large edition, and could be issued in pamphlet form and sold at a very good profit compared to some of the other works on mineralogy. The greater portion of such works that I have seen endeavor to get too many things in a short space and only give a dim outline of the character of each mineral, and a great many of them are of no practical value to the miner or prospector.

I would further state that I firmly believe that there are rich cinnabar deposits in this section of California; certain peculiarities of rock, differing from any I ever saw elsewhere before, being found here. Most men pronounce it a species of iron, but I have seen a great many specimens of iron ore from different localities and fail to detect the least resemblance to that mineral. I will give you a description of it as it is found on the surface. Color, light brownish-red, with a good deal of orange-yellow intermingled, and seams of clear, transparent, white quartz all through it. When freshly broken it gives off a brown red paint profusely, of a greasy feeling and very glossy when rubbed on the hands. It is of a bright, metallic luster and looks as though it had contained at some time some valuable material, which time and exposure had oxidized or evaporated, leaving a large quantity of worthless trash on the surrounding surface. Were the above croppings to be found anywhere in the gold belt of the Sierras it would have been prospected long since, but situated as it is in this part of California, among farmers and stock raisers, it is almost impossible to form a company to prospect it. It would not take a very large amount of money to test the ground, (say \$1,000,) but I have not the means to spare from my farm to justify me in making the venture on uncertainties. Judging from what little I have heard of the New Almaden mines, I am led to believe that the ground I have described has a very close resemblance to it. I would be much pleased to see in your paper some sketches of the New Almaden and New Idria quicksilver mines, also of other productive mines in this State, describing the croppings, etc., of the two former more particularly, they being among the most prominent.

E. S. BIGELOW.
Potter Valley, Mendocino Co.

Growth of Gold.

EDITORS PRESS:—In a recent issue of the PRESS, I read with much interest an article on the "growth of minerals," and observe that the subject has been discussed in the *Chemical News*, and before the Mineralogical Society of Great Britain. In this connection I would state that I have strong reasons for belief in the growth of gold, founded on my own observation. I am in possession of a specimen of gold-bearing quartz which illustrates, (to my satisfaction at

least), the growth of gold in this sample. Possibly it may be the decay of the cubes and prisms of sulphurets, but nevertheless the aggregation of gold is perceptible and unmistakable. The specimen can be identified by well known gentlemen in your city, among whom I may name Mr. F. Reichling, J. A. Mars, D. M. Hosmer, W. Aug. Knapp and Dr. Henry De Groot. Should your local scientists desire to investigate the subject, I will place the specimen in the custody of Henry G. Hanks, for that purpose.

W. A. SKIDMORE.
Grass Valley, Nevada County, June 11th, 1877.

Gravel Mining.

An Important Development in Nevada Co.

We have, says the Nevada Transcript, during the past four years, written much concerning the section of country known as the "Ridge," located in Nevada county, between the Middle and South Yuba rivers. It consists of a mountainous belt of country intersected by frequent canyons and gorges, and running in a southerly direction from the summit of the Sierra Nevada mountains. On it, from Eureka South to French Corral, mining has been successfully prosecuted, at different points along the line, for the last 20 years. The most important gravel mines of the State are located on that Ridge—among the number are the Milton and Sweetland Creek, the American, Badger Hill, the Eureka Lake company's Consolidated, North Bloomfield, the Blue Banks and others of importance, all of which are on an ancient river channel which traverses the Ridge from Snow Point to French Corral, a distance of somewhere in the neighborhood of 20 miles. The principal mines are surrounded by claims having less development upon them, but the ground is known to be equally as rich as that owned by the larger companies. The developments on the line of the channel have been made at points remote from each other, and where the channel cropped out on the surface and revealed its locality. Intervening between the points worked, a heavy deposit of earth, and in some places lava, is found above the channel, and its course, between such points, has therefore been a subject of conjecture. The theory has for a long time prevailed that the channel which runs from Laporte, Plumas county, via Forest City and other points in Sierra county, is that found on the San Juan ridge, in Nevada county, and that it crosses the Middle Yuba river and enters Nevada county at Snow Point, and follows the Ridge down to French Corral; but just where it runs between Snow Point and North Bloomfield has been a mystery. Between these points the surface of the Ridge is composed of a deep lava formation, which prevents the channel from cropping out at any point, except at Moore's, Orleans, and Woolsey's Flats. These locations are not on the Ridge proper, but are benches several hundred feet lower than the main Ridge.

Some years since, while engaged in mining in the State of Nevada, S. B. Hunt, a former resident of Moore's Flat, conceived the idea that the mines on those flats or benches, had been fed, or rather that the gravel found there was simply an overwash from the main channel under the high Ridge above. He also came to the conclusion that the same amount of money expended in testing his theory there would eventually result more profitably than would the same amount expended in Silver State mining enterprises. He therefore, in 1873, left Nevada and went to San Francisco. After a long time he succeeded in organizing a company, and in 1875 he incorporated. The capital stock was divided into 60,000 shares, of the par value of \$30 each. W. B. Cluff is the President, J. M. Buffington Secretary, and Mr. Hunt Superintendent. After a limited amount of capital was secured, operations were commenced in October, 1875, in sinking a shaft, and the erection of hoisting works, carpenter and blacksmith shops were started at the same time. The point selected on which to sink a shaft, was on a bench close up to the prospected Ridge above. The locality was in a heavy belt of timber, and everything had to be cleared off and roads cut to enable the works to be erected. Practical men who knew the country there, thought the enterprise was a very doubtful one, and that the projector was visionary in the extreme. The encouragement received consisted generally of undisguised sneers—no one believing that the channel run near the point selected. However, Mr. Hunt pushed ahead. The location of the Ridge in the rear of the shaft convinced him that the shaft would eventually strike a heavy body of water, so a tunnel was started in November of last year, and the facts soon warranted the correctness of his conclusions. At 110 feet in depth the eight-inch pump was found unable to cope with the water, and sinking had to be stopped. The tunnel, in order to reach a point beneath the shaft, will have to be run 1,728 feet. Over 200 feet of it had been completed when sinking stopped. By putting on three shifts of men a distance of 815 feet has since been run mostly through a rock that had to be blasted to be taken out. When that point was reached—which occurred on May 26th—the workmen struck through the rim rock into gravel, which there is but little doubt is the main channel, for which the Superintendent has all along been running. As soon as the news spread, the town was wild with excitement. The workmen suspended work, and the event was celebrated in true miner's fashion. The development proves that an old river

channel traverses the Ridge under the lava formation, and that from Snow Point to Bloomfield, a distance of nine miles, it lies untouched in all its native richness. It proves, as Mr. Hunt anticipated, that Orleans and Moore's Flat gravel were only outwashes from the main channel, and their richness indicates what the main channel contains. The tunnel will be pushed ahead until it reaches a point under the perpendicular shaft, which will be about 223 feet below the surface. It is expected the bottom of the channel lies about 170 feet below that, or that the deposit, from the surface to the bottom, is 393 feet. The ground will be drifted out, or that portion of it near the bedrock. Experience has shown that a majority of the gold in the channels in that section is within four feet of the bedrock. The deposit drifted out will be raised to the surface and placed in a dump house, which will hold from 4,000 to 5,000 tons. A sluice will be run through the center, and when the house is filled it will be washed through a sluice 1,000 feet or more in length. It is expected one day's washing will run off all the dirt raised during a week's work and that 500 inches of water will do it. The company own 214 acres of ground, all secured by good title. As soon as well opened it is expected 200 men will be employed in drifting and that they can take out about 600 tons of the gravel per day. It is believed that within the grounds of the company there is the junction of two channels, or that the Woolsey Flat channel is the one struck, and that it unites with the main channel further back in the Ridge. The amount expended by the company in building tunnels, shafts and other outlays, up to date, is but \$30,000. We regard it as the most economical outlay ever made, and from it there will flow greater results than was ever realized from a similar expenditure. It proves that a vast extent of the richest possible mining ground in our county has hitherto been untouched; that there is a field for the profitable investment of millions of dollars; that thousands of men can, in the near future, find remunerative and continuous labor in that territory, and that gold exists there in quantities past computation. The rim-rock of this channel can be traced from North Bloomfield via Snow Tent and Forest City to Laporte, in Plumas county. Hunt's discovery warrants early openings all along the line where work has not before been prosecuted. We feel that too much credit cannot be awarded to the gentleman, who has persevered under all manner of discouraging circumstances, until he has demonstrated to the world what the capabilities of Nevada county are as a field for mining.

Resting Springs District.

A correspondent of the Pioche Record, writing from Resting Springs, San Bernardino county, Cal., says: It is possible that some of the residents of your section may be curious to know what we have and what we are doing away down here on the ragged edge of San Bernardino county. After a residence of eight months in this district, and a thorough familiarity with all its developments and resources, I consider it one of the very largest things on this or any other coast. We have wood and water in abundance, a magnificent climate, inexhaustible beds of peat within six miles, and, as for the mines, I hardly know where to commence or how to say of them. Imagine two or three Eureka and a couple of old-fashioned Pioches condensed into one mining camp, and that camp situated in a wild, new region of country away down on the borders of Death valley, as isolated from the world as were the mutineers of the *Bounty* on Pitcairn's Island, and you may form a weak conception of our prospects. I will only speak of two out of 15 or 20 of our mines. The Gun-Sight, owned by Mr. J. B. Osborne, down 80 feet; an unbroken ledge the entire depth of eight feet in width; ore averaging \$600 per ton; under the management of John Taylor, formerly foreman of the American Flag, of your place, and of the Tehipia, a continuation of the Gun-Sight, with a solid ledge of magnificent smelting ore of a very high grade, some six feet in width. Then we have the Alexander, the Balance, the Noonday, and the Sherman, owned by Silas Pierson & Co., and a host of others, but we do not ask any one to believe us unless they choose. There has never been an effort made to induce immigration, and there is none being now made. Only wait a few short months, and you will see a stream of bullion rolling from Resting Springs district into the avenues of commerce that will astonish the mining world.

GRANITE.—There is a granite quarry near Rough and Ready, in this county, that turns out the finest building stone in the State. It is by far superior to the granite of the quarries at Rocklin and Penryn in Placer county, and is better than the stone of the same name that is in the northern part of this county. Persons who are posted in such matters inform us that the Rough and Ready granite is equal, if not superior to any found in New England. Some of these days the cities below will be calling on the Rough and Ready quarries for splendid building stone. That will surely be the case when samples of it are sent to the architects and builders of the larger cities. In the Masonic and Odd Fellows' hall of this place can be seen samples of the stone that have defied time and weather and that have experienced considerable heat from fire without being changed.—*Grass Valley Union*.

MECHANICAL PROGRESS.

System and Cleanliness in Machine Shops.

Order and cleanliness in machine shops and manufactories may be advocated for higher reasons, and yet none is more convincing than the method which shows the economic side of the question. A writer in the *Polytechnic Review* has some sharp points to make on this subject and we quote as follows: A workshop, however small, however few the number of hands, is never too small to have a system; want of system is the cause of great waste of time and material, besides constant worry and discontent. Step inside this building of fair dimensions, whose front is covered with big lettered signs, showing that it is devoted to the production of all kinds of machinery.

What do we find? The floor covered with litter, heaps of cuttings under ever lathe or machine, under every bench; on the floor new and old material of all kinds have been thrown in almost inextricable confusion; the machinery is encrusted with oil and dirt, except just those parts that meet the hand in working, and the speed cones and pulleys polished by the running belts, showing what might be and is not.

The cutting tools, the bolts and plates, and other gear used in these machines, lie around their bases; a new strata seems to be fast closing over some of them. Overhead is heard the harsh grating of some loose pulley; the belts have been thrown off others by some sensitive workman, who cannot bear the unpleasant noise in such cases; the belts dangle from the shafts, the running shaft keeping a stretch on them and wearing them all the time. About 30 men are employed in these works, yet there is no one whose special duty it is to look after the tools, to replace or repair them when lost or broken.

A man has to drill a three-quarter inch hole in a piece of plate; the time actually required would be about five or ten minutes if good order were kept on this case. The man commences by making a tour of the shop, for there are some drills lying around this machine, and some around that, and there is no one place where every drill not in use is sure to be found. His search is not crowned with immediate success; a three-quarter clearing drill (13-16ths) is the nearest he can procure; he has set his callipers and taken the size of it; he proceeds to grind it to three-quarters; having reduced it to the size, he finds it will not clear itself so high as he wishes; however, at last, by more grinding, he is satisfied with it, and is ready to commence—time lost, 20 minutes. He is hardly through drilling, when up comes a man looking for the three-quarter clearing drill he was using 25 minutes ago; he, finding it has been altered, takes it to the smith, and waits to have it flattened out, which, with the re-grinding, makes a further loss of 20 minutes—total loss, forty minutes on the drilling of a three-quarter hole, for which the boss could scarcely charge more than 10 cents.

Another has a brass to plane; no tool for brass seems to be visible; he has probably trodden it down too deep in the thick red dust of the flooring to be distinguishable. However, he soon grinds off the top of a tool for cutting wrought iron; that is easy enough; but when that tool is wanted again to work in the material it was made for, 1-16th of an inch must be ground off its facets to restore the original angle—waste of time and steel.

If a workman should happen to drop a small pin, washer or key, he makes another, because among the debris around he knows it is as much lost as though when it fell the earth had gaped to receive it.

WEIGHT OF A LIFE IN COAL.—We see in the English discussions concerning loss of life in coal mining the following statements: The real cause of this yearly sacrifice of lives is the use of gunpowder in fiery seams. There is a want of precaution amongst miners in employing this explosive, and until they can be brought to understand what their negligence may bring about, "drilling-out shots" and other forbidden acts will continue to be done when deputies are out of sight. Mr. Wynne, in his report for 1875, says that in his district falls of coal and roof have caused 14 accidents, by which 14 lives have been lost, and, compared with the loss of the previous year, 23 lives, this is a very clear proof that making managers responsible for the absolute safety of the working places of the mines has had a very salutary effect. In the year 1868, a death occurred for every 103,429 tons of coal raised in England. In 1875, 108,918 tons of coal were raised per life lost; in 1868, 104,566,959 tons of coal were raised in Great Britain, involving a total loss of 1,011 lives, and in 1875, 133,306,485 tons, with a total of 1,224 lives lost, but more men were employed and more mineral raised.

BETTER TIMES IN NEW YORK.—It is stated as an evidence of the improvement in the times, that while four months ago there were 50,000 idle mechanics in New York city, there are now not more than 15,000 men out of employment. The president of the Trades Assembly, it is said, regards the condition of the workmen as better than it has been any time for three years past.

Important Improvement in Submarine Telegraphy.

A Paris letter in the *Boston Advertiser* thus describes Tommasi's invention, which is expected to effect a revolution in the methods of ocean telegraphy: The transatlantic cable requires the use of very feeble currents, as the only means of avoiding combustion or oxidation of the wires, and this feebleness of current necessitates the use of a compass, placed perpendicularly in a dark room opposite a blackboard, upon which a strong ray of light permits the operator to follow the movements of the needle and take down the dispatches as they arrive. Not only is this system fatiguing and slow, but it leaves the sender and receiver of a dispatch quite at the mercy of the telegraph operator, whose slightest inattention may result in an error over which there is no control. Constant accidents of this kind have abundantly proved the necessity of some new improvement, which leads us to hope the Marquis Tommasi's invention will be a source of universal satisfaction. The present cables, wires and batteries can be employed, and the current be reduced to one-sixth its present force; the dark room is done away with, and every guarantee and security of control given, as the dispatches arrive printed as well from Europe to America as from New York to Washington. The whole system depends upon the extreme sensibility and obedience of the magnet needle, which, forming part of a condenser, is perfectly under the control of the manipulator, who can direct the needle from right to left or from left to right. A magnetized regulator placed above the needle recalls it automatically to its normal direction after each shock. On each side of the needle is placed a flexible fine steel blade, which it touches when itself moved by the electric shock, and this movement is again communicated to a second battery of any amount of force necessary for printing the dispatches received. These second batteries are placed at both extremities of the line, and serve not only to print the dispatches but to control the operator's exactness, and as they are independent of the cable their power can in no manner injure the cable wires.

FLUX FOR WELDING STEEL.—An intelligent reader of the *Manufacturer and Builder*, who has had extensive experience in welding steel, and steel to iron, communicates the following formula and manipulation of the heated metals to be welded. He says: "To one part of flour of sulphur add two parts of sal ammoniac and 10 parts of borax. After having pulverized these ingredients, mingle the mass thoroughly in an iron kettle, put it over the fire, and continue a steady heat until every particle is melted. As soon as all the spume has disappeared from the surface, the flux should be poured out into another vessel and allowed to cool. Now reduce it to a fine powder, and it will be ready for use. When two pieces of steel are to be welded, the ends should first be heated to redness and all rust and scales be removed by filing or grinding, after which let the metal be heated in a clear and steady fire of charcoal until a welding heat is attained, when the heated steel will appear of a bright yellow. Great care must be exercised lest the surface of the steel be raised to a degree of heat above the welding point, which is always ruinous to good steel. Now sprinkle some of the flux on the heated bars, remove all scales, return the parts to the fire, bring them carefully to a welding heat, and unite the clean, smooth surfaces beneath the hammer. A skillful smith who has had but a limited experience in welding, will be able to perform a satisfactory job with little difficulty when welding steel to steel, or steel to iron."

CAR HEATING.—A new French combustible compound has a base of carbonized tan or wood bark, and this is mixed with a small quantity of nitrate of lead or spirits of niter, slaked lime or loam being added as agglutivative matter. It ignites easily, burns gradually and continuously in this state, and still slower by adding a small quantity of wood charcoal dust. Neither smoke nor odor are perceptible. A small quantity burned in a foot-warmer or chafing-pan, with a limited supply of air, will not be entirely consumed for about 16 hours, and during that time will develop heat enough to warm a compartment of an ordinary carriage. The dangerous railroad stove may be succeeded by an improvement on some such mode of heating as this. It may be that steam pipes, supplied with either live or exhaust steam, and connected with flexible gutta percha pipes, might be much better, but it is certain that some general provision of safety from this source of danger to life and property is needed.

NEW HORSE-SHOE.—Mr. Yates, of Manchester, England, has invented a horse-shoe composed of three thicknesses of cow-hide, compressed into a steel mold and then subjected to a chemical preparation. It lasts longer and weighs only one-fourth as much as the common shoe; it never splits the hoof and has no injurious influence on the foot. It requires no calks; even on asphalt the horse never slips. It is so elastic that the horse's step is lighter and surer. It adheres so closely to the foot that neither dust nor water can penetrate between the shoe and the hoof.

SCIENTIFIC PROGRESS.

Transparent Gold.

In the course of a lecture on gold, delivered before the Franklin Institute, as reported by the Secretary, Mr. A. E. Outerbridge, Jr., of the Assay Department of the Mint in Philadelphia, gave an account of some experiments he had made, with a view of ascertaining how thin a film of gold was necessary to produce a fine gold color.

The plan adopted was as follows: From a sheet of copper rolled down to a thickness of 5-1,000ths of an inch he cut a strip two and one-half by four inches. This strip, containing 20 square inches of surface, after being carefully cleaned and burnished, was weighed on a delicate assay balance. Sufficient gold to produce a fine gold color was then deposited on it by means of the battery; the strip was then dried without rubbing, and re-weighed, and found to have gained 1-10th of a grain, thus showing that one grain of gold can, by this method, be made to cover 200 square inches, as compared to 75 square inches by beating.

By calculation, based on the weight of a cubic inch of pure gold, the thickness of the deposited film was ascertained to be 1-980,400th of an inch, as against 1-367,650th for the beaten film.

An examination under the microscope showed the film to be continuous and not deposited in spots, the whole surface presenting the appearance of pure gold.

Not being satisfied, however, with this proof, and desiring to examine the film by transmitted light, Mr. Outerbridge has since tried several methods for separating the film from the copper, and the following one has proved entirely successful: The gold plating was removed from one side of the copper strip, and by immersing small pieces in weak nitric acid, for several days, the copper was entirely dissolved, leaving the films of gold intact, floating on the surface of the liquid. These were collected on strips of glass, to which they adhered on drying. When viewed with transmitted light with the microscope, it was seen to be of the characteristic bright green color, and very transparent. Viewing it by means of reflected light its true gold color is seen.

Mr. Outerbridge has continued his experiments, and, by the same processes, has succeeded in producing continuous films, which he determined to be only the 1-2,798,000th of an inch in thickness, or 10,584 times thinner than an ordinary sheet of printing paper, or 60 times less than a single undulation of green light. The weight of gold covering 20 square inches is, in this case, 35-1,000ths of a grain; one grain being sufficient to cover nearly four square feet of copper.

How to Prepare Botanical Specimens.

The following hints on this subject in the *English Mechanic* are clear and practical, and on some points the best that we remember to have seen:

Small plants should have the roots; and, if possible, obtain a specimen of each at different seasons—the young plant, in flower, and when the seed or fruit is nearly ripe. Get a quire of good thick blotting-paper and a couple of large boards and paper on which to mount your specimens. Let the boards be about the same size as the blotting-paper. Demy paper of good quality is the best size for mounting. Arrange your plants between the sheets of blotting-paper—some plants require several thicknesses—and see that the leaves, etc., are properly disposed on the paper, as you will not be able to alter them when they are dry. It is a good plan to interpose a few sheets of card-board, as it prevents one plant from spoiling another. When your drying-paper is filled, put the whole between your boards and subject to pressure; take them out every 24 hours, and dry the paper, correcting any displacement as you go on; when dry they are ready for mounting. Don't gum or paste them to the paper, but make short slits with a penknife under the stalks about one-eighth of an inch long. Take a piece of paper, as broad as the slit is long, fold the paper, and pass it over the stalk and through the hole at the back, and gum the ends on the back. I have seen every (I think) method of mounting, and this is certainly the neatest and cleanest. After this they must be painted with the following preservative solution: Corrosive sublimate, 20 grains; camphor, 20 grains; rectified spirit of wine, one ounce. This is a deadly poison, and should be handled very cautiously. Each sheet should have a neat label in the corner stating date and place of collection, and name of collector, also general habitat, specific and generic names, with natural order, etc. Without these particulars they will (as a collection), be perfectly valueless.

GLACIAL ACTION.—The last English Arctic expedition promises to confirm the views of glacialists respecting the origin of the Parallel Roads of Glen Roy, in Scotland. In Greenland nearly every valley shows similar terraces, which have been found in fresh-water lakes, kept in place by barriers of pack-ice. That represents perfectly the condition of things when the Ben Nevis glacier dammed the valley of the glen, producing an extensive lake.

Heat.

In resuming his lectures at the Royal Institution, London, Prof. Tyndall, having caused a ball of lead to fall from the roof of the theater on to a stone, drew the ball up again and let it down gently with a string and pulley. The heat generated by the collision in the first instance was the exact equivalent of the heat produced in his finger and thumb and in the string in the second instance. The outlay of the muscular force expended in drawing up the ball was made obvious by causing the ball to be drawn up again by a small engine worked by compressed heat. The exact equivalent of the heat evolved by a quantity of coal, completely consumed by consumption with oxygen, sufficient to lift a weight of 50 tons to a height of 100 feet above the earth, would be produced by the collision of that mass with the earth when allowed to fall. Given the velocity of a body, the heat generated by the destruction of that velocity could be easily calculated, and some time ago he was led to the conclusion that the stoppage of a rifle bullet would produce sufficient heat to fuse the metal. This conclusion was proved in the Franco-German war, when bullets which had been stopped by contact with a bone, showed on being extracted undoubted marks, in many cases, of a fusion. The same thing had also been illustrated incidentally in the experiments with gun cotton at Stowmarket. The old notion of heat was that it was a substance which could be squeezed out of matter as water was squeezed out of a sponge. A bullet squeezed in a hydraulic press acquired heat, which was rendered obvious in the galvanometer by the thermo-electric pile. Even as late as the time of Faraday, it was conceived that heat was something for which some bodies had a greater capacity than others. If compressed air from one vessel was allowed to pass into a vessel in which the pressure was much less, it would have been said that the motion of the air gave to the comparatively empty vessel a greater capacity for heat. The heat thus produced was shown by means of the galvanometer and thermo-electric pile; but the reason for that heat was, said Prof. Tyndall, quite differently understood now. The coefficient of the expansion of gases was next described with some minuteness; and, continuing the illustration of what used to be termed "capacity for heat," the lecturer said the explanation of different metals, when subjected to the same degree of heat, not possessing in themselves the same amount of heat, was that heat had two operations—one, the production of tremors (which was heat), the other the weakening of molecular attraction. Thus, if lead and iron were exposed to the same high temperature the lead would be much hotter than the iron, because in the former case less internal molecular work was performed, and more heat was expended in the production of tremors; while in the latter case more heat was used up in internal work, and less in the production of tremors. The same degree of heat was in operation, but the apparent results were different, and hence grew up the very natural notion that different bodies had different capacities for heat.

IN AFRICA.—News, says *Nature*, has been again received at Munich, after a long time, from the African traveler, Dr. Erwin v. Bary. He had safely returned to Ghat from his journey into the Valley Mihero. He is the first European who has visited the hot springs of Sebarbar and seen the crocodile-pond. Interesting geological and geognostic results, with a collection of many hitherto unknown plants, have been gained from this journey. It was very dangerous, owing to the war of the Asgar with the Hogar of Tuareg, and the traveler was in constant risk of attack. The sheikh of Tuareg, Jehenuchen, 102 years old, has lost two sons; so he is not easily propitiated. The murderer of the Dutch traveler, Alexandrine Tinne, whose unhappy fate excited European sympathy, goes about freely in Ghat. Dr. v. Bary will endeavor, notwithstanding the danger, to penetrate further into the country of the Tuareg, in order to prosecute his geological and botanical inquiries.

WOODRUFF SCIENTIFIC EXPEDITION.—We have received a copy of a pamphlet describing an enterprise which bears the above name. The plan is to charter a steam vessel and carry a load of professors and students around the world on a two-years' cruise of scientific study and observation. The plans are all laid and the ship will sail from New York city October 1st, 1877. Among the professors who will embark we notice Prof. B. G. Wilder, of Cornell; Prof. W. G. Farlow, of Harvard; Prof. S. I. Smith, of Yale, and half a dozen others. The enterprise is under the management of Mr. James Woodruff and Gen. Daniel Macanley, of Indianapolis, Indiana. We believe that applications for students' places in the floating university are still acceptable and full information can be gained by addressing the managers at the place named.

JURASSIC FAUNA.—Dr. Herr shows in a recent publication that along the shores of the Amoor, in Siberia, is the finest development known of Jurassic plants, amounting to 83 species. Like those from Yorkshire and Spitzbergen, the conifers, *Salisburia*, and tropical forms predominate. Of existing forms we recognize *Asplenium*, *Thyrsopteris* and *Dicksonia*.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 31.	Week Ending June 7.	Week Ending June 14.	Week Ending June 21.
Alpha.	94	88	11	154
Alta.	40	30	55	60
Baltimore Con.	4	3.40	4.35	33
Belcher.	35	45	40	75
Best & Belcher.	164	17	141	154
Bon.	4	3	8	4.30
Caledonia.	2.10	1.1	2.15	3.70
California.	304	274	304	282
Challenge.	60	22	22	35
Chall. & Photos.	24	24	4	3
Confidence.	4	24	4	3
Con Imperial.	45	35	50	40
Con Virginia.	294	263	30	28
Crown Point.	4.10	3.60	4	3
Dayton.	75	60	60	60
Eureka Con.	174	164	164	154
Exchequer.	3.10	24	3.70	5
Gen. Thomas.	25	25	25	25
Grand Prize.	5	5	5	5
Gila.	10	25	25	25
Globe Con.	3	3	2.65	1.90
Golden Chariot.	72	5	6	9
Gould & Curry.	2.40	1.65	2.45	5
Hale & Norcross.	5	15	10	15
Hussey.	1.40	1.05	1.05	2.60
Julia.	4	4.15	5	4.55
Kentuck.	24	24	24	24
K K Con.	3	3	3	3
Kentuck.	3	3	3	3
Knickerbocker.	20	15	20	15
Kossuth.	20	15	20	15
Lady Bryan.	75	50	50	50
Lady Wash.	11	1.10	3.10	1.10
Leviathan.	30	30	30	30
Leeds.	1.55	70	1.75	1.40
Modoc.	3.65	24	3	24
Manhattan.	74	7	64	74
Mansfield.	25	10	80	25
Meadow Valley.	74	54	9	64
Mexican.	74	54	9	64
North Con Virginia.	25	15	20	10
New York.	25	15	20	10
Northern Belle.	164	154	164	154
New Cose.	3.60	34	3	1
Occidental.	10	10	10	10
Ophir.	12	104	114	114
Overman.	12	104	114	114
Pacific.	12	104	114	114
Phil Sheridan.	10	15	40	25
Panther.	10	15	40	25
Prospect.	35	25	40	35
Raymond & Ely.	54	44	7	5
Rock Island.	3	2.40	5	2.10
Savage.	18	18	21	18
Sierra Nevada.	3.70	1.85	41	54
Silver Hill.	1.30	1.20	2	1.30
South Chariot.	80	70	60	65
Sutro.	4	24	4	4
Union Con.	111	84	104	104
Wells Fargo.	4	4	4	4
Yellow Jacket.	62	4.65	64	54

Sales at S. F. Stock Exchange.

FRIDAY, A. M. JUNE 15.	
730 Alpha.	154
450 Alta.	154
1155 Best & Belcher.	154
955 Belcher.	154
710 Baltimore Con.	154
430 Con Imperial.	154
935 Crown Point.	154
240 New York.	154
330 Chollar.	154
100 Confidence.	154
1025 Caledonia.	154
115 Challenge.	154
335 Dayton.	154
1175 Exchequer.	154
1560 Gould & Curry.	154
1245 Hale & Nor.	154
300 H. & Norcross.	154
2045 Justice.	154
20 Kentuck.	154
780 Mexican.	154
2140 New York.	154
855 Ophir.	154
300 Overman.	154
345 Savage.	154
1855 Sierra Nevada.	154
540 Seg Belcher.	154
1285 Silver Hill.	154
690 Union Con.	154
400 Utah.	154
50 Woodville.	154
1100 Yellow Jacket.	154
AFTERNOON SESSION.	
1655 Andes.	154
670 Alpha.	154
200 Argenta.	154
1090 Best & Belcher.	154
1325 Bullion.	154
150 Belmont.	154
1000 California.	154
615 Con Virginia.	154
540 California.	154
1150 Crown Point.	154
1020 Con Imperial.	154
110 Chollar.	154
215 Eureka Con.	154
1145 Exchequer.	154
1100 Grand Prize.	154
945 Gould & Curry.	154
100 Golden Chariot.	154
1280 Hale & Nor.	154
1090 Hussey.	154
300 Justice.	154
400 Leopold.	154
30 Lady Wash.	154
1075 Leviathan.	154
1550 Modoc.	154
500 Meadow Valley.	154
850 Mexican.	154
185 Northern Belle.	154
100 New Cose.	154
1840 North Con Vir.	154
400 Ophir.	154
560 Overman.	154
1850 Prospect.	154
500 Panther.	154
540 Raymond & Ely.	154
750 Sierra Nevada.	154
950 Trojan.	154
1165 Union Con.	154
230 Utah.	154
1880 Yellow Jacket.	154
SATURDAY, A. M. JUNE 16.	
1520 Alpha.	154
1190 Alta.	154
1190 Andes.	154
250 Argenta.	154
1100 Best & Belcher.	154
955 Belcher.	154
1180 Bullion.	154
1180 California.	154
125 Belmont.	154
1835 Crown Point.	154
355 Challenge.	154
910 Con Imperial.	154
400 Confidence.	154
2155 Caledonia.	154
735 California.	154
560 Con Virginia.	154
430 Chollar.	154
20 DeFrees.	154
3795 Dayton.	154

3300 Lady Washington.	202
100 Leopold.	202
730 Leeds.	202
100 Meadow Valley.	202
1240 Modoc.	202
200 Manhattan.	202
1280 Northern Belle.	202
1345 New Cose.	202
2470 New York.	202
280 North Con Vir.	202
680 Overman.	202
490 Occidental.	202
1445 Ophir.	202
1270 Prospect.	202
200 Peytona.	202
350 Panther.	202
150 Raymond & Ely.	202
50 Rock Island.	202
100 Rye Patch.	202
1230 Silver Hill.	202
800 Savage.	202
2830 Trojan.	202
1080 Yellow Jacket.	202
2800 Union Con.	202
2800 Alpha.	202
3915 Best & Belcher.	202
3215 Belcher.	202
2215 Bullion.	202
5950 Crown Point.	202
18420 Con Imperial.	202
1085 Con Virginia.	202
2280 California.	202
1230 Chollar.	202
190 Confidence.	202
1280 Exchequer.	202
4685 Gould & Curry.	202
300 Kentuck.	202
1300 Mexican.	202
735 Ophir.	202
1585 Overman.	202
2200 Peytona.	202
355 Sierra Nevada.	202
900 Utah.	202
1780 Yellow Jacket.	202
AFTERNOON SESSION.	
100 Alps.	202
970 Andes.	202
300 Argenta.	202
2020 Best & Belcher.	202
340 Belmont.	202
1090 Baltimore Con.	202
100 Challenge.	202
65 Chollar.	202
1230 Caledonia.	202
1105 California.	202
4850 Dayton.	202
100 DeFrees.	202
3215 Eureka Con.	202
645 Exchequer.	202
330 Golden Chariot.	202
1440 Grand Prize.	202
1580 Gould & Curry.	202
2200 H. & Norcross.	202
1550 Hale & Nor.	202
1115 Justice.	202
230 Jackson.	202
2300 Julia.	202
1070 K. & S. Wood.	202
1470 Leeds.	202
790 Leopold.	202
2640 Lady Wash.	202
2550 Ophir.	202
200 Manhattan.	202
50 Meadow Valley.	202
1725 Modoc.	202
1300 Mexican.	202
1230 Monumental.	202
400 North Con Vir.	202
100 New Cose.	202
405 Northern Belle.	202
2200 New York.	202
275 Occidental.	202
950 Panther.	202
1150 Peytona.	202
2310 Prospect.	202
1230 Rye Patch.	202
2850 Rock Island.	202
SALES OF LAST WEEK AND THIS COMPARED	
THURSDAY, A. M. JUNE 14.	
785 Alpha.	154
2190 Best & Belcher.	154
715 Bullion.	154
800 California.	154
100 Confidence.	154
2340 Caledonia.	154
1230 Chollar.	154
1230 Caledonia.	154
7900 Con Imperial.	154
750 Con Virginia.	154
1210 Exchequer.	154
1020 Gould & Curry.	154
1230 H. & Norcross.	154
1190 Justice.	154
875 Julia.	154
220 Kentuck.	154
1230 North Con Vir.	154
265 Ophir.	154
635 Mexican.	154
1085 Savage.	154
1120 Sierra Nevada.	154
450 Seg Belcher.	154
450 Utah.	154
1645 Yellow Jacket.	154
AFTERNOON SESSION.	
1615 Andes.	154
200 American Flat.	154
780 Best & Belcher.	154
305 Belcher.	154
75 Belmont.	154
1057 Bullion.	154
130 Chollar.	154
1020 California.	154
170 Challenge.	154
760 Con Virginia.	154
2570 Con Imperial.	154
590 Crown Point.	154
850 Dayton.	154
875 Empire.	154
1230 Eureka Con.	154
615 Exchequer.	154
1015 Grand Prize.	154
1100 Gould & Curry.	154
750 Hale & Nor.	154
760 Hussey.	154
1560 Justice.	154
100 Leopold.	154
735 Leeds.	154
5 Lady Wash.	154
2335 Modoc.	154
130 Manhattan.	154
230 Mexican.	154
100 Morning Star.	154
1000 New Cose.	154
355 Northern Belle.	154
290 North Con Vir.	154
800 New York.	154
670 Ophir.	154
440 Prospect.	154
1735 Panther.	154
645 Raymond & Ely.	154
35 Rye Patch.	154
1050 Savage.	154
50 Sierra Nevada.	154
2270 Silver Hill.	154
4110 Trojan.	154
245 Union Con.	154
210 Yellow Jacket.	154
WEDNESDAY, A. M. JUNE 20.	
600 Bullion.	154
120 Alpha.	154
750 Chollar.	154
20 Belcher.	154
270 Best & Belcher.	154
AFTERNOON SESSION.	
430 Andes.	154
400 Alta.	154
540 Grand Prize.	154
365 Belmont.	154
190 Baltimore Con.	154
2500 Caledonia.	154
340 Chollar.	154
700 Dayton.	154
50 Eureka Con.	154
75 Empire Id.	154
400 El Dorado South.	154
50 General Thomas.	154
50 Golden Chariot.	154
700 Hussey.	154
350 Jackson.	154
1600 Leeds.	154
1000 Leopold.	154
500 Manhattan.	154
300 Meadow Valley.	154
310 Modoc.	154
500 New Cose.	154
500 New York.	154
100 Northern Belle.	154
120 Raymond & Ely.	154
800 Silver Hill.	154

Pacific Board—Latest Sales.

WEDNESDAY, A. M. JUNE 20.	600 Bullion.	154
120 Alpha.	154	154
750 Chollar.	154	154
20 Belcher.	154	154
270 Best & Belcher.	154	154

MINING SHAREHOLDERS' DIRECTORY.

[Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.]

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
American Flat M Co	Washoe	7	25	May 18	July 11	July 31	C A Sankey	331 Montgomery
Alta S M Co	Washoe	7	25	June 7	July 11	Aug 2	W H Watson	302 Montgomery
Caledonia S M Co	Washoe	20	10	June 3	July 13	July 31	R Wegener	414 California
Empire M Co	Idaho	13	100	Apr 26	May 30	June 26	W H McClintock	330 Pine
Hayden Con M Co	Nev	3	10	May 3	June 7	July 2	R H Brown	426 California
Justice M Co	Washoe	20	150	June 7	July 12	Aug 1	J S Kennedy	419 California
Knickerbocker M Co	Nev	18	30	May 16	June 21	July 12	J H Sayre	330 Pine
Leopold M Co	Nev	2	50	May 3	June 4	June 25	R H Brown	426 California
Meadow Valley M Co	Ely District	12	70	June 6	July 20	Aug 13	T W Colburn	419 California
Mexican S M Co	Nev	3	40	June 5	July 10	July 30	C L McCoy	419 California
Pacific Cons M Co	Cherry Creek	2	50	June 15	July 15	Aug 13	J L Fields	334 Pine
Savage M Co	Washoe	28	100	May 29	June 11	July 18	E B Holmes	309 Montgomery
Sutro M & M Co	Washoe	17	50	May 28	July 2	July 18	W H Watson	302 Montgomery
Sierra Nevada S M Co	Washoe	49	50	June 13	July 17	Aug 6	W W Stetson	309 Montgomery

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Con Bonanza M Co	Nev	1	10	June 4	July 10	July 31	W Martin	19 First
Crown Point M Co	Washoe	31	1	100 June 19	July 24	Aug 14	J Newlands	419 California
Con Imperial M Co	Washoe	4	20	May 19	June 21	July 12	W E Dean	419 California
Barcelona Con M Co	Nev	2	25	May 2	June 4	June 26	J E Moore	320 Sanoma
Booth G M Co	Cal	2	—	Apr 30	June 4	June 25	G R Snoddy	320 California
Comanche M Co	Cal	1	50	May 24	June 2	June 26	W W Traylor	309 Montgomery
El Dorado Water & Deep Gravel Co	Cal	16	100	May 12	June 18	June 28	H Elias	524 California
Equator M Co	Nev	1	60	June 6	July 11	July 31	W Willis	309 Montgomery
Jennie A and Black Rock M Co	Nev	1	20	May 11	June 11	July 31	J W Clark	418 California
Kennedy S M Co	Cal	14	50	June 5	July 9	Aug 4	A Wissel	210 California
Low Range M Co	Washoe	2	3	May 21	June 25	July 7	F E Lutz	507 Montgomery
Lucky Rock M Co	Cal	1	2	May 30	June 2	July 2	C S Leahy	Merchants Ex
Mammoth S M Co	White Pine	20	50	June 4	July 12	Aug 7	D A Jennings	401 California
Maryland M Co	Washoe	1	10	May 9	June 10	July 2	C A Sankey	331 Montgomery
Martin White M Co	Nev	1	200	May 28	July 9	Aug 4	J J Scoville	309 Montgomery
Mariposa Land & M Co	Cal	11	1	100 June 6	July 5	July 25	Leahy Leavitt	309 Montgomery
Marquette Belle M Co	Cal	1	25	June 14	July 14	Aug 14	Riley	320 California
New England T & M Co	Cal	4	10	Apr 25	May 31	June 23	A C Hammond	401 California
New York M Co	Washoe	12	15	June 14	July 17	Aug 6	D L Thomas	419 California
Occidental Reduction R & M Co	Cal	3	1	50 Apr 2	June 7	June 30	A C Hammond	401 California
Sierra Nevada M Co	Washoe	40	50	June 13	July 9	Aug 6	W Martin	309 Montgomery
Silver King Nevada Co	Arizona	—	15	May 11	June 9	July 9	H P LeMay	240 Montgomery
Silver Sprout M Co	—	—	5	May 23	June 25	July 16	T B Wingard	328 Montgomery
Young America M Co	Nev	—	15	May 12	June 16	July 12	R H Brown	426 California

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

OLIVE.—Amador Ledger, June 17: The clean-up last week did not result so favorably as was expected. From what we can gather, it was sufficient to cover expenses. The rock is now being taken from a depth of 80 feet, and the Bonanza mill is still running on the ore.

TALMANS CLEAN-UP.—The clean-up made this week panned out splendidly, much better than any previous run, except the first, which averaged nearly \$15 per ton.

FROM PLUMCOTT.—The Phoenix company will this season put up reduction works to work their sulphurets, which amount to one and a half tons per day. We also learn from Supt. Green that last month the clean-up for 15 days' run exceeded by 100 lbs. any run made by 50 stamps. When the mill is closed down, both shafts will be sunk from 100 to 200 feet deeper, and we hope that we shall not lose any of our citizens for want of employment. Two breaks occurred on the ditch last week; one carried away 40 feet of the embankment. The breaks are now caused by floating timbers, which jam and cause breaks. From 30 to 40 timbers are now delivered daily at the mine through the ditch.

BUTTE.

GOLD.—Oroville Mercury, June 16: The dry season has not entirely cut off our gold crop. Thursday night of last week there came some \$70,000 in dust into the express office, to be sent below for coinage. The best part of the story is, that most of it came from new claims where the low water permitted the miner to open them up. This is but the first installment. We expect they will be quite frequent during the coming season.

CALAVERAS.

OWIN MINES.—Calaveras Citizen, June 16: Until recently the mining operations in the Owin mine have been confined to the south of the shaft. A short time since prospecting was commenced to the north. A drift was commenced on a level 1300 feet deep. When in a distance of about 70 feet ore was struck immensely rich. The drift is now in about 170 feet, and still holds rich. The milling capacity of the mine is 40 stamps; only 23 are being worked, putting through between 50 and 60 tons per day.

THE WATER SUPPLY.—Calaveras Chronicle, June 16: The water famine is approaching. We understand that there is only about 400 inches of water in the ditch, and it is decreasing rapidly. Another week or two of warm weather will cut off the supply altogether, unless the water company can make arrangements for the contents of the Sandy Gulch ditch, for which we understand they are negotiating. All the hydraulics are making haste to finish cleaning up while there is water enough left to "wash down" their dunes.

CONSOLIDATION.—We understand that the Good Hope and San Bruno mines, at Mosquito, are to be consolidated under the control of a San Francisco company. The two mines are on the same ledge, and the plan is to connect them with a tunnel, which, when completed, would admit of the employment of any number of hands.

URSA COXNEY TRAIL.—Times continue exceptionally brisk in the upper country, especially at West Point and vicinity. The mills are all in active operation, and a good deal of money is being taken out. A large amount of capital is being invested, and the developments made are flattering and encouraging. Champion, still crushing and sinking. Rock sufficient to keep the mill employed until middle of August is already mined. The ledge is widening as the shaft goes down. The crushing of rock from the Granite is concluded, and the Supt. has gone below to arrange for the purchase of the mine. The ledge is 18 feet wide, the rock averaging \$7.50 per ton. The new mill at the Zacatero will be ready to start up next Monday, and there is any amount of rock in the vicinity waiting to be crushed. At Railroad, Clark's mill is kept running on rock from the Sundermiller mine. Operations have been temporarily suspended at the Chapman mine in consequence of the inability of the pump to keep the shaft free of water. A new pump will be put in as soon as practicable. At Mosquito Garland's mill will be started up next Monday on rock from Gass & Co.'s mine. Lamson has also a crushing out and will commence hauling to the mill immediately.

COLUSA.

MANZANITA.—Cor. Lower Lake Bulletin, June 12: The Manzanita (gold and quicksilver), is doing well under the management of Mr. George Senn, the enterprising Superintendent. Mr. Senn deserves much credit for his energetic effort to develop it into one of great worth, which it has already proved itself to be. The mine is turning out considerable quantities of very rich ore in gold, and the tailings pay well in quicksilver—being reduced by a process recently adopted. I have heard it asserted that the company intend very soon to increase their milling capacity, which, when put in operation, will insure employment for a considerably larger force, by which the laboring class in this section will be very materially benefited.

THE BUCKEYE (quicksilver), is in successful operation, employing a large number of men; only a small number are Chinese. Mr. H. Caswell, the Superintendent, has displayed great skill in re-opening the mine, which was greatly damaged by a cave during the winter of 1875-6, and which almost entirely cut off communication with the best bodies of ore. The facilities for extracting the ore are at present greater than ever before. The company are now constructing a fine-ore furnace, which the Superintendent thinks, when finished, will at least double the present production—the best ore being contained in the "fine dirt," of which they have now on hand a large quantity.

INYO.

MODOC.—Coso Mining News, June 16: If the accustomed car-load of bullion is not received in San Francisco for two or three days the present month, parties interested in the Modoc need not become frightened in the least, for they have only shut down for a day or two to make repairs to the engine and furnaces, which had become somewhat demoralized after so long and hot a siege. Probably will be running with accustomed regularity before this issue of the News is read in San Francisco.

BULLION SHIPMENTS.—Inyo Independent, June 12: The season of Rex Montis bullion shipments has opened. Superintendent Holt having shipped fine bullion to the value of \$2,800 during the past two weeks. With our knowledge of the value of the ore, it is not far from probable that Rex Montis will prove to be for the present season the most productive five-stamp mill on the coast.

PIUTE DISTRICT.—A pack train of 14 mules passed through town during the week, from Lone Pine, bound to the Johnson mill in Piute district, near Bishop, where they are to be employed in transferring from the mine to the mill about 200 tons of ore on the dump at the mine. The mill has been thoroughly reconstructed, and it is very probable that when the works start up this time it will be to some effect.

LITIGATION.—The Hidalgo mine in Darwin, which is included among the properties of the Santa Rita furnace company, seems about to be involved in serious litigation. Thomas Sheridan enters a complaint in the United States Circuit Court praying judgment against Tinoco, Fortune, et al, for possession of the mine, \$50,000 damages and costs of suit.

THE ECLIPSE.—Superintendent Nelson of the Eclipse has gone upon a flying visit to San Francisco, on business pertaining to some suits brought against the company, wherein the mill and personal property were attached. Bonds were promptly given releasing the property, and

Mr. Nelson has gone to get funds to pay off the debts, or at least such as he thinks are just.

LAKE.

UNCLE SAM.—Lower Lake Bulletin, June 10: From H. R. Callahan, Superintendent of the above-named quicksilver mine, situated on the southeast slope of Uncle Sam mountain, and about 10 miles from Lower Lake, we learn that work will be resumed immediately on the mine—a force of 10 men having already been engaged. Ten tons of ore will be shipped next week via Lower Lake to Sulphur Bank to be treated to test its percentage. Five tons are already in the dump, the other five will be taken out during the week. Mr. Callahan informs us that the prospect is excellent, and that it is the intention of the owners to give the mine a thorough test.

NEVADA.

GOLD DIRT.—Nevada Weekly Gazette, June 16: The North Bloomfield gravel company shipped by Wells, Fargo & Co., on Sunday morning last, over \$400,000 worth of gold dust, the proceeds of the last 15 or 20 days' run. The mine is just beginning to be opened so as to allow of profitable work. Next year the proceeds ought to be double that of this year. What a glorious thing it would be if the money taken out of the county could be kept here. Millions of dollars may be extracted from the ground yearly, but very little sticks to the county. Capitalists are needed to develop the resources of the county, but it would be better if local capitalists should do it, for then we would have more ready cash in circulation than any place in the world.

In the town of Eureka South is located the Blackhawk ledge, which is a set of rich wash and the rock from it is heavily charged with sulphurates. It is owned by A. Cochran, who is unable to put up machinery upon it, and would dispose of a liberal share of it for such purpose.

We saw some rock yesterday from the Black and Young ledge, located about one mile from Eureka South in this county, in a place called Rocky Glen, which shows gold very liberally, and it is thought will pan out first-rate. It is owned by John Dillbert. He has taken out a lot which is being worked at the mill.

ALASKA MINE.—Grass Valley Union, June 16: The Alaska is proving itself to be a pretty good mine. A clean-up was completed yesterday and the showing is good. Fifty-five loads of rock were milled, and gold to the value of \$5,000 was the result. This does not include sulphurates. The Alaska company have a strong and well defined ledge, which pays by mill process \$34 to the ton. That sort of affairs must be gratifying to the stockholders. Many Sacramento men are in that lucky list. The Alaska is superintended by Mr. Dodsword. It is confidently expected that a nice little dividend will be declared in July.

GRASS VALLEY NEW.—A fine ledge was struck in the shaft of the Grass Valley New mine on last Friday. The ledge is two feet in thickness and the rock has a fine appearance. Good judges pronounce it to be a good millable ore. The Grass Valley New is located near the Nevada road about a mile from Grass Valley. It has generally been facetiously termed the Gimlet, but we guess that name will now be dropped.

OAKLAND.—Active and regular work on this mine will begin this week. A water wheel which will drive a pump and enable the mine to be worked 200 feet in depth is to be put up, and by that time the owners confidently anticipate having gold enough on hand taken from the mine, to put up machinery of any capacity that may be required. The ore that has been taken out so far certainly justifies the anticipation.

GOOD PROSPECT.—Mr. Silvester is having his cellar under his store enlarged, and of course a good bit of dirt has to come out. The other day a friend of ours tried that dirt with a pan and found it pretty rich with gold. Had all the dirt been taken out and hauled through a sluice, gold enough to help materially to pay for the cellar enlargement would have been realized. Grass Valley's streets are paved with gold-bearing rock and its houses are built on gold-bearing earth and rock.

GOLD.—Nevada Transcript, June 16: A gentleman who claims to know, informs us that about \$100,000 in gold bars have been shipped to San Francisco from this city during the past week. Most of it came from Bridgeport and Bloomfield townships. Our mines are not quite played out.

BULLION.—On Wednesday afternoon the San Juan stage brought over a large amount of bullion from the Ridge. Sim Johnson, the express driver, had a little more than he could carry across the sidewalk to the wagon. He is a pretty stout man and we should judge there must have been in the neighborhood of \$30,000 in the express box.

PLACER.

THE SEASON.—Dutch Flat Forum, June 15: Since our last issue we have been having hot weather, which has caused the snow on the mountains above to disappear and we fear, hasten the close of the washing season. The various camps on the river have been working with unusual vigor, the Superintendents apparently realizing the importance of improving the remaining time.

The Star and Union have been off since the 1st inst., pending the driving of a powder drift into the point of gravel at the head of its rock cut, which was completed, the blast exploded on Monday and washing resumed on Tuesday. This claim has done well this season, notwithstanding the fact that the fine gravel has been removed. There still remains from three to six feet of the lower strata next to the bedrock, which we understand it is the intention to work off after the water falls.

The Baker claim continues washed on the gravel loosened by the blasts that were exploded in the latter part of April. Thus far only the top gravel has been removed, and it will take about three weeks yet to work off the bottom. At the largest one of these blasts was in a drifted ground, the result is looked for with considerable interest.

The Franklin is lying off running a powder drift. The Polar Star and Southern Cross are again running smoothly, using a large head of water, which is alternated between the two, one using it while the other is removing boulders. The Pacific is off owing to a scarcity of water. The Elmore Hill claim continues washing, but expects to put pieces worth from \$1 to \$7. They claim, however, not to be into their best ground yet. They are working gradually up the ravine, and expect soon to reach a piece of virgin ground that they think is good.

A. T. MOLIN is sinking away on a ledge near the old Calf Pasture, a mile or two north of Auburn, and though he keeps very quiet it is generally understood that he has a good mine. Only a week or two ago he crushed out 25 or 30 pounds of rock, which yielded him a little over \$4 per pound. Indeed it is understood he is realizing big wages from what he pounds out in a hand mortar between regular working hours, to say nothing about the good milling ore that he is taking out every day.

PLUMAS.

ANOTHER STRIKE.—A week or two ago we spoke of a fine prospect in a new ledge discovered between Soda creek and Long valley, or the head of Rush creek. It is owned by Geo. W. Williams, and the developments being made indicate that there is a first-class mine. The rock shows more free gold than any quartz in that section.

MIDDLE FORK.—The waters are fast receding to summer standard, and in a short time the Middle Fork will be way below the usual summer flow. Many old miners are now looking up and refreshing their memories about rich places in the river years ago, with a view of trying it once more, as this will be the most favorable year that has happened for a decade, if not the driest ever known. Mr. Swan is working a high bar, and has five or six men at work. His prospects are promising. Mr. Culver, of Hardscrabble, has leased his claims for the season, to Geo. Cass & Co. The Jackson Brothers, of the same locality,

are at work. Mr. Mason will enlarge his Long valley ditch this season. Mr. Hanson worked his claim for a short time this spring, with but little over half a head of water, and that too, in our most cold and stormy days. The result was entirely satisfactory, and will justify any outlay for improvements. If those San Francisco men, who are laboring to revive their defunct stock boards, would advise their capitalists to come to Plumas county and stop one month, and then invest on merit, and work the ground for the profits, in one or two years we would show the "cloud-hoppers" of any county in the State, who would have the largest purse.

SIERRA.

THAT BOMB.—Mountain Messenger, June 16: The Pioche mining company commenced boring on Wednesday last, and made 17 feet the first day. The machinery worked as well as could be expected, for a starter. Work will progress more rapidly when everything is in running order.

OREGON CREEK.—The Bald Mountain company has purchased the creek claims of Treloar and Lee, at Forest city, and will hereafter dump their tailings into the creek instead of running them through a mile of dunes. This will enable the company to work to much better advantage than ever before. The consideration is said to be \$11,000.

MONTICRISTO QUARTZ CO. are still engaged in pushing forward their bedrock tunnel, at Monte Cristo. They are in 220 feet, and have about 70 more to run before tapping the ledge, which will be accomplished early in August. Another when used to 30 feet below the creek, the quartz ledge, and the quartz looks splendid. San Francisco, Oakland and Stockton capitalists are interested in this mine.

TRINITY.

PAID WELL.—Trinity Journal, June 16: The Weaverly ditch and hydraulic mining company finished cleaning up in the Ward mine, on Oregon mountain, last week. Dust was taken out to the amount of \$4,300, which added to the result of a previous clean-up makes over \$8,000 as the result of the season's work. Superintendent Lovelidge tells us that the whole run of water for the season was only 300 hours, the average product of the mine therefore being at the rate of over \$25 a day. It is a pity that more water is not taken to that mine. There is enough rich ground there to pay for the construction of a long ditch.

"LUCK."—Miners are somewhat superstitious. One of our old chums used to swear "by Jolly" that the gold moved out of a claim if a certain unlucky devil happened to come there to work, or even looked over the bank. Another who used to 30 feet below the creek, the quartz ledge, and the quartz looks splendid. San Francisco, Oakland and Stockton capitalists are interested in this mine. It is a pity that more water is not taken to that mine. There is enough rich ground there to pay for the construction of a long ditch.

Nevada.

WASHOE DISTRICT.

CONR. VIRGINIA.—Gold Hill News, June 20: Daily yield 500 tons of ore of the same rich quality as that that heretofore extracted and milled. The ore stops on the 1500, 1550 and 1650-ft levels are both looking and yielding well at every point. The southeast drift from the ore stops on the 1650-ft level is still showing good ore. The east drift from the deep winze on the same level is also in fine ore. The ventilation of the 1650-ft level has been greatly improved by a strong current of air that passes from the 1550-ft level on forward through the shaft through the Consolidated shaft. The ore breasts and stops on the 1400-ft level are yielding splendid ore, and are showing rich as they are opened up further to the northward. Sinking the C. & C. shaft has been resumed.

CALIFORNIA.—Daily yield, 550 tons of ore. The ore stops on the 1600, 1500 and 1550-ft levels are showing splendidly at all points, and yielding rich ore. The north drift from the deep winze on the 1650-ft level is steadily advancing, and will connect with No. 4 winze in a day or two more. The large winze below the 1650-ft level in cross-cut No. 5 is being sunk below the 1650-ft level, and will not be stopped until it has reached the 1840-ft level, and been connected with a drift that is to be run in the meantime from the Ophir workings. Winzes Nos. 3 and 4 below the 1600-ft level are each making excellent progress, the bottom of both still in rich ore. A drift west has been started at a depth of 60 feet in winze No. 4. This drift has penetrated a distance of 16 feet, the face being still in rich ore. Sinking the joint double winze below the 1650-ft level is making excellent progress, the bottom still in rich ore. The yield of bullion for this month is far in advance of the yield at the same date in May, so that the payment of the usual dividend of \$2 per share is already assured.

YELLOW JACKET.—The main drift east at the 2200-ft level was in 107 feet this morning, and still continues in hard, dry, bird-eye porphyry. Even this apparently barren rock shows small spots and bunches of black sulphurates of silver sprinkled through it. The south drift at the same level is in 112 feet to-day and shows small stringers of quartz running diagonally across the drift in a southeasterly direction. No water is met with as yet in either drift, although it might be expected at almost any depth in drifting about at that depth. The new working shaft to the eastward is to-day down to the depth of 755 feet.

SILVER HILL.—The north and south drifts on the 650-ft level are being pushed forward with all possible energy, the prospect of finding paying bodies of ore growing better every day.

GOLD & CURRY. The pumps at the 1500-ft level are doing splendid work. The plug has been withdrawn, and the flow of water from the face of the main east drift on the 1700-ft level is being gradually drawn off and the face of the drift again advanced. As soon as the water is sufficiently drained the other cross-cuts will be forwarded in every portion of the mine and the value of the east ore vein determined in a very short time.

LEVATHAN.—Cross-cut No. 3, from the south drift at the 600-ft level, has been extended at least 30 feet through good ledge matter. Fine stringers and bunches of quartz are being constantly run through.

SOLID SILVER.—Work is resumed in this mine, which is situated on the north end of the Comstock range, in Cedar hill. From the main tunnel or adit, which is 1,200 feet in length, running north into the hill, following the ledge, cross-cutting is being done, both east and west, in excellent ore indications.

ALPHA CON.—The north drift on the 2000-ft level has penetrated to the Exchequer line, so that cross-cutting the ore vein in that portion of the mine is next in order. **BEST & BELCHER.**—The mine was never in as cool and fine a condition for rapid developments on the 1700-ft level as it is to-day. In a day or two more the east cross-cuts in the 1700-ft level will have drawn the head of water, and enabled the starting up of all of the prospecting drifts in that portion of the mine.

BELCHER.—Daily yield, 80 tons of ore, keeping the Santiago mill running, and making a reserve on which it is the intention to start up the Kelsey mill in a very few days. The east cross-cut from the south drift on the 1600-ft level is showing some good ore.

UTAH.—The south drift on the 1150-ft level is being pushed vigorously forward, the face still in quartz of a fine character. This drift will be driven forward until it connects with the north drift from the Sierra Nevada on the 1200-ft level.

BULLION.—Sinking the main incline below the 1500-ft level is making the best of progress. The north and south drifts on the 1600-ft level are each steadily advancing, the face of either drift in a fine character of ledge material.

OPHIR.—A small Cameron pump has been put in at the south winze below the 1700-ft level, as it was found that the flow of water could not be kept down without it. The bottom of this winze is still in very favorable quartz and ore.

IMPERIAL CON.—Sinking the south winze near the Yellow Jacket line is making the usual fair rate of progress, the bottom being in very favorable quartz and ledge matter.

MEXICAN.—The joint winze on the Ophir line is making the best of progress, the bottom following the foot wall of the ledge and showing some very fine quartz and ore. The east cross-cut on the same level is in very soft, favorable material.

ATLANTIC CON.—The main tunnel is being pushed vigorously ahead, the face in quartz of a fine character. The progress made is excellent, and the tunnel will in all probability strike the ledge at a depth of 50 feet below the present workings in running a distance of 50 feet further.

SIERRA NEVADA.—The south drift on the 1700-ft level is showing a very encouraging improvement. The winze now being sunk below the 1500-ft level, in the southern portion of the mine, is also showing some quartz.

JUSTICE.—Daily yield 450 tons of ore, keeping the mills all steadily running up to their full working capacities. The ore stops from the 400 down to the 700-ft levels are all yielding the regular amount of paying ore. The winze below the 800-ft level continues in excellent ore. The ledge and ore on the 1000-ft level is showing splendidly and promises a rich harvest.

JULIA.—The main south drift on the 1500-ft level is showing better ore than for some time past, and the indications are that instead of having passed through the best portion of the quartz and ore body on that level, that this drift is but just reaching its outskirts.

ALTA.—The shaft has reached a depth of 1050 feet, at which point it is the intention to open a station and run a drift to the ledge.

OVERMAN.—The main south drift on the 1300-ft level is making splendid progress, the face in fine quartz and ledge matter.

HALE & NORCROSS.—The water is reduced to a point 100 feet below the 1000-ft level.

LADY WASHINGTON.—The back wages due to the workmen at the time of suspending operations have been paid in full, and everything is being put in order with a view to resuming work in the mine as early as possible.

NORTON CON. VIRGINIA.—The extraction of the water has proven more of an undertaking than was at first expected.

CHOLLAR POTOMI.—Daily yield, 110 tons of ore, the average assay value of which is \$24.50 per ton.

UNION CON.—The north drift from the bottom of the winze below the 1300-ft level is making good headway, the face in ledge matter of a lively character.

SUTRO TUNNEL.—The header is running in very favorable working material, which drills and blasts well. It is principally ledge matter, requiring careful timbering. Streaks of low grade ore are quite frequently met with.

CALIFORNIA.—The north drift on the 1600-ft level is being pushed forward with all the vigor possible.

GROWN DIST.—The south drift from the main east drift on the 2000-ft level, now running in connection with the combination Belcher air and drain shaft, is being pushed ahead with speed.

SAVAGE.—The pumps are doing splendid work, and are kept running at the top of their speed. The water is now down 98 feet below the 1900-ft level, measuring the distance by the incline slope of the mine.

AYTON.—The men at the mine have received their pay in full, and preparations are being made to start the entire mine into full operation again.

CORNUCOPIA DISTRICT.

THE MINES.—Cor. Silver State, June 18: I do not know of anything new to say about the mines, only that those who think they know say that the present developments in them indicate greater prospects than have been seen ever before. There are a good many men employed, although the bullion shipments appear to be light, but will increase shortly. Some new locations have been made lately in this district, one, a new discovery, running across the Leopard, has been located by Phil Sullivan and others, which prospects well at the depth of 20 feet, as far as they are down at present. Another location has been made north of town which shows well on top. I had thought I could give you some items of interest from Mountain City when I saw Mr. Plummer of that place. He was here a few days ago, and speaks very encouragingly of that locality, but says that it will take time and money to develop it. He is going to stay there, being fully convinced that he will see the day when it will excel the days of its glory. He would not advise broken men to come there, unless for the parties who are working claims are not now prepared to employ everybody that comes along.

ELY DISTRICT.

ALPS MINING CO.—Pioche Record, June 16: Work progressing vigorously on the Washington & Creole and Maizeppa mines; a large force being employed working and extracting ore, of which 50 tons were shipped to the Concord mill during the week, and 50 tons more will be shipped either today or Sunday. Everything about the mines is looking well, and as the company will get well to work by the 1st of July they expect to make a good showing.

RAYMOND & ELY.—There is good progress being made all through the mine and the lower level is looking very well. The mill at Bullionville started 15 stamps to work on Monday. None of the ore from the lower level has yet been worked, as for the present they are confining themselves to ore from the upper levels.

HIGHLAND FURNACE.—The Highland furnace closed down on Wednesday evening on account of one of the smelters becoming sick from being leaded, and there being no one to supply his place. During the run 245 bars were run off, making about nine tons of bullion. The furnace started again on Monday, there being plenty of ore and other material on hand. The ore worked on this run was from Bristol district.

EUREKA DISTRICT.

THE K. K. MINE.—Eureka Sentinel, June 15: The mine has been under the management of Superintendent Arlington since last July, during which time he has done over \$40,000 worth of prospecting and dead work. The mine was started in September and has run continuously since that time with the exception of occasional stoppages for repairs. He has shipped to date 1,100 tons of bullion, worth on an average about \$300 per ton. This has returned a net yield, including ore and coal on hand, of about \$40,000. Counting the dead work that was necessary to be done, it will thus be seen that the mine has produced, over and above working expenses, something like \$80,000 since last September. These figures are only approximately correct, but they only serve to show that the K. K. is a most valuable property. Still better results may be anticipated when the seventh level shall have been fully opened.

PROSPECT MOUNTAIN.—The Oregonian mine is situated on the southwest slope of Prospect mountain and contains 1,000 feet. It is opened by a shaft and tunnel. The shaft is about 60 feet deep, and contains ore of a high grade. The tunnel is about 100 feet in length, and is designed to tap the lode 100 feet below the bottom of the shaft. There is ore at the end of the tunnel. The core mine is situated below the Matamoros on the west side of Prospect mountain. It is opened by two shafts. No. 1 is inclined and is 20 feet deep, and contains ore assaying in silver \$30 and in gold \$35. Shaft No. 2 contains ore of a high grade, as shaft No. 1. The Handy Andy mine is between the Matamoros and Williams mines. It is an old location opened by four shafts and a tunnel. The tunnel 35 feet in length—is being run, and is designed to tap the lode 100 feet below the surface.

THE HAMBURG DUMPS at the furnace are full of ore, necessitating a partial suspension of work until the furnaces can catch up. A new development has been made in the north shaft, Friday No. 2, a body of high grade ore having been met with in a winze on the 400-ft level. The mine never looked better at present.

Arizona.

PECK.—Arizona Enterprise, June 13: The increase made in the force on the Peck mine has made everything

The Tea Plant.

The culture of the tea plant and the production of first-class sewing circle material may be said to be one of the California problems. We have credit in all the encyclopedias with the ability to produce good plants, but putting the production upon a practical and profitable basis is another question and is, we believe, as far from satisfactory demonstration as it was when our first experiments were made. We chose the tea plant for illustration this week because its cultivation may still be considered as among our far-off possibilities, and because, as the illustration is a good one, the publishing of it may be of interest to our amateur students of botany, and for the information of readers generally. So far as the introduction of the plant as an element of agricultural production is concerned we have again the oft repeated assertion that the Asiatic fields are showing signs of decadence. Whether the report be true or not we have no present means of judging, but it may serve as a stimulus toward the determination of our latent resources. We have no reason to believe, from the present quality and price of labor in this State, that we can produce tea profitably, and yet why is there not the same field for the introduction of labor-saving machinery in production of tea as in other complex operations which have already yielded to the achievements of inventors? It is, however, chiefly with the intention of interesting readers who are not familiar with the appearance of the tea plant that we use it as an illustration.

Our engraving gives an excellent exhibition of the analysis of the plant botanically. As we read the studies of the botanist, it is now generally agreed that there is not sufficient reason to give the tea plant a genus of its own, but it must be classified as a species of the genus *Camellia*, and its name is *Camellia thea*. The tea plant differs from the other species of *Camellia* grown in this country, according to one authority, by having "longer, narrower, thinner, more serrate and less shiny leaves. Its flowers are axillary and nodding, and though only about an inch across, closely resemble those of a single *Camellia*. The sepals and petals are usually five, the stamens numerous, a portion forming by their united bases a cup, within which are numerous separate stamens. The fruit or pod is usually three-celled, with a single large seed in each cell." These points are well shown in the engraving. At the lower left hand corner are shown the tripartite pistil, the cross section of the three-celled ovary, and the three-celled seed-pod, when fully grown. At the right lower corner are sections of the seed, with and without its covering, and one seed split to show the position of the germ.

Such, in brief, is the plant which has given China a name throughout the world. Of the growth of it in China we have the following interesting description in the words of a traveler:

In the black tea districts of China, as in the green, large quantities of young plants are yearly raised from seeds. These seeds are gathered at maturity, in October, mixed immediately after and packed in sand and earth, in which they are kept during the winter months. In this manner they are preserved fresh until spring, when they are thickly sown in some corner of the farm, whence they are afterwards transplanted. Sometimes they are sown in rows where they are destined to grow, and consequently do not require to be removed. When about a year old the plants are usually from nine inches to a foot in height and are ready for transplanting. They are set in rows about four feet apart, in bunches or hills, three or four feet asunder along the rows, with five or six plants to each bunch. In some cases, however, when the soil is poor, as in many parts of Woo-e-shan, they are planted very close in the rows and appear like hedges when fully grown.

The young plantations are always made in the spring and are well watered by the rains which fall at the change of the monsoon in April and May. The damp, moist weather at this season enables the plants to establish themselves in their new quarters, and they afterwards require but little care, except in keeping the ground free from weeds.

When the winters are very severe, the natives tie straw bands round the young tender shrubs to protect them from the cold, and to prevent them from cracking or bursting from frost or snow.

A tea plantation, when seen at a distance, looks like a little shrubby of evergreens. As the traveler threads his way among the rocky scenery of Woo-e-shan, these plantations, which are constantly seen dotting the hillsides, afford a pleasing contrast to the strange and often barren surface by their rich dark-green leaves. When young, they are allowed to grow unmo-lested for two or three years, or until they are well established and producing strong and vigorous shoots. The practice of plucking the leaves is very prejudicial to this shrub, and the natives always take care that the plant shall be in a vigorous and healthy condition before this operation is commenced. Even when the plantations are in full bearing they never take many leaves from the weaker plants, in order that their growth may not be checked. For, under the best mode of treatment and on the most congenial soil, they ultimately become stunted and unhealthy and are never profitable when old. Hence, in well managed tea districts, the natives annually remove old plantations and supply their places with fresh ones.

The Gum Arabic Tree.

We have many acacia trees in this State, and they grow well in some localities, while in others they are destroyed by a scale insect. We are not aware of the species of all the acacia trees in the State, nor do we know whether any one has the "Egyptian Gum Arabic Tree" (*Acacia Vera* L.). If not, the introduction of it would seem to be a matter of interest, and possibly the foundation of a promising industry. The locality in which the experiment might be tried would have great influence upon the result, for the tree is represented to be fastidious grower. It is said to be doing well in Florida, and Mr. Benjamin Hall gives the Florida *Agriculturist* the following interesting account of the tree: "This semi-tropical tree, or, more properly, shrub, rarely exceeds fifteen feet in height, and is remarkable for its peculiar, crooked shaped trunk. Its foliage is of a pale green color, and may be said to be the most beautiful of the acacia family. It puts forth its flowers in March, and its seeds, which grow in a hard, coriaceous pod, somewhat resembling the *Acacia jombosia*, and its seeds those of the lupine, which

hotter, incisions are generally made through the bark to assist the exudation of the gum. The gum when new emits a faint smell, and when stowed in the warehouse, it may be heard to crack spontaneously for several weeks, and this cracking is the surest criterion of new gum, as it never does so when old. Several kinds of gum, yielded by different trees, are occasionally to be met with, but that which is commonly substituted for it is brought from the island of Senegal, on the coast of Africa, and is called "Gum Senegal." This tree is remarkably sensitive to sudden changes of the weather, and its leaflets are open only to the rays of the sun. There are several trees growing successfully on the Indian river, and appear to be adapted to this soil and climate. This tree is possessed of much merit, and is worthy of culture, both for ornament and profit. It is propagated by its seeds, which can be obtained by mail, at letter postage rates, through the American Consul, resident in Cairo, or Alexandria, in Egypt."

SINGULAR FORMATIONS.—The character of the bed-rock at and near Point Bar, on Trinity river, is very different from the general run of river mines. In a general way deep places in



THE CHINESE TEA PLANT.

yields a reddish dye, used by tanners in the preparation of leather. This tree, which affords the finest gum arabic of commerce, is native of the sandy deserts of Arabia, Egypt, and the western parts of Asia; it also grows abundantly in Barbary and other parts of Africa, particularly on the Atlas mountains. In Cairo and Alexandria in Egypt, many streets are adorned with this tree, which is set on either side. In Morocco, where this tree is called "Attelep," large quantities of this gum are collected for export. The trunk of this tree is covered with a smooth, gray bark, while that of the branches is of a yellowish green or purple tinge. At the base of the leaves there are two opposite awl-shaped spines, growing nearly erect, and having a slight glandular swelling below. The wood is hard, and takes a good polish. The gum exudes spontaneously from the bark of the trunk and branches of the tree in a soft or nearly fluid state, and hardens by exposure to the air or to the heat of the sun. The more sickly the tree, the more gum it yields, and the hotter the weather the more prolific it is. A wet winter and a cool or mild summer are unfavorable to the crop. The gum begins to flow in Egypt in December, in Florida in March, immediately after or near the time of the flowering of the tree. Afterwards, as the weather becomes

the bed-rock, unless they are regular channels or crevices, pay nothing; the pay dirt not extending below the level of the surrounding rock, but continuing along in the gravel at that level. At and near Point Bar, the reverse is the case, the best and richest pay having been always found in deep depressions of the bed-rock. On Point Bar itself some four or five of these deep places have been found, filled with big boulders and blue gravel, rich in gold. The deep places are from thirty to a hundred yards long, fifteen to thirty yards in width and of a varying depth. One in the river, a short distance below the old store and garden, was twenty feet deeper than the water in the channel, and looked like a long, deep hole in the bed-rock, as in fact it was. Hughes & Wallace have found two such depressions in their claim opposite Garden Bar, one mile below, both of which prospect well; and so far as worked have paid well. It is the only place along the river that we know of, where anything like a "pothole" pays anything below the level of the surrounding rock.—*Trinity Journal*.

THEY have the leaching process in full blast at Leeds, Utah. They now leach only two tons in a day, but will soon be able to treat five tons per day.

THE ENGINEER.

The Canadian Pacific Railway.

We have heard but little lately of this great enterprise to which the Dominion of Canada is committed, but some interesting information as to the progress and position of the railway is afforded in a report just issued by Mr. Sandford Fleming, the chief engineer of the undertaking. The surveys or examinations made by Mr. Sandford Fleming and his associates have not all been of the same character, but they have varied according to circumstances. They may be subdivided under six heads: First, explorations; secondly, exploratory surveys; thirdly, revised surveys; fourthly, trial locations; fifthly, location surveys; and sixthly, revised locations. At the commencement of the survey, all the sources of information open to inquiry with regard to the passes through the Rocky mountains were consulted; and after careful examination, it appeared that two passes known as the Howse and the Yellow Head possessed advantages which, taken in conjunction with the approaches to them, called for further examination. It was evident that the obstacles which intervened between the passes and the coast of British Columbia were of a serious character, and that the selection of the pass through the main Rocky mountain range depended on the discovery of a practicable line across the whole mountain region. After various examinations, the Yellow Head pass was preferentially selected, and it was found that it was possible to reach the coast by the course and outlet of the rivers Thompson and Fraser, the line terminating at an excellent harbor on Burrard inlet. It was ascertained that portions of the route through the Rocky mountain region would be expensive, but that the engineering features which govern the cost of working a railway and transporting goods promised to be much more favorable on the Canadian line than on the American route.

Ten routes have been opened for consideration by Mr. Sandford Fleming and his assistants. These routes terminate on the coast of the main land at seven distinct harbors, but they all converge on Yellow Head Pass. The line has been "located" with sufficient accuracy to admit of the construction of an overland telegraph. Upwards of 1,000 men have been employed in the surveys directed by Mr. Fleming, and the routes explored amount in the aggregate to nearly 46,000 miles. Of this aggregate, eleven thousand five hundred miles were laboriously measured yard by yard, through mountain, prairie, and forest, with spirit level, chain, and the usual appliances. Mr. Fleming is obliged to admit that, although several routes are available from the Rocky mountains to the Pacific coast, it cannot be claimed for any one of them that it is free from constructive difficulties.

PROGRESS ON THE BROOKLYN BRIDGE.—The work of laying two of the four great cables of the Brooklyn bridge is now in progress. The steel billets out of which the wire of these cables is manufactured, says the *American Manufacturer*, are from the works of Messrs. Anderson & Passavant, of Pittsburg, and, as delivered, are drawn to a fourth inch in thickness. The work of preparing the wire from these billets is done at a manufactory in Brooklyn. Before being galvanized this wire measures 165-1000 of an inch in diameter. Before being sent to the bridge it is galvanized and receives two coats of oil, increasing the diameter to from 168-1000 to 173-1000, weighing in coils of from 800 to 1,200 feet, not less than 60 pounds. On the anchorage the wire receives another coat of oil, and is wound on to drums in lengths of about 10 miles, the wires being spliced, and from them is paid out and brought to the New York anchorage by means of the carriers. The cables, of which there will be four, when complete will consist of 19 strands of 330 wires each. It is thought that one strand for each cable can be completed in one month, at which rate it will take nineteen months to finish the cables. The cables will measure about 15½ inches in diameter, and weigh some 800 tons each.

IMPROVEMENTS IN THE OHIO RIVER.—It appears that measures are being taken by the proper officials to secure to the United States government a title to needful grounds on the river, for the construction of an experimental dam at the head of Davis island. The *American Manufacturer* says this is intended to test the suitability and efficiency of the proposed lock and dam system for the improvement of the navigation of the Ohio river. Such a dam will not only afford the required test, but will subserve the very important end of raising the water in our harbor, so as to facilitate, at all times, navigable communication between its various parts, and present to the fleet transporters water-room and depth for making up their tows, and having them always in readiness to depart on the flood tides. At these periods a channel four hundred feet in breadth will be opened in the dam, giving ample room for the easy descent of the tow-boats with their long and wide-spaced convoys.

WHAT IS AN ENGINEER?—At the last meeting of the English Society of Engineers the President, Mr. Vaughn Pendred, stated in his address that in the highest sense of the term an engineer is a man who cannot only invent or de-

wise but execute; in a subsidiary sense every man who can construct is an engineer. Such an admirable definition, says the *Mining Journal*, can offend no one, for it will include not only the Telfords, but the Stevensons, and the builders of such elegant bridges as that which recently doubled up in Germany, but also the entire manufacturing population of the world, from Sir Joseph Whitworth to the itinerant tinker; it will account, too, for the freedom with which the title of engineer is assumed by men of all classes and possessing various degrees of knowledge, and should have the effect of largely increasing the number of members of that useful society of which Mr. Pendred is the able representative. Admitting that every man who can construct is an engineer, there will be less difficulty in accepting the President's gratifying assurance that the whole army of engineers, civil and mechanical, has operated from the earliest ages to the present moment in the achievement of a great work, no less a work than the civilization of mankind, and that he is enunciating a great truth in declaring that engineers have done more to raise men to the high level which they now occupy than even the philosopher or the statesman; that engineers are the great civilizers of mankind, and that nearly all that is good, or pleasant, or worth having in modern life—happy engineers—results from their labors.

CROOKED RAILWAYS.—We read of something abroad which has been hinted at in our own country. The crooked nature of the railway from Galatz westward parallel with the Danube is a peculiarity which there is nothing in the surface of the land to account for. A correspondent of *Le Temps* explains that in following out on the map the capricious zigzags which the principal Roumanian railway describes, a circumstance which becomes more complicated in the eyes of the traveler by reason of a number of curves of a utility more than questionable, one asks himself the reason of this extraordinary antipathy for straight lines, which has placed under the cannon of the Turks an important point in the line of communication so valuable, since it would have been both more direct and safer to have one line run ten good leagues distance in the interior. Here is the singular explanation they give, such as it is. The Roumanian railway was undertaken by Strousberg. It was a memorable impudence, to speak with prudence. One of the stipulations of the contract was that there should be a certain subvention per mile, and this was accorded before the line was laid out. The contractor accordingly lengthened his line with curves to the utmost possible extent.

GRANITE RAILWAYS.—A French engineer has proposed to establish tramways with granite tracks in lieu of rails, in Finisterre. He is of opinion that this system is far preferable to the ordinary railroads. There already exists a vast network of what are in truth tramways with granite rails, worked by horse traction, in northern Italy. In the streets of the principal towns, and sometimes on the roads, tracks of granite are laid in the highways. The surface of these tracks being flat and perfectly smooth, the wheels of the vehicles glide over them with the least possible friction. The conductor of each vehicle takes care so to guide it that the wheels always remain on the granite. The author of the project maintains that there is nothing to prevent the granite lines from being used by carriages driven by steam power, in like manner as though drawn by horses. At the same time it is not proposed to adopt the train system on granite tracks; each carriage will be provided with its own steam power, will move by itself, and be guided by means of a mechanism specially devised for the purpose.—*Pull Mall Gazette*.

THE INTERIOR SEA IN ALGERIA.—From the recently published report by Rondaire on his mission to the Chotts, between Biskia and the Gulf of Gabes, in North Africa, *apropos* of the project of making an interior sea, the *English Mechanic* learns that some 25,000,000 to 30,000,000 cubic meters of sand would have to be displaced directly. The probable expense is put at 25,000,000 to 30,000,000 francs. The water of the Mediterranean would be depended on to effect the deepening of the trench, to the extent of 110,000,000 cubic meters.

THE WATER ROUTES FROM CHICAGO TO NEW YORK.—Erie canal-men have reduced their charge to four cents per bushel on corn from Buffalo to New York; the lake vessels are carrying from Chicago to Buffalo for two cents, and, adding the elevator charges at the latter place and the insurance, the total cost of sending a bushel of corn from Chicago to New York is now about seven and a half cents, the rate being about 16½ cents per bushel. Last year the canal rate alone was nine cents on corn, which was a large reduction from former charges.

AN EASTERN ENGINEER COMING.—The *Railway Age* announces that Major Lyman Bridges, of Chicago, well known as an engineer and bridge builder of high repute, is about to take a tour of observation through California and several of the Territories, and has kindly consented to favor the *Railway Age* with a series of communications upon railway matters in those regions. Major Bridges's familiarity with railway construction in this country and Europe will make his letters of special interest to readers.

USEFUL INFORMATION.

Poisons in White Rubber.

We have lately alluded to the dangerous qualities in this substance. The subject is worth further description and we quote from the *Manufacturer and Builder* as follows: Rubber is at present largely adulterated so as to make it cheaper. The overshoes and boots made of this material are adulterated with finely-ground burned potter's clay, of which it can stand as much as 65 per cent, without losing its fitness for the purpose. The adulteration is harmless, only the material is not so strong, and the shoes or boots, instead of lasting several seasons, as the old-fashioned little or non-adulterated material, scarcely last one season, as they tear very easily and holes soon wear in them. While the pure rubber is stronger than the best leather, the adulterated rubber is less strong than the worst leather.

Rubber hose and sheet rubber are usually adulterated with soapstone. This gives a lighter color to the material, while the burnt clay adulteration leaves it dark-colored, which is preferred for shoes. But some adulterations are hurtful, being poisonous in their nature. Such is the adulteration with zinc-white, which makes the rubber very light-colored, and is used in the rubber for nursing-bottles and children's toys. The effects of zinc poisoning on the system are scarcely less alarming than lead poisoning. Some time ago a little child in Pennsylvania died from chewing a paper collar, which, like many paper collars, was prepared with zinc-white; and cases are now on record where children have become sick from keeping rubber toys in their mouths. So many cases of zinc poisoning from the white nipples of nursing-bottles have already occurred, that the use of zinc in them has been mostly abandoned. These rubber nipples, or dolls, when laid in vinegar, become covered with an incrustation of zinc acetate. In one case, in 0.73 gram of a doll 0.45 gram of zinc oxide was found, (over 60 per cent.) In subjecting such rubber objects to a red heat, 62 per cent. of ashes remained, while the ashes were yellow while hot and became white on cooling, which is the characteristic behavior of zinc oxide, called zinc-white. In another case, in a doll warranted harmless, 58 per cent. of ashes was obtained, mostly all zinc oxide.

Several chemical journals are now calling attention to these facts, and it is to be hoped that it will effect an amelioration in the consciences of the manufacturers.

TO DISCOVER COTTON IN WOOLEN FABRICS. The *Journal of Chemistry* says: Ravel out the suspected cotton fiber from the wool and apply flame. The cotton will burn with a flash, the wool will curl up, carbonize, and emit a burned, disagreeable smell. Even to the naked eye the cotton is noticeably different from the filaments of wool, and under the microscope this difference comes out strongly. The cotton is a flattened, more or less twisted band, having a very striking resemblance to hair, which, in reality, it is; since, in the condition of elongated cells, it lines the inner surface of the pod. The wool may be recognized at once by the zigzag transverse markings on its fibers. The surface of wool is covered with these furrowed and twisted fine cross lines, of which there are 2,000 to 4,000 in an inch. On this structure depends its felting property. Finally, a simple and very striking chemical test may be applied. The mixed goods are unraveled, a little of the cotton fiber put into one dish and the wool into another, and a drop of strong nitric acid added. The cotton will be little or not at all affected; the wool, on the contrary, will be changed to a bright yellow. The color is due to the development of a picrate.

LIQUID WATERPROOF SHOE POLISH.—The following is said to be a good formula for the purpose: Dissolve 1 oz. of india rubber in 1 pint of oil of turpentine by the aid of a water bath, preventing loss; dissolve 15 ozs. of pure beeswax, 2 ozs. of Burgundy pitch, and 1 oz. of gum olibanum in 4 pints of oil of turpentine; then rub 2 ozs. of the finest lamp-black with 1 pint of oil of turpentine to a smooth mixture, and mix the three solutions. Add now ½ pint of copal varnish and afterwards 5 pints of lime water in quantities of 4 ozs. at a time, stirring after each addition, and continuing the stirring after the whole of it is added for some time afterwards. The mixture must always be well stirred up before any is taken out for use.

COPPERING IRON AND STEEL, DRY WAY.—In cases where it is desired to give a stout coating of copper, brass or bronze to wrought or cast-iron goods, and a uniform thickness is not essential, a sufficient quantity of the metal is set to melt in a crucible. Its upper surface receives a layer of Gaudoin's flux, a mixture of cryolite and phosphoric acid, and the article, heated to the temperature of the bath, is placed in it. If the article is heavy, it will be well to heat it gradually and thoroughly, both to avoid unequal expansion and to obviate the danger of the coating peeling off in consequence of unequal contraction.

KETTLES.—The old notion that a three-legged tea-kettle boils soonest, is correct, because the legs conduct heat more rapidly than the plain surface alone.

Durability of Timber.

The durability of timber is almost incredible. The following are a few examples for illustration, selected for the *Railway Age*, from various sources, and vouched for by scientific men.

The piles of a bridge built by Trajan, after having been driven more than 1,600 years, were found to be petrified four inches, the rest of the wood being in its ordinary condition.

The elm piles under the piers of London bridge have been in use more than 700 years, and are not yet materially decayed.

Beneath the foundation of Savoy place, London, oak, elm, beech and chestnut piles and planks were found in a state of perfect preservation, after having been there for 650 years.

While taking down the old walls of Tunbridge castle, Kent, there was found in the middle of a thick stone wall a timber curb, which had been enclosed for 700 years.

Some timber of an old bridge was discovered while digging for the foundations of a house at Ditton park, Windsor, which ancient records incline us to believe were placed there prior to the year 1396.

The durability of timber out of ground is even greater still. The roof of the basilica of St. Paul, at Rome, was framed in the year 816, and now, after more than 1,000 years, it is still sound, and the original cypress-wood doors of the same building, after being in use more than 600 years, were, when replaced by others of brass, perfectly free from rot or decay, the wood retaining its original odor. The timber dome of St. Mark, at Venice, is still good, though more than 850 years old. The roof of the Jacobin convent, at Paris, which is of fir, was executed more than 450 years ago.

The age of our country's settlement does not enable us to refer to examples of like antiquity; but no good reason appears to exist why timber may not be as durable in America as in Europe. Many old white-pine cornices here exist, which, having been kept properly painted, have been exposed to the storms of more than 150 years. The wood is still sound, and the arisies are as good as when they were made; while freestone, in the same neighborhood, has decayed badly in less than 50 years.

THE COST OF FEEDING PARIS.—The cost of the daily dinner of the Parisians has been calculated by one of the French papers as follows: Bread, about 275,000 francs; wine, 250,000 francs; beer and cider, 15,000 francs; water, for cooking and drinking purposes, 6,500 francs; sausages, pig's feet, etc., 8,000 francs; pates and crabs, 5,000 francs; oysters, 4,500 francs; eggs, 17,500 francs; butter, 11,000 francs; beef, 230,000 francs; veal, 20,000 francs; mutton, 35,000 francs; pork, 33,000 francs; poultry, 24,000 francs; fresh water fish, 2,000 francs; sea fish, 16,000 francs; vegetables, 200,000 francs; entremets, fine and ordinary pastry, 50,000 francs; cheese, 4,000 francs; fruits and preserves, 12,000 francs; brandy, liqueurs, etc., 50,000 francs. This gives a total of 1,268,500 francs, or about \$255,000, with the addition of 5,000 francs, estimated cost of toothpicks, making altogether an average cost of 25 cents per head as the daily cost of the nourishment imbibed by the Parisians.

PRIMING FOR VARNISH.—Mr. W. R. Lake has patented, in England, an invention for preparing wood for varnishing, which consists of a mixture of "finely powdered flint, quartz or felspar, which are non-absorbents of moisture, is mixed with a suitable liquid, as oil or varnish, colored and applied to the wood by rubbing into its pores with a cloth pad."

GOOD HEALTH.

Do Not Check Perspiration.

Nearly every one knows it is dangerous to check perspiration quickly, and yet many forget to practice the truth they know. The weather has been unusually hot, and the heat may return. Let the following be a hint for behavior. *Hall's Journal* says checked perspiration is the fruitful cause of sickness, disease and death to multitudes every year. If a tea-kettle of water is boiling on the fire, the steam is seen issuing from the spout, carrying the extra heat away with it, but if the lid be fastened down and the spout be plugged, a destructive explosion follows in a very short time.

Heat is constantly generated within the human body, by the chemical disorganization, the combustion, of the food we eat. There are 7,000,000 of tubes or pores on the surface of the body, which in health are constantly open, conveying from the system by what is called insensible perspiration this internal heat, which, having answered its purpose, is passed off like the jets of steam which are thrown from the escape-pipe, in puffs, of any ordinary steam engine; but this insensible perspiration carries with it, in a dissolved form, very much of the waste matter of the system, to the extent of a pound or two or more every 24 hours. It must be apparent, then, that if the pores of the skin are closed, if the multitude of valves, which are placed over the whole surface of the human body, are shut down, great harm results. The great practical lesson which we wish to impress upon the mind of the reader is this:

When you are perspiring freely, keep in motion until you get to a good fire, or to some place where you are perfectly sheltered from any draft of air whatever.

Cooling off suddenly when heated sends many of our youth to an early tomb. It is often a matter of surprise that so many farmers' boys and girls die of consumption. It is thought that abundant exercise in the open air is directly opposed to that disease. So it is; but judgment and knowledge of the laws of health are essential to the preservation of health under any circumstances. When over-heated cool off slowly; never in a strong draft of air. Gentle fanning, especially if the face is wet with cold water, will soon produce a delightful coolness, which leaves no disagreeable results.

Pure Milk for Infants.

The ills which the innocents have suffered through the drinking of impure milk form one of the most startling chapters of modern hygienic literature. It is wise when we know the evil exists to guard against its coming to our loved ones. Prof. James Law, of Cornell University, writes on the subject to the *New York Tribune* many useful suggestions:

The milk must be obtained from a sound, healthy cow, as it is unquestionably tainted in some cases before it leaves the udder.

Few people have any idea of the perfect cleanliness necessary to the preservation of milk. An ordinary washing with water, though uncomfortable for the hands, or even with soapuds, is utterly insufficient. There should first be the thorough cleansing of the dish, and then a rinsing with water at a boiling temperature, which must be poured out, and the vessel dried by simply inverting it over a drawer or table, but without the possibility of contact of its interior with any solid body. If dried with a towel, or if hand or finger, or, indeed, any solid body, is brought in contact with its interior after it has been scalded, organic matter, bacteria, and other germs may be deposited which will precipitate decomposition in the milk placed in it. But if the vessel is first carefully cleansed from all organic matter that may cover and protect such germs, then rinsed out with boiling water, set aside to drip, and finally filled with milk, having had nothing touch its inner surface from the contact with the boiling water until now, such vessel will not communicate to the milk any decomposing element. Every vessel, from the pail which receives the milk as drawn from the udder, to the bottle from which the baby sucks its supply, must be treated in the same way. In the case of babies' bottles, it is best to keep two, to be used alternately, the one with its tubes and the teat being thoroughly washed with soda, and then immersed in a dish of pure water until wanted, when it may be taken out and scalded before the milk is put in.

As regards temperature and antiferments. None of the chemical antiseptics are entirely unobjectionable. Boiling of the milk renders it more indigestible, and tends to produce costiveness. The only unobjectionable method is to secure perfect purity of dishes and milk, and to keep the latter at a low temperature. A sufficient degree of cold may be obtained in any house, with no expense and little trouble, by simply enveloping the dish in which the milk is kept in a wet towel, from which evaporation will go on constantly. A tin can with cover, enveloped in a wet cloth, will not only be kept very cold, but will be protected against the access of germs which would superinduce decay. I have in this way kept milk for the baby, perfectly sweet and good, in the warm rooms of a boarding house, in midsummer, while the landlord failed to keep the same milk sweet for half the time, though in a cellar and abundantly surrounded with ice. The great superiority of the wet-cloth preservation consists in its filtration from the air of all germs of decomposition which would otherwise gain access to the milk.

EAU DE COLOGNE AS AN ANÆSTHETIC.—At a recent meeting of the Nice Society of Medicine, Dr. Hughes presented some observations upon the anæsthetic influence of Eau de Cologne, which he had recently noticed. In one instance, that of a young lady afflicted with tubercular consumption, and with whom injections of morphine and the use of chloral had failed to produce the desired repose, a friend suggested a trial of Eau de Cologne, which she had already used with success in similar circumstances on some twenty different occasions. An immediate experiment was made, by placing a handkerchief well moistened with cologne under the nostrils of the invalid, who, in the space of seven minutes, sank into a profound slumber. The same experiment was repeated in other cases, with excellent results.

FORCE-GIVING FOOD IN SUMMER.—Brown bread, oatmeal and fruits are all force-giving, but to a less extent than fats, yet sufficiently so for the requirements of the season, and those persons much who have very muscular work to do may use more freely force-giving foods in hot weather than those whose labor is sedentary and light. From experiments which we have seen tried, over and over again, however, we are satisfied that even farmers, in the hottest days of summer, who are obliged to work in the harvest field can do more work, suffer less with heat, and incur less risk of sunstroke by following the rules we have laid down, than by using a highly carbonized diet of oils and fats.—*Dr. Holbrook*.

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SAN FRANCISCO:

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The Week.

The principal feature of the week in connection with the mining interests, has been the very sharp advance in mining stocks and the equally sharp decline which followed. This little spurt has been quite disastrous to small buyers, who, after a couple of days' rise, went in only in time to have their margins cleaned out in the fall. This fluctuating in prices so suddenly only proves that something more than mere rumor is needed to sustain the market at present.

The various hydraulic mines throughout California are beginning to think of final clean-ups for the season, as the water is giving out pretty fast. The remainder of the summer must be passed in preparing for the fall rains and getting the claims in order. Of course many mines are still washing, but this will not continue much longer. There is nothing special to chronicle in connection with the quartz-mining interest, other than what we have mentioned in our "Mining Summary." In a general way, the most exciting news of the week is that of the uprising of the Indians and massacre of settlers in Idaho. In the first conflict with the troops the Indians have had the best of it. If the dispatches state the truth our troops are not to be praised for bravery, as they broke ranks and retreated in spite of all the officers could do to prevent them. Captain Theller and Captain Trumble were both killed, as were a number of troops. The Indians are well armed. The War Department seems to be taking unusually active measures for the concentration of troops, and will doubtless close this "war" quicker than those carried on against the Modocs or the Apaches.

Alluvial Mining.

The deposits of auriferous gravel in the State of California are even more immense than was supposed a few years ago, and they are now being mined in every direction. New deposits are being found and opened, and new channels discovered. In another column will be found the details of the latest discovery of this kind, in Nevada county. Not content, however, with mining the beds of the ancient pliocene rivers, our progressive miners are devising all sorts of plans to get the gold out of the present river beds in places where the flow of water prevents their working the bed by wingdam and flume. True, this year, owing to the dryness of last winter and the consequent small flow of water, the upper parts of some of the big rivers are now being worked in this way; but means are also being arranged to get out the gold where the flow of water is heavy and continuous.

One way now being tried is to sink shafts on the banks and drift under the river bed and get the gravel out that way. The Yuba River mine, worked in this way, struck pretty rich gravel a few weeks since and the projectors think the enterprise is success, and they will have many followers. A similar scheme, however, tried in the Feather river last year has been abandoned.

Another method now being tried is with the "mining machine," at work in the Feather river, near Oroville. This machine—a sort of boat—takes up the debris from the bottom of the river and discharges it into a flume. It is claimed that this machine is a perfect success, and others are now being built and contracted for. The machines cost about \$10,000 each, and while they are highly praised by one of the local papers where they are at work, another one condemns them.

Still another plan for working river beds, only applicable, however, to particular localities of favorable geographical features, is being tried on the South Yuba river. In this as in other rivers in this State, vast amounts of rich gravel and tailings pass down every year, from the gravel claims discharging into it, so that the bottom is very rich. The Nevada *Gazette* describes a method of working the bed, without having to put up an expensive flume, which is liable to be washed away at any time. A point has been selected at the old Hoyt road crossing, where the river makes a horseshoe bend around a projecting point, and here it is proposed to construct a tunnel large enough to take the entire stream at all moderate stages of water. This tunnel will be flumed and paved in the usual way, and also have undercurrents at its lower end. By having proper head gates at the entrance of the tunnel the flume is made perfectly secure from damages or loss by high water, and the flow through it can be regulated to suit the capacity of the flume at all times. The tunnel will be one thousand feet in length, twelve feet wide and eight feet high, with a grade of three inches to the box. The location has been carefully planned and surveyed, so as to secure every advantage which a work of such importance, and requiring such a large outlay of capital, should have. The head of the tunnel will tap the river eight feet below its bed, while its mouth will be above the highest water mark. The proprietors of this enterprise have gone quietly to work without display, buildings have been erected, materials hauled upon the ground, and the tunnel is now progressing through hard granite, at the rate of five feet a week, with one shift at work. In a short time three shifts will be at work and it is expected that at least fifteen feet per week will be made until the work is completed.

COAL AT PALISADE.—The recently discovered coal mine at Palisade is developing into a fine vein. Messrs. Ferguson & Young are busily engaged sinking a shaft and have attained a depth of 20 feet. The vein grows larger and better-defined as developments are made, and the company are very sanguine of the future importance of the mine. Quite a quantity of the article has been brought to Palisade and submitted to various tests, all of which have proved that it is of a superior quality. Johnny Bell tried it in his engine and claims it is better than the Rocky mountain product. Prof. Price examined a specimen and pronounced it a first-class article of coal. The benefits that will accrue to Palisade in the event that it proves to be a permanent and large deposit can hardly be estimated. The great want of the Central Pacific railroad is coal, as at present they are at the mercy of the Union Pacific and draw their supplies from that source. Any discovery that would render them independent would immediately command a large price, and we have no doubt but they are watching the developments at Palisade, ready to become purchasers at the right time.—*Eureka Sentinel*.

AT FOREST CITY, Rev. W. P. Koutz will deliver the 4th of July oration. A handsomely executed poster, from the office of the Downieville *Messenger*, gives an interesting programme of exercises, which will doubtless be enthusiastically carried out, in that patriotic altitude of the high Sierras.

The Black Hills.

We had a conversation this week with Mr. Murry Dunham, of Oakland, who has just returned from the Black hills, and elicited from him some interesting facts concerning that region. He says the region is one about which two entirely different accounts may be given and yet both be true, which is probably the reason why so many contradictory stories are current. One thing, however, admits of no contradiction, which is, that the place is the worst one for a poor man that can be conceived. If he depends on his labor alone he cannot possibly make a living. Any man is foolish to go there thinking that he will be able to get a living by working for other people in case he does not strike a rich claim. There are lots of men there now willing and glad to get a chance to work for their board. Provisions and tools are very high. No credit whatever is given. The richest man in the country could not get trusted for 10 cents' worth of grub. Nothing but hard cash will satisfy the people in there, most of whom, who have anything to sell, are Eastern men who have had no experience in mining camps and are the "closest" people that ever lived.

All the placers except Deadwood and a very small portion of Whitewood gulch are very deep; these gulches are deep, too, but have plenty of fall. The water is very scarce. French creek has only between 10 inches and a foot fall to the mile, and the diggings are from 25 to 40 feet deep. If a man had means to drift out the gravel he might make it pay, but it would take a good deal of money, pumps, etc. They have never found anything very rich in French creek, although the original town of the hills was started there, on rim-rock prospects. The streams there do not seem to rise in the hills as they do here at all. The hills are broken and stand alone. The streams run through the plains toward the Cheyenne and other large streams that eventually empty into the Missouri.

As to quartz, there is plenty of it in the hills, and nearly every man you meet has a rich "ledge," but wants to sell it. Mr. Dunham does not think, however, that there is a regular true fissure vein in the country. The quartz is simply in deposits which seem to extend over the whole region. One can sink almost anywhere from two to five feet and he is sure to find it, more or less rich. If the prospectors do not find free gold in the quartz they consider it of no value, and try again. The probability is that they will find better claims than those already located when they begin to examine the quartz more carefully. There are seven quartz mills in the hills and one arastra; Mr. Dunham met on the road the machinery for 15 more mills, which will be put up immediately.

In most of any of the quartz mines two men can get out ore enough to keep a 20-stamp mill running, as the deposits are all surface, so that few miners can find work getting out quartz. They strip off the top dirt and put in a giant powder cartridge so as to break out the rock easily. These quartz deposits seem to be from four to 15 feet deep.

The hills seem to be right down in a pot-hole about 3,000 feet below Cheyenne, and the streams all run through on a level with the plains. Mr. Dunham thinks that Deadwood will fizzle out soon and the town of Troy, formerly Gayville, will be the center of population of the hills. Deadwood, however, has got a pretty good start.

In Mr. Dunham's opinion the Black hills country is the best prospected one he ever saw. There are so many men there with nothing else to do that they keep at it right along, and have gone over every foot of ground where they thought it likely they might find something. They will tell a stranger that if they could only get down to the old channel of French creek and have pumps at work that they could get out any amount of gold. In trying this Mr. Dunham put down a shaft eight and one-half by nine and one-half feet on the rim rock on both sides. Then they went to the center and sunk a shaft 10 by 15 feet, 17½ feet deep, cleaned up the bedrock and never got a color. The papers have told a good many yarns about men making \$40 a day on French creek, in places where they have really not found a color. There are perhaps 300 inches of water running in the bedrock, but none at all on the surface. The gold seems to be all on the rim rock and on the bars and not much at that. They do not really amount to much more than "China diggings."

Castle, Battle and Spring Creeks are all places of great expectations, which Mr. Dunham thinks will never be realized. In Farmer's gulch and Foster's gulch there are some claims that are paying; there they are drifting out the gravel. The famous claim formerly owned by Mr. Wheeler is washed from the surface, but all the others are drifted out and the gravel hoisted. All of this has to be timbered, as there is not gravel enough to hold, and when clay is struck the ground slides. Although there have never been so many people in the hills as supposed, Mr. Dunham thinks that there are more there now than the country can support. There will be a great deal of suffering there this winter, as almost every man you meet is broke, and it is difficult to see how they are going to get away. They can do nothing, even if there were lands to cultivate, as the grasshoppers are seen by the millions every-

where. A good many men have gone to the Big Horn and Yellowstone on prospecting trips. Mr. Dunham says that if the rush continues there will be 5,000 people in the Big Horn region this fall. In the Black hills, within a space of 25 square miles, there have been as many as 40,000 people, so that it has been pretty well prospected. Most of the people were from the East and Colorado. The climate is horrible, with thunder, lightning and rain seemingly all the time. It is colder at Cheyenne, however, than in the hills. Between that town and the hills there are 200 miles of plains where there is no shelter or timber, and in the winter these plains are pretty hard places to cross on foot. It is called 290 miles from Cheyenne to Deadwood, but all those who walk it call the distance the longest kind of 400 miles, so it is pretty hard to get out of the hills after once getting in.

The people are still going in, however, and on the road our informant met between 3,000 and 4,000 Chinamen on their way in. These fellows all get on in the mines some way. They apparently have no work, but are never seen to beg, and must help each other.

The Indians have probably killed a great many more of the prospectors than is supposed, and those traveling in small parties have fared pretty rough. There is many a fellow packing his blankets out who rode in on the stage not long since, but there are many more who cannot get away and have nothing to do while there. The country is a pretty big one for quartz, but a miner with the best sort of a claim might as well have none, unless he has the money to get a mill; the hills will need capital just as other mining localities need it to be developed. The class of people there now, generally have no knowledge of mining, although there are, of course, exceptions to this statement. The country in the hills themselves is heavily timbered, and the timber is very thick where it occurs at all.

Mr. Dunham thinks that the quartz interests of the hills will be very large, but that the placers will never amount to much. The quartz seems a big body all over the hills and some of it is very rich indeed. Free gold is to be found almost everywhere, and everybody owns claims, which, however, are not much use to them in making a living.

The Coming Industrial Exhibition.

We are assured by Mr. Culver, Secretary of the Twelfth Industrial Exhibition under the auspices of the Mechanics' Institute, that the coming fair promises to be the most successful ever held in this city. Already there have been more applications for space than ever before, and the number of exhibitors will be largely in excess of any previous fair. There will be a number of very fine exhibits in different classes which will eclipse former efforts.

The exhibition will open on August 7th, and be continued for one month. The Pavilion will be open for the reception of articles on and after July 16th. The Board of Directors have purchased the large engine which furnished power last year, and will continue to use it for that purpose; of course no charge will be made for power. The engine will be in operation for one week previous to the opening, and exhibitors of machinery will be required to have their machines in running order on that day.

This year premiums are to be awarded for the first degree only, as no second-class premiums will be given. It will be understood that while one class may be considered superior in merit to another class, yet the awards made will be for the best in that class to which the article receiving the award belongs. A copy of the award of the jury, certified to by the proper officers, will, in all cases, be given when demanded, and no fee charged. In cases where cash constitutes the premium, the awards will vary in accordance with the value of the exhibit.

A very good feature, if carried out, will be that of experimental tests and trials with mechanical devices competing for awards. These trials always excite considerable interest, and put the competitors in a position in which they must show true merit, or "take a back seat." As only one premium is given, as stated above, the article in any special class winning the medal will be the best in its class. Therefore, as an advertising proposition alone, it behooves manufacturers and agents to begin to get ready their machinery as soon as possible, so as to have everything in first-class order.

The dull times in business which have been felt lately among us have not been at all detrimental to the interests of the coming exhibition; in fact, the reverse has been the case. In many instances previously people have failed to exhibit, giving as an excuse that they did not have the time to spare to arrange any display. Of late, however, business generally has been so dull that there has been plenty of time for preparation, and as it is known there is always a good attendance of visitors at the fair, those likely to exhibit know they can have no better opportunity of bringing their names and wares before the community. Accordingly a much better and longer display than usual is expected.

Messrs. Dewey & Co. have been awarded the privilege of publishing the *Fair Daily* again this year, and are preparing to get up a first-class paper, devoted to the interests of the Twelfth Industrial Exhibition. The experience of this firm in this particular field warrants the assertion that the *Fair Daily* will as usual be favorably received by exhibitors and visitors.

The Monnier Process at the Providence Mine.

In the MINING AND SCIENTIFIC PRESS of Sept. 4th, 1875, we gave the details of the Monnier process, as applied to copper ores. Since then it has been for some time at work on gold ores, at the Providence mine, in Nevada county, in this State. Our correspondent, Mr. J. W. A. Wright, who is at present in Nevada county in the interest of the PRESS, last week examined this process carefully, and sends us the following notes concerning it, which will be read with interest:

Perhaps no mining enterprise in California is watched with more interest, at present, than that now connected with the well-known Providence quartz and sulphuret mine, on Deer creek, near Nevada City. Experts call it "a new departure" in the mining interests of the Pacific States.

This valuable mine is owned by

Messrs. Walrath & Hunter.

During the last six months they have been preparing for the introduction on this coast of this new method of reducing ores, and for more than a week past their works have been in successful operation. This is the method of reducing refractory ores by roasting and lixiviation, as invented and patented by Alfred Monnier.

Being kindly afforded every facility to investigate this method of extracting the precious metals, so entirely new to our coast, I shall try, by aid of the Professor's explanations, and the accompanying diagram I have made of the ground plan of the works, to give your readers some idea what this method is, how it differs from and what its advantages are over the usual method.

These works are on a steep hillside. Going from A, the highest point, to B, the lowest, you descend from floor to floor some 20 feet. The shaft and hoisting works are about 100 feet to left of point 1. The order of arrangement of cylinder, tanks, arastras, etc., will naturally vary according to the surface to be built upon.

1. Lump ore from mine. 2. Sulphate of soda. 3. Rockbreaker and crusher. 4. Elevators which carry crushed ore and soda to 5. Receptacle of same, whence through 5, they are conducted into 6, revolving cylinder, where the mixture is roasted. 7. Fire-box of cylinder. 8. Lixivating tanks. 9. Reservoir for lixiviating tanks. 10. Reservoir for strong solution. 11. Feeder for evaporator. 12. Evaporator. 13. Crystallizing tank. 14. Arastras. 15. Feeder for copper plate in 16, amalgamating trough. P. Roasted and lixiviating ore ready for arastras. S2. Sulphate of soda taken from crystallizing tank. b, point where iron car receives roasted ore. t, tramway over which car passes to lixiviators.

What are known among miners as "Refractory Ores."

Are those containing a large proportion of metallic sulphurets. The method long in vogue in what are called the "sulphuret works" of our mining regions, is that of chlorination, where common salt, manganese and sulphuric acid are used, and must be purchased for the purpose. The Monnier method for the treatment of metallic sulphurets may be correctly distinguished from the former as the method of sulphatization—a term suggested by Prof. Monnier—since its chemical processes consist in changing into sulphates the sulphurets of different metals contained in the quartzose ore.

The Messrs. Walrath and Hunter have been working their mine about six years, reducing the ore by the common method of chlorination. Their shaft is down something more than 800 feet, with the usual drifts every 100 feet. Some 20 men are now at work in the different drifts and the ore brought up daily is a very fine quality of sulphurets. The chemical compounds it contains, besides the pure silica of the quartz, are sulphurets of silver, copper, iron, zinc, and lead, containing gold, also small quantities of arsenic and antimony. That portion of the ore which is reduced by

The Monnier Method

Is treated as follows:

The crude dry ore in lumps (1) is mixed with sulphate of soda (5) and passed by the shovelful into the rock breaker and thence between Cornish rollers (2). The proportion of the mixture is 20 lbs. soda to 80 lbs. ore. Through one elevator (3) the crushed mixture passes to a wire sieve with 24 holes to the linear inch, i. e., 576 to the square inch. From this sieve the coarser particles return by a chute to the rock breaker, the finer pass through it into a second elevator (3) which conducts the finely pulverized and dry material into a large box (4) whence it is passed regularly through a small chamber of brick and iron into the huge revolving cylinder (6) which is five feet in diameter by 40 feet long.

The Roasting

Is here accomplished. This cylinder is revolved very slowly by water power. Its upper end (a) is raised six inches above the level of the lower end (b). This elevation can be increased, according to the proportion of sulphur in the ore. The cylinder has now been revolving without intermission for a month. Its slow motion causes the roasting mixture to gravitate gradually towards the lowest level, and some 12 hours are required for the crushed sulphurets to pass from the upper to the lower end of this revolving cylinder. It thus contains at one time about seven and one-half tons of the ore, since about

15 tons are reduced by this method every 24 hours.

An intensely heated draft of air passes steadily from the fire-box (7) into the lower end of the cylinder. The mixture is thus heated to a high degree, until at the lower end (b) the ore reaches a dark red heat. This roasting within the cylinder gradually transforms the sulphurets into sulphates and the gold is set free. Chemically this is explained by the sulphur becoming oxidized and

Forming Sulphuric Acid.

This combines with the soda, forming a bisulphate of soda the decomposition of which reduces successfully the sulphurets of iron, etc. A considerable quantity of sulphurous acid is also formed and escapes from the cylinder. The resulting sulphates being soluble in water, you can look with safety from the upper end of the cylinder through its entire length, and see myriads of brilliant scintillations flying to and fro, and falling like so many meteors in miniature. These are caused by the union of sulphur with the oxygen from the atmospheric air. The degree of heat required is maintained by consuming in the fire box half a cord of mountain cedar each 24 hours. The red hot ore passes at b into an iron wheelbarrow, which is trundled by one man along a tramway (t), passing over five huge wooden tanks (8), made on the Monnier plan and partly filled with water at its natural temperature. Here

The Process of Lixiviation

Begins. The man who handles the wheelbarrow takes the roasted ore from it by the shovelful and drops it into any one of the lixiviating tanks. Quite a detonation follows as each shov-

We will now return and see what becomes of The Residue of Insoluble Matter

Left in the lixiviating tanks. It consists of silica, pure gold and sesquioxide of iron, also a small amount of silver with sulphate of lead. When the liquid has been drained from it, it is shoveled out on the platform (P), from which it is passed into the arastras (14). After mixing with water and thorough grinding it runs into the feeders (15)—which act also as reducers of the remaining sulphate of silver—and thence through wooden spigots and troughs into the broad, shallow and long troughs (16), provided from point to point with boxes or catchers of peculiar construction. The bottoms of these troughs and boxes are covered with amalgamated copper plates. Here

The Gold

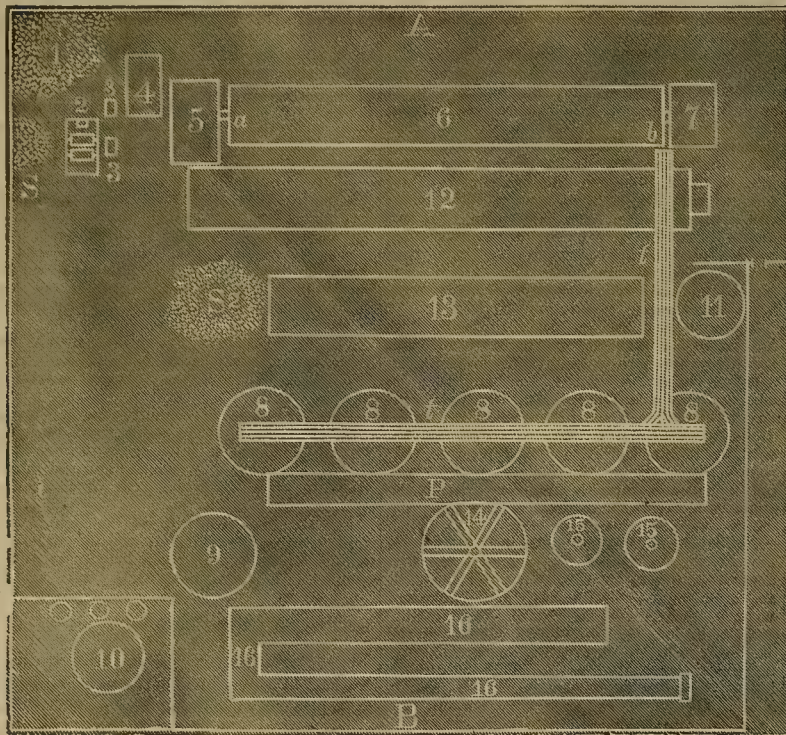
Is so free it is immediately taken up by the quicksilver, and with the remaining silver is secured in the form of an amalgam, while the residuum, containing oxide of iron, passes outside of the building to a large wooden tank. From that the oxide is collected in a still larger tank, where it settles and is collected and dried. Mixed with oil this

Oxide of Iron

Makes the purest of metallic paints—its natural color reddish brown—and is the very best that can be used on all iron structures. By combining different ingredients with it various colors can be produced. It makes a first-class fire-proof roof paint.

Advantages of Sulphatization

We shall close this description by stating some advantages of sulphatization over chlorination, as is proved at the Providence mine.



GROUND PLAN OF PROVIDENCE REDUCTION WORKS.

elful is thrown in. This is continued until each tank receives its allowance.

By a set of rubber tubes, connection is kept up between the liquid in three of the tanks at a time, thus forming a battery.

When the water in any of the five tanks holds in solution the largest possible amount of sulphates of silver, copper and soda, it is sent by a tube into small tanks filled with cement copper by which the silver is precipitated. Thence the remaining liquid is run into a reservoir (10). This is done in what is called

The Silver Room.

Any weaker solution is passed into another reservoir (9), to be used again in lixiviating, till it attains sufficient strength.

From the reservoir (10), the solution is conducted by a wooden pump and trough into a tank under tank 11. Thence it is raised by a wooden pump into the latter tank, which serves as a feeder for the evaporator (12). This huge evaporator is filled through a wooden trough from tank 11, and the liquid in it is kept at boiling heat by the hot air passed into it from the revolving cylinder and the fire-box.

After a certain time allowed for evaporation, the remaining liquid is passed by rubber syphons from the evaporator into the crystallizing tank (13). This tank now contains only sulphates of copper and soda in solution. As the liquid cools, the sulphate of soda crystallizes and is drawn out by an iron hoe with a long iron handle into a pile (s2), to be used over again to repeat the process *ad infinitum*. The amount lost is scarcely appreciable.

The Copper

In solution is then precipitated by iron. All the round tanks are about the same size, having a capacity of some 700 cubic feet. The five used for lixiviating each hold 25 tons of ore, besides the water needed to dissolve the sulphates of silver, copper and soda.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

QUICKSILVER CONDENSER.—Richard F. Knox, S. F. This condenser is constructed in two parts. The base is cast in one piece and its floor is made in the form of a V, so as to form a middle channel and inclined sides. The base is supported on suitable legs or supports, the length of which are regulated by the pitch of the inclined floor. The upper part of the condenser is made of sheet copper, a metal which will not be affected as readily as iron by the sulphurous acid which accompanies, to a greater or less extent, the quicksilver fumes produced from the raw ores, and which soon destroys iron condensers. Either the iron base or copper upper portion can be removed when necessary and thus produce a considerable saving in the cost of condensers. The thinness of sheet copper also renders the condenser more effective, because it allows the heat to pass off more readily than through a thick iron condenser. The upper part of the condenser is made square and provided with a pan top for holding water, described and claimed in a patent issued to Knox & Osborne, June 14th, 1870. In addition to the pan top for holding water, Mr. Knox makes a well or hollow partition across the condenser near the opening through which the fumes pass out of the chamber, and this partition extends down inside of the chamber to within a short distance of the bottom, so that the fumes must pass under it before they can pass out through the exit opening. This water partition or well communicates with the pan top, so that it is kept filled with water, and as the water in it becomes heated it will rise to the surface of the pan and flow off while the cool water takes its place. This partition enables the inventor to draw off the coolest vapors first, as the vapor in the condenser will settle to the bottom as it becomes reduced in temperature, and will thus first pass under the partition.

BEE-HIVE.—Thos. A. Atkinson, Merced, Merced Co. This invention relates to an improvement in bee-hives, which is more especially useful in preventing the ravages of the bee-moth, and which the inventor calls the moth exterminator or trap. It is a well-known fact that this moth can go wherever the bee can go and a moth-proof bee-hive is an impossibility. They may, however, be trapped and destroyed by the apiarian, and this this invention is designed to effect, by providing artificial hiding places into which the worms will pass at the proper season for the purpose of forming their cocoons and entering the chrysalis state and they may easily be collected and destroyed from these receptacles. The worms which may be concealed in the hive early in the spring are comparatively harmless, but if left to themselves thus will enter the cocoon, emerge as moths and lay thousands of eggs, which are hatched nearly simultaneously, so that before the bee owner is aware of it the bees are destroyed. It is the habit of the worms found in the hives in the early spring to let themselves down from the combs and after reaching the floor to seek cracks and hiding places, both to escape the bees and in order to enter the chrysalis state. It will therefore be seen that when they reach the inclined floor of this hive they will find no place to hide until they reach certain grooves in the entrance blocks. Into these grooves they pass at once and thence down tubes provided for the purpose, into a trough from which they cannot escape, but may be removed and destroyed. This hive is economical and easy of access.

DOOR-LOCK.—C. H. Covell, Stockton. This invention relates to such door-locks as are secured to doors by being fitted in a recess in the side of the door stile, and principally on the inside of the door. These locks as heretofore constructed require the recess to extend from the edge of the door stile, next to the casing, almost entirely across the stile, and this recess must be deep enough to admit the full thickness of the lock so that its outer face will be flush with the side of the stile. Only a narrow thickness of wood was left between the lock and the opposite side of the door, almost cutting the stile in two, and materially weakening the door at that point. And, again, the screws which fastened the lock in the recess were screwed into this narrow thickness of wood, which furnished a slight hold, so that the constant jamming to which the lock was subjected soon rendered it useless. This invention provides such a construction of the lock, that a portion of the wood next to the casing is left to its full thickness, and the screws which fasten the lock in place are screwed into the stile where it has the full thickness of the wood to enter. Other improvements also provided relating to a keyhole guard.

ENGINE VALVES.—Eugene O'Neill, San Francisco. The invention relates to certain improvement, in valves for engines and pumps, and it consists in a novel construction of valve having upper and lower seats in pairs and provided with inner and outer steam and water passages for each pair of seats, so that by a small lift of the valve a large area for the admission of steam or water is exposed,

The engineers who made geological explorations and soundings for the submarine tunnel between France and England, report that the tunnel is perfectly practicable, as there is a continuous bed of chalk between the two shores.

San Andreas Mines.

Within a circle of a few miles of this place are some quartz veins which we firmly believe within the near future will develop into paying properties. The Thorn mine, if it were located in Arizona or some other distant section, would be eagerly gobbled up by capitalists and with good reason, as it presents all the evidences of a rich lead. All that is needed, judging from the prospects is the expenditure of capital to make it a profitable investment. The Thorpe mine always paid for working it, and the only bar to its proving a bonanza was that the proprietor being possessed of but small means was unable to put proper machinery on it, and the abundance of water drove him out. Several thousand dollars have been gouged out of the Comet lead near town, and there is little doubt that a proper mode of working these leads—as well as a number of others, such as Gottschalk's mine, the Portuguese claim, the Jackson claim, all situated near this place, and all carrying free gold in a well defined ledge—would prove remunerative. The two investments which capitalists have made in quartz in this immediate vicinity have been subject to influences which were not calculated to make any mine pay. In one case they took as Superintendent a kid-gloved miner, and after expending considerable money in a stylish way gave up the mine without having really tested its merits at all. This was the Hudson gold mining company, limited—certainly very limited if a knowledge of the principles of quartz mining is referred to. Then another company, "The Everlasting," composed of men who ought to have been possessed of some sense, hired a lumberman—or rather a man who was known as a good hand in a lumber yard—to superintend their investment. It didn't pay; singular, but true, the mine *must* have been worthless. We assert that the prospects of a half dozen leads in this vicinity would justify a company in buying them, and with the aid of a practical, working miner as Superintendent—one who knows the difference between the hanging and foot wall and can tell when men have done a day's work—reaping the reward which the investment of a comparatively small amount of money and as much common sense will surely give.—*Calaveras Citizen.*

Bullionville.

Being among the picnickers on Thursday, on their trip to Bullionville, we took occasion of visiting the Raymond & Ely mill, now in charge of John Cahill. We found that the 18 pans were running day and night to their full capacity on tailings, the eight settlers also being busily employed. Amalgam was being turned out in pretty large quantities, the retorts being made ready to convert it into bullion. The tailings are being worked now to much better advantage than they have heretofore been, and the daily manipulation of them will make the process of working come easier as they are handled and tested. The battery of the mill is now being fixed ready to start crushing ore. Ore is accumulating at the mine and will be sent down pretty rapidly when the battery gets to work.

Near the Raymond & Ely mill Hugh White has his concentrating works concentrating tailings from the Magnet mill. He is at present only able to work a few hands, owing to the Raymond & Ely mill being unable to pump a sufficient amount of water, having to use so much for the mill. To remedy this defect Mr. White has sent to Salt Lake city for a pump, by means of which he will be enabled to secure a large supply of water. The pump is expected to arrive there this evening. The furnace is at a stand still and it is not known when it will start to work, although it is expected daily.

The business portion of Bullionville looks much better since our last visit to that burg, and the business men are not now complaining.—*Pioche Record.*

DEEP MINING SHAFTS IN EUROPE.—Twenty years ago the deepest mining shaft in the world reached only about 2,000 feet below the surface. The very deepest, we believe, was a metalliferous mine in Hanover, which has been carried down to the depth of 2,290 feet. The deepest perpendicular shaft to-day is the Adalbert shaft in a silver-lead mine in Przibram, in Bohemia, which has reached a depth of 3,280 feet. The attainment of that depth was made the occasion of a three-days' festival, and still further noticed by the striking off of a large number of commemorative silver medals of the value of a florin each. There is no record of the beginning of work on this mine, although its written history goes back to 1527. Quite recently an elegant commemorative volume has been written and printed, which is most interesting to those who have a taste for either the actualities or antiquities of mining industry. There are two other localities, however, where a greater depth has been reached than at the Adalbert shaft, but not in a perpendicular line. These are: first, the Rocksalt bore-hole, near Spereberg, not far from Berlin, which, a few years ago, had been bored to a depth of 4,175 feet; second, the coal mine of Viéville, in Belgium, where the miners, by shaft sinking, together with boring, have reached a depth of 3,542 feet. Turning from these two mines, no shaft, in unbroken, perpendicular line, has as yet exceeded the depth of 3,280 feet.

Hydraulic Machinery at the Ophir Mine.

In a recent article the Gold Hill *News* says: The Ophir has the finest incline machinery on the lode, and probably in the world. It consists of a double-cylinder engine of 500-horse power, each cylinder working by a double-gear attachment to an end of the conical reel, upon which in a continuous groove runs the round, tapering, steel-wire cable which descends into the depths. This cable is 3,600 feet in length, two inches in diameter at the larger end and one and three-fourths at the smaller, and weighs 21,850 pounds, and cost \$6,700.

The engine is driven by an extra set of boilers, and is so arranged that either one of the cylinders can be used separately. The convenience of this has been demonstrated. The engineer on duty recently found that, for some reason, the throttle-valve of one of the cylinders would not work, and the engine could not be stopped. It was a moment of awful peril. The giraffe was fast approaching the head of the incline, and in a moment more would be run crashing into the sheaves, carrying death at least to the tender, and no one knew how many more men who might be thereon. Then would come the snapping of the cable as a thread, the fall of the giraffe down the incline, and the dashing to pieces of the miners in the bottom. It was indeed a terrible time, but the engineer, with that readiness of action and presence of mind which never forsakes a competent man when on duty, reversed the engine and thus prevented the disaster. It was then discovered that a coil of wire had in some way found place in the valve, preventing it from closing. While the damage done to the valve is being repaired the other cylinder to the engine is doing the work of both, and trundles the immense conical cylinder with apparently as much ease as both did previously.

Besides the foregoing cylinders to work the incline, the Ophir has two hydraulic engines worked by water from the mine, under a pressure of 400 feet head, which increases the force by 268-horse power. These look like immense battery guns placed for action. They work only in raising the giraffe. In lowering it the water used is, by the weight of the giraffe and cable, pumped back into the tank on the hill, where it is ready to be used again, and so on, over and over. In this way the power for the hydraulics is maintained without cost, subsequent to that of the original construction. These are the engines which are first mentioned as being overhauled preparatory to being put in use.

And now that we are upon the subject of hydraulics, it may not be amiss to mention another power derived from that source, and in constant use at the Ophir. Another hydraulic engine, but of a different kind, has been constructed to raise ore from the level of the works 47 feet, to the top of the ore house erected beside the track of the Virginia and Truckee railroad. Here, again, the motive power costs nothing, as the water is transferred from the engine directly to the boilers, and is none the worse for having once done duty.

The arrangements for protection against fire are perfect. A 10-inch lap-welded main connects with a tank 400 feet above, on the hill, and capable of containing 100,000 gallons of water. Hydrants connect with these mains, and two and one-half inch hose leads all over the exterior of the buildings, while one and one-half inch hose protects the inside. The Ophir buildings cover nearly 40,000 square feet of ground. These, with the machinery they contain, are valued at \$600,000.

LAKE SUPERIOR SHIP CANAL.—The troubles of this unfortunate corporation do not seem to be entirely ended yet. The sale of the canal, its franchises, lands, etc., was made under foreclosure proceedings on the 11th of May. The property, says the *Detroit Post*, was bid in by trustees for about \$377,000 (a sum not sufficient to pay the preferred bonds in full), who proceeded to organize a new company, to whom it was transferred. All parties of record consenting thereto, the sale was confirmed by Judge Brown several days since. At the time of the sale a representative of some of the New York bondholders was on the ground and filed with the master making the sale a written protest against the proceeding, alleging that there was a ring, a conspiracy; that an appeal was pending, that the sale had been insufficiently advertised, and that capitalists stood ready to buy the property in due time at something like its value. This protest was ignored, and this protestant came before Judge Swayne and asked that the confirmation of the sale be set aside. There was much talk about fraud, rings, extraordinary haste in confirming the report of sale, etc. Judge Swayne took the matter under advisement.

CUBICAL CONTENTS OF A TON.—Few persons have any idea as to the amount of coal that can be stowed in a given space; we therefore give an example of the manner in which it may be figured up. A shed or room 15 feet high, 18 feet wide and 300 feet long will hold 200 tons of anthracite coal, and perhaps 10 tons less of Cumberland. Thus 15x18x30=8,100, divided by 40, average cubic contents of a ton of anthracite=202½.

THROUGH THE PYRENEES.—A tunnel through the Pyrenees will complete the railroad communication between France and Spain by January 1st, 1878. It will save twelve hours of diligence riding.

Arizona as a Mining Country.

It is only very recently that Arizona has been admitted to be a mining country. It is true that we have heard for many years stories bounding on the marvelous, about golden bullets, caves studded with chunks of gold, and other wonderful stories of a mineral wealth which, so far as then known, only existed in the realms of romance.

For many years, even after Arizona began to emerge from being a land of savages, and became the home of hardy pioneers, who came at the peril of their lives to settle and civilize this wild region, the first search of the prospector was for gold. No inkling of the great future of Arizona, as a silver mining country, had yet dawned upon the people.

After a few years, however, silver ledges began to be discovered, and in a few years more it began to be discovered that upon the silver mines of Arizona her future greatness would to the greatest extent depend.

For a long time but little development had been made to prove the permanency of the great silver-bearing ledges, but to-day, with the McCrackin down to a depth of over 525 feet, the Hackberry, 430 feet; the Peck, 300 feet; the Silver King, 240; the Lone Star, 250 feet, and the Yellow Jacket over 200 feet, all of these mines actually producing, and producing largely in excess of the expense of working them, we can point to these as mines, not developed, of course, to the same extent as the Comstock mines, but still sufficiently developed to prove this a mining country. No mining man can doubt the permanency of the Hackberry, the McCrackin, the Arnold, the Peck, the Richmond, the Silver Prince, the Black Warrior, and many other ledges which might be named.

The wonderful rich ledges in the Globe district, Humburg district, Peak district and elsewhere, are something new to mining men, so far as the vast number of places in which they are found are concerned, and there are a number of new discoveries in which, like the Zalida, marvelously rich ore is found near the surface, and which it remains for time and muscle to prove.

There is no field for the mining capitalist who wishes to invest in legitimate mining enterprises, at all to be compared to Arizona. The field is larger. From the Wallapai mountains on the north, to the borders of Sonora on the south, from the Castle Dome on the west to the White mountains on the east, is one vast mining district, a net-work of mineral bearing veins.

We would say to the mining men of San Francisco and elsewhere, come and see for yourself. You will find the trip well worth the journey.

Another great opportunity for the investment of capital is in the erection of reduction works, which are ridiculously scarce in Arizona. Ore can be had in any quantity and the miners are willing to pay a liberal price for the reduction of ores.

For any kind of enterprise connected with mining, the opportunity for the investment of capital is better in Arizona than in any other country.—*Arizona Enterprise.*

Utah Smelters.

Sandy, which is some day in the near future destined to become an important mineral center, suffers from the decline in the price of lead quite as seriously as any of the camps. The Flag-staff, however, is running the four stacks at full blast, as usual, and is running through 135 tons of ore every 24 hours, employing 100 men worked on eight hour shifts. Everything is well appointed. The flux is hoisted from the crusher on a tramway by means of a friction gear so arranged that heavy car-loads of lime rock and iron can be sent up to the upper floor without any assistance except one man who loads and dumps the car. After several months' test, Mr. Gist speaks very highly of the Bruckner rotary roaster, and he says he works the Last Chance ores with ease, although very refractory. Since December last the smelter has shipped 350 car-loads of bullion, and the pay roll shows that this concern has dispersed among laborers \$9,000 per month.

The Mingo is now running two stacks, chiefly on ores from Bingham. Mr. Knap intends putting up a single hearth roasting furnace, with a capacity of 10 tons every 24 hours. The bullion is shipped to the Pennsylvania Lead Company, who speak in the highest terms of Utah lead.

The old Telegraph smelter, on Jordan, is still running on ores from the company's mines. The Germania, Morgan and Wasatch, together with the other smelters of the Territory feel the low price in lead. In fact, to be brief, the decline fell like a wet blanket over Zion, her mines and mining men, and they feel sick.—*Salt Lake Tribune.*

One of the buildings at the International exhibition, at Philadelphia, erected and used by the United States Government on the exhibition grounds, having been torn down on Friday last without authority from the Government, the affair will probably lead to difficulties with the Finance Board of the exhibition, as it is charged the building was destroyed by order of that Board. The matter was placed in the hands of the Attorney General, with a request that he proceed against the Board to recover damages; also to have the offenders punished.

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Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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Continued from page 397.

look better in Peck district. The north tunnel is in a depth of about 250 feet. Its face is in high grade ore, and the pay streak is about two feet wide. Men are kept at work in all the drifts and shafts, and the showing made by the mine is better to-day than ever before. In the south tunnel some excellent ore is being stopped out.

Some work is being done on the Silver Prince, and five tons of very high grade ore were brought in yesterday for shipment to San Francisco.

WORK is being pushed upon the Black Warrior and a very fine character of ore, carrying native silver, is being taken out.

MESSRS. LUKE & Co.'s mill, in Bradshaw basin, is rapidly approaching completion, and will be ready for the reduction of ores about the 1st of July. The mines in the vicinity of the mill are getting out ore ready for reduction by this mill, the advent of which has enlivened everything in Bradshaw district.

THE MESA gold mine, in Big Bug district, is being vigorously worked by D. R. Poland and his associates. The main tunnel is now in 75 feet, and another one has been commenced. There is also an open cut of 75 feet in the mine. Two astras are being used in reducing ore from this mine, and a partial clean-up makes a good showing.

TURKEY CREEK.—*Arizona Miner*, June 12: Mr. John Holmes, of the Goodwin mine on Turkey creek, is in town laying in a stock of supplies. The Goodwin is soon to be favored with a 10-stamp quartz mill, when a large force of men will be put to work on the mine to extract the rich ores contained between the walls, which are seven feet apart. Mr. Holmes has now out on the dump about 15 tons of ore, 10 tons of which it is confidently believed will pay \$400 to the ton.

NEW MACHINERY FOR THE SENATOR MINE.—Two of Paul's pulverizers passed our office to-day en route to the Senator mill. These pulverizers are in the shape of barrels, and each weigh about 5,000 pounds. We have heard Paul's pulverizing dry process highly spoken of, and sincerely hope that they will come up to the excellence claimed for them.

THE Superintendent of the Zalida mine reports to the owners that the ledge is now four feet wide, and that the rich gold streak is widening and the silver-bearing lode holds its richness. Some of these little razor blade veins do pan out now and then in spite of precedents. Get your Zalidas, boys, and don't make up a mouth at your medicine.

Idaho.

GOLDEN CHARIOT.—*Idaho Avalanche*, June 16: Operations are progressing quite satisfactorily at the Golden Chariot. A winze is being sunk on the 13th level about 70 feet south of the shaft, for the purpose of determining the continuance of the ore body encountered in the drift. The work thus far has been attended with the most promising results. A sample of the ore assayed, at a recent visit of operations, went as high as \$300 to the ton, and there is a decided improvement in quality and quantity as the work progresses. A splendid quality of ore is also being taken out of the 7th Minnesota and the 6th Chariot levels, and every development in progress has a most auspicious outlook.

SILVER CORD.—A few days ago Mr. John Ward, who resides in the vicinity of the Silver Cord mine, while sorting the ore on the dump, struck a lump of rock of marvelous richness. With scarcely any exception it is the richest piece of rock ever taken out of any mine in this section of the country. Nor is this all, for the ledge in the mine at a point above the 6th level, from which the rock was extracted, is said to embody an abundant supply of just such rich ore as this. And this was one of the mines that was sold at Sheriff's sale for taxes a few days ago.

EMPIRE.—The developments in the Empire mine still continue to be immense. Indications are more favorable than ever, and it is impossible to predict the extent of the marvelous richness of the bonanza deposits beneath the Empire works. The ledge between the 5th and 6th levels still continues to produce marvelously rich rock, and all the indications connected with the progress of the winze on the 7th level are most favorable for the existence of a magnificent bonanza at a point where the two ledges meet. A considerable quantity of second-class ore has just been crushed, and the bullion yield has been quite satisfactory.

SOUTH MOUNTAIN.—The property of the S. M. G. M. Co., at South Mountain, was sold at auction here on Saturday last for taxes. Wm. Moody bought in the same for Lloyd Tevis, Esq., of San Francisco, the amount paid being somewhere in the vicinity of \$1,475.

SOME 30 tons of Potosi ore crushed here recently yielded \$50 to the ton, or double the amount realized from the previous crushing. The Potosi is a good little mine.

THE flow of water still continues to prove a serious obstruction to the progress of operations at the Belle Peck and some other mines.

ARRANGEMENTS are nearly completed with the creditors for starting up the Oro Fino mine.

Montana.

NEW DISCOVERY.—*Butte Miner*, June 12: The Little Darling silver-bearing quartz lode was located on the 12th day of May last, and crosses Gimlet gulch about three miles from town, just around the point after passing the Burlington lode. The discovery was made on the left bank of Gimlet gulch, where the hill rises very abrupt. Very little work has disclosed a vein some 30 feet in width, the ore carrying, according to assays, from 40 to 140 ounces in silver, besides some lead. A tunnel has been run in on the vein on the east side of the gulch some 20 feet, the ore from which can be seen on the dump at the mouth. The ore is very easily mined and one man working has taken out we should judge about 40 tons in half that number of days, using nothing but pick, shovel and bar. On the west side of the gulch another opening is being made on the vein, and every stroke of the pick discloses quartz of equal value with that in the opposite tunnel.

COPPER MINES.—It is well known that some of our copper mines have been under bond during the past 60 days, by parties contemplating their purchase and the erection of works for reducing their ores. The time for which the property was bonded expired on Saturday last, and those in interest were on hand to consummate the purchase. Only a portion of the property was taken, however, but enough to insure the erection of works at no distant day. This is merely a starter—the first step leading to the placing of nearly all our copper interests into the hands of intelligent and energetic capitalists. What speaks in the highest praise of our copper mining interest, is the fact that the sales just made were to local capitalists, to men identified with the country; men who expect to live and do business in the country; who have been and are still interested in other sections of the Territory, and have had experience and are well posted in all the advantages and disadvantages connected with the business of mining.

Utah.

OPHIR MINES.—*Cor. Salt Lake Tribune*, June 16: Ophir is dull and quiet, extremely so; still, there is a marked improvement within the past few weeks. The mercantile life is slow, yet from the fact that there is but little outfitting for mining and prospecting now-a-days, small quantities of supplies suffice for the mines now working, so that this line of business is pretty much cut down to family trade, of which there is nearly as much as ever. One of the business places here have closed out, some of the buildings have been sold and taken away, as has much of the machinery which was formerly used in the canyon. A well managed custom smelter would do a good business here, from the fact that there is plenty of good base ore of high grade which is now being shipped away in small quantities, time and again being consumed nearly to the extent of the profits of the ores; whereas, a smelter could use them and thus make a grade of bullion that would pay to ship, notwithstanding the exorbitant tariff of the

Union Pacific. A smelter in connection with the Buckhorn mine would make a very valuable piece of property, and we hope ere long enterprise will consummate such a project. This will surely become a good camp again at no distant day. Our mines and reduction facilities will not long be overlooked by capital.

BINGHAM CANYON.—The decline in ore has had a very depressing influence upon our camp, the miners feeling that they might just as well leave the ore in the ground as to extract it and make the smelting fraternity a present of it. If the ore buyers can afford to let their works remain idle for the sake of keeping lead down, we can stand the pressure. It is a poor rule that won't work both ways, and a good pile of ore on the dump looks just as fascinating in our eyes as it would down in Sandy, and probably more so. Bingham to-day never looked better in prospect; her mines are turning out fully as good, if not better, and this part of the canyon is attracting more attention on account of the high grade silver ore it is producing.

Oregon.

CHERRY CREEK.—*Mining-Immigration Journal*, June 15: News from the new gold diggings at Cherry creek represents that there are 50 men at work making good wages. The mines are situated in the heart of an agricultural district, and provisions are consequently very cheap.

The development of the Monumental mine is anxiously watched by a large number, particularly in eastern Oregon. Parties interested feel that should the tunnel now being run prove the ledge in the Monumental to be one of permanence, it will greatly stimulate all other mining enterprises in that section.

Mr. J. S. HOWARD will commence this week the permanent survey of the ditch for the Portland Sterling mining company. It will be 234 miles in length, with a capacity of 4,000 inches. The mining will be conducted in the most experienced manner, principally by the hydraulic method.

I. B. MOORES and Wm. Salmon started up to Quartzville, and will probably be gone a week or more, looking over their interests in that locality. Work on the White Bull mine is progressing favorably, and the company are sanguine of success.

A DAY or two since a Grand Ronde, in prospecting in "Rowan" gulch, struck a rich placer mine, which on the bedrock yielded \$40 to the pan. At Auburn the Graham brothers have also struck rich mines, directly under the town of Auburn, which pay largely.

Another Indian Uprising.

The Nez Perces and Salmon River Indians, in Idaho, have taken the war path and massacred men, women and children at Camas prairie. The warriors number some 2,000, so that the Government has another Indian war on its hands which will take a little time to conclude. Settlers in the Pelouse and Paradise valleys and the country north of Lewiston, Idaho, are fleeing for their lives and going to the towns. The men are sadly in need of arms. Troops have been ordered from a number of forts and are on the way to the scene. Generals McDowell and Howard have been very prompt in arranging for sending the troops, although there are more Indians than soldiers. On Saturday 100 troops with 150 men from Mount Idaho, encountered the Indians at the head of White Bird canyon. The troops dismounted and left a few soldiers and 20 friendly Indians to hold the horses. The Indians opened fire upon the troops and the fighting was continued for some time. The friendly Indians became alarmed, and the soldiers guarding the horses could see that the Indians were getting the best of the fight, and the soldiers were retreating. The Captain of the citizens, Sergeant Lytle, and one soldier were known to be killed. The whole horse guard, Indians and whites, broke and ran, some for Mt. Idaho and some for Lapwai, leaving the horses to run loose over the prairie. Those coming to Lapwai never stopped till they reached the post. Many houses on the prairie have been burned. Another soldier who reached the garrison at 8 o'clock on the morning of the 18th from the fight, reported that the troops were on foot and surrounded by Indians in the canyon, and in a hand-to-hand fight, Col. Perry and about one-half of the command are said to have been killed, and the remainder surrounded and fighting against odds when the soldier left. The Indians engaged in the fight are non-treaty Nez Perces. They, together with other disaffected tribes, number 2,000 effective warriors. There is a general uprising among the savages, and the whole country is wild with alarm. The Indians are massacring men, women and children in Camas prairie and the settlers are fleeing in all directions for safety.

THE *Herald's* London special says: The relations between Russia and England are of the most critical kind short of actual war. The two countries stand on the very verge of hostilities, and the slightest incident might at any time precipitate a conflict. Never since the Crimean war has the position been of such peculiar difficulty, though the relative strength and influence of Russia and England has changed very materially since that period.

THE Committee on Literary Exercises for the Fourth of July celebration, in this city, have chosen Henry George as orator; George H. Jessup, poet; and Henry Edwards, reader of the Declaration. Mr. Barton Hill will probably read the poem. The exercises will take place at the California theater, which has been kindly offered by Mr. McCullough.

THE United States Fish Commissioners, consisting of F. N. Clark, H. E. Quinn and L. Kumlein, arrived in this city on Friday evening. They placed 110,000 fine young shad in the Sacramento river at Tehama.

SENATOR SPENCER, of Alabama, with a large exploring and prospecting party, leave about the 21st for the Big Horn country.

THE San Francisco Benevolent Association distributed \$18,989 in charity last year.

Early History of the Eastern Slope—No. 7.

In concluding this series of articles on the Eastern Slope, we shall be able to barely glance at the official career of some of the more prominent persons connected with the government of Nevada, either through appointment by President Lincoln or by election by the people of the Territory. The following embrace the set of officials first appointed to the several positions named; the most of whom arrived in the Territory with Governor Nye, July, 1861, or came out shortly after:

Benjamin B. Bunker, Attorney General, an amiable, quiet man of correct precedents and good business habits. Without being a brilliant advocate he was a lawyer of fair legal attainments, discharging his official duties in a manner that gave general satisfaction. After being in the Territory for a year or so, not liking the country, he resigned his position and returned to New Hampshire, his former place of residence, Thomas D. Edwards having been appointed his successor. This gentleman, who proved an efficient as well as a popular officer, held the place till the Territorial was superseded by the State government.

Henry Grice, first U. S. Marshal, has, for many years past, been a resident of San Francisco, holding, during most of the time, an office under the General Government. Perry G. Childs was the first Territorial Auditor, and J. H. Kinkead the first Territorial Treasurer. Under their supervision the fiscal affairs of Nevada were conducted ably and discreetly, the foundation for the high credit which the country has always enjoyed having been laid during their administration. A good proof of their financial ability is found in the fact that they succeeded in negotiating from Michael Reese a loan of \$50,000, at a time when the Territorial exchequer was without a dollar, nor had any revenue system yet been established. Shortly after this loan had been effected the value of greenbacks fell to a very low figure, causing the lender much uneasiness lest he should be repaid, as he might have been, in this depreciated currency. When due, the amount, with interest, was paid in gold, whereat Michael rejoiced exceedingly. Both of these gentlemen have, for many years past, resided in San Francisco, where they have been engaged chiefly in mining pursuits.

In the Surveyor General's Office.

There was appointed John W. North, Surveyor General, with Butler Ives, Deputy, and John F. Kidder, Chief Clerk. These were all men of high character, and more than average professional ability, and not often has this branch of the public service been committed to better hands. On the resignation of Gordon N. Mott, Judge of the First District in 1862, North, who was educated to the law, was appointed to that place. His rulings in some of the great mining suits tried before him having excited the hostility of the lawyers engaged therein, he was fiercely denounced by the latter through the newspapers and in public meetings, causing for the time being a great commotion. The judge, however, came out of the conflict unscathed, having been acquitted of the charges made against him at the bar of public opinion. This gentleman, for the past 10 or 12 years, has been a resident of San Bernardino county, California, where he founded the Riverside colony, one of the most prosperous enterprises of the kind yet established in the State.

Ives and Kidder were employed on the several commissions appointed for ascertaining and fixing the boundary line between California and Nevada, and in various other public capacities, in all of which they performed their work in a creditable manner. The former was afterward in the service of the Central Pacific Railroad Company, who held him in high estimation for his faithfulness and capability. He was one day found dead a short distance from his camp, the cause of his death being unknown. As he was at the time a strong, healthy man, free from all bad habits, the event will probably forever remain a mystery. Kidder, after getting through with his labors in Nevada, had charge of several important railroad enterprises on the Pacific coast, in all of which he displayed great constructive and engineering skill. At present he is Superintendent of the Colfax and Nevada narrow-gauge road, of which he was the chief surveyor and supervising builder. Besides making this road a financial success, he has managed it with such caution and vigilance that no serious accident, either to person or property, has happened upon it since its completion, more than a year ago.

The Judiciary.

The members of the Supreme Court consisted of George Turner, Chief Justice, and Horatio N. Jones and Gordon N. Mott, assistant Justices. Judge Turner, after a residence of some years in Nevada, removed to San Francisco, where he has since been, and is still successfully practicing his profession. Judge Mott, having resigned his position on the bench in 1862, was afterwards elected delegate to Congress from Nevada. For some time past he has been living in this city, practicing law, and also acting as a Court Commissioner. Judge Jones, though a well meaning man, and not deficient

in legal learning, was so extremely sensitive to adverse criticism and even the opposing opinions of others, as to render him unfit for the proper discharge of his judicial duties. Aware, himself, of this fact, and being withal disgusted with his rough surroundings, he resigned his office after a short term and returned to Missouri, his former home.

The Council.

An arm of the Territorial legislature corresponding to the senate in most law-making bodies, was composed of nine members; J. L. VanBokelen, from his thorough acquaintance with parliamentary law and legislative usages, having been chosen President, the functions of which position he discharged ably and well. This gentleman was killed in Virginia City some three years ago, through the explosion of dynamite or other dangerous substance with which he was at the time experimenting. Several other lives were involved in this catastrophe; Charles Knox, of San Francisco, a most estimable young man, having been one of the victims.

Dr. J. W. Pugh settled early in Sacramento, and, engaging in trade, also in the practice of his calling, in which he stood well, made considerable money there. He went to Washoe early and succeeded in securing many mining claims. After serving in the legislature to the entire acceptance of his constituency, he followed for a time the vocation of a broker in Virginia City and then returned to Sacramento. A few years after he was afflicted with softening of the brain, which malady increasing upon him, finally necessitated his removal to the insane asylum at Stockton, where he died soon after.

Wm. M. Stewart, with his knowledge of law, proved a very useful member of the legislature, having done much towards molding the code of laws adopted and directing the general action of that body. After representing the State of Nevada for two terms in the United States Senate, he removed to San Francisco, where he is now living, engaged in the practice of the law. Thomas Hannah, one of the most active and influential members of the council, is also now a resident of this city, being largely interested in mining and other business enterprises. Isaac Roop, first Provisional Governor of Nevada, emigrated to the Eastern slope long before the discovery of the Washoe mines. He was the founder of Susanville, in Honey Lake valley, at which place he died about seven years ago. Roop was a man of fine social qualities and a good deal of energy, though marked by that lack of system and thrift common with those fond of pioneer life. Ira M. Luther, also an early settler in the country east of the Sierra, after a diligent and useful term in the Council, visited the Atlantic States, then returned to California, where he is still living. John W. Grier lives with his family at Silver City, Nevada, where he was living at the time he served on the council, he being then, as now, the agent of Wells, Fargo & Co., at that place. There are few better men than "Uncle John," as every one likes to call him, and in fact there is no need for any better. A. W. Pray carries on, as he has done for many years, an extensive lumber business in the Sierra Nevada easterly from Lake Tahoe. He is an energetic business man and has always enjoyed the best kind of a reputation in the community where he has lived. Solomon Geller, a sensible, clear-headed farmer from the Truckee meadows, is still living in that vicinity, a large land owner and the raiser of many sheep.

Henry O. Smeathman, Secretary of the council and who also performed the functions of chaplain to that body, came to his death about ten years ago in a singular manner. While returning with two or three others from a prospecting trip in the Black Rock region, the party was attacked by a band of Piutes. All being pretty well mounted, his companions seeing their danger hurried up their animals and got beyond the reach of the arrows sent after them. Smeathman, however, made no effort to escape, and when the others, looking back, last saw him, appeared to be making Masonic signs, as if he expected thereby to arrest the threatened attack. This availed not, and his escaping companions saw poor Smeathman fall from his horse fatally shot with arrows before they got out of sight. Reaching the mining settlements on the Humboldt, the whites obtained reinforcements and returned to the spot, where they found the body of the unfortunate man quite naked, his clothing, horse and everything else having been seized and carried off by the savages. The victim of this atrocious act had a good horse under him and might easily have made his escape, and by what fatuity he failed to do so will always remain a mystery. Being a powerful young man, capable of making a good resistance, why he offered none when attacked is also something unaccountably strange.

THE Lord Provost of Edinburgh has notified General Grant, through the American legation at London, of the desire of the corporation and citizens to make, in the event of General Grant's visiting Edinburgh, a public recognition of the high estimate they hold of his character and the services which he, as President, rendered to the cause of general peace, particularly in the continued friendly relations between the United States and Great Britain.

A WASHINGTON special says: The well-known philanthropist, W. W. Corcoran, distributed \$20,000 among the poor men and women who were recently thrown out of employment by reason of reductions in the departments.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

The New England ledge is turning out eight tons of good ore per day. The last crushing of 115 tons yielded \$5,086 in free gold and eight tons of sulphureta.

In the Silver Hill the north drift on the 650-foot level, which corresponds in depth with the 1000-foot level of the Justice, continues in fine quartz.

They struck the foot-wall in the Alpha on Saturday, 23 feet west of main drift, and found no ore.

The ore in the east and west drifts, third level, of the Grand Prize is now worth from \$250 to \$300 per ton.

The connection between the upraise and winze in the El Dorado South has been made.

The mill and furnace of the Advance are running satisfactorily.

On the 1750-foot level, from the C. & C. shaft, the west drift is very large and when complete will have a double track connecting the shaft with the ore vein.

In the Justice a very important change has taken place in the face of north drift, 750-foot level. This is on the east spur of the vein; also a decided improvement has taken place in the face of the south lateral drift on the west spur of the vein on the 750-foot level. Each improvement is producing a better quality of milling ore.

Board of Managers and Standing Committees of the Fair.

The following comprise the Board of Managers of the twelfth industrial exhibition, under the auspices of the Mechanics' Institute of this city:

- A. S. HALLIDIE, Pres't.

HENRY L. DAVIS, Treas.

GEORGE SPAULDING.

HENRY S. SMITH.

JAMES SPIERS.

COLUMBUS WATERHOUSE.

J. B. STETSON.
- P. B. CORNWALL, V. Pres't.

ERNEST L. RANSOME, Cor. Sec.

ASA R. WELLS.

A. L. FISH.

JAMES DUFFY.

JAMES DUFFY.

H. F. HUTCHINSON.

At a meeting of the Board, held on June 19th, the following standing committees were appointed to serve during the continuance of the forthcoming exhibition, which opens August 7th:

- AUDITOR.—C. Waterhouse, J. B. Stetson, James Drury.

BUILDING.—James Drury, A. L. Fish, A. R. Wells.

CIRCULARS AND CLASSIFICATION.—James Duffy, James Spiers, C. Waterhouse.

PRINTING AND ADVERTISING.—Geo. Spaulding, James Duffy, E. L. Ransome.

POWER AND MACHINERY.—James Spiers, A. L. Fish, H. S. Smith.

RULES, REGULATIONS AND AWARDS.—P. B. Cornwall, Geo. Spaulding, H. L. Davis.

TICKETS AND ADMISSIONS.—Asa R. Wells, E. L. Ransome, H. L. Hutchinson.

MUSIC AND DECORATION.—Henry L. Davis, H. L. Hutchinson, P. B. Cornwall.

PRIVILEGES.—A. L. Fish, P. B. Cornwall, H. L. Davis.

LOCATION.—E. L. Ransome, James Spiers, H. S. Smith.

POLICE.—J. B. Stetson, James Drury, C. Waterhouse.

HORTICULTURAL GARDEN.—H. L. Hutchinson, A. R. Wells, Geo. Spaulding.

GAR AND WATER.—H. L. Smith, James Drury, J. B. Stetson.
- Mr. J. H. Gilmore is Superintendent, and Mr. J. H. Culver, Secretary.

General News Items.

PRESIDENT D. C. GILMAN, formerly of the California University, was married at Newport, R. I., last week, to Miss Lillie Woolsey, niece of ex-President Woolsey, of Yale College, and sister of Susan Coolidge, the well-known authoress.

The President and Secretary Sherman have expressed themselves strongly, in private, to the effect that if silver is to be made a legal tender, custom dues and interest and principal of the public debt must be expressly exempted from the operations of the Act.

A NEWBURG (N. Y.) dispatch says: The 17-year locusts are here in abundance. They keep up a disagreeable hum-drum noise, but farmers do not think they will be dangerous in destroying the crops. Chickens and turkeys feast on them, and consequently it will be a good year for poultry.

Geo. K. Fitch brings suit against Charles De Young and Michael De Young to recover \$5,000 damages, for an alleged libel published in the San Francisco Chronicle, of November 30th, 1876, in which it was editorially charged that plaintiff and Loring Pickering had sold the use of their columns to the railroad company.

No correspondents are now allowed to leave the Russian headquarters. Those who are fortunate enough to be at the scene of fighting cannot use the telegraph to send their news forward. Grand Duke Nicholas has shut off every avenue by which intelligence of the forthcoming great move of his army can get abroad. The railroads, post-roads, telegraph lines, and even the mail bags are under his censorship.

The California quicksilver mining company are taking from their mines, according to the Yolo Mail, from 70 to 100 fasks of quicksilver per week; not that many per month, as we recently stated on the same authority.

A PARTY of 20 miners, bound for Big Horn, were fired upon by Indians when about 60 miles out from Deadwood. One of the miners was slightly wounded.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

WEEK ENDING JUNE 5TH, 1877.	
101,529.	HOISTING MACHINE, (Hydraulic).—F. G. Hesse, Oakland, Cal.
101,548.	BAKING PAN.—J. H. Pitts, S. F.
101,561.	EXPANDING REAMER.—R. Blair, S. F.
101,035.	BEE HIVE.—T. A. Atkinson, Merced, Cal.
101,037.	QUICKSILVER CONDENSER.—R. F. Knox, S. F.
101,733.	CONVERTIBLE CHAIR.—J. P. True, Ponce de Leon, Col.
REISSUES.	
7,790.	KEY HOLE GUARDS FOR LOCKS.—C. H. Covell, Stockton, Cal.
FOR WEEK ENDING JUNE 12TH, 1877.	
101,767.	TOOL HANDLE.—C. Groth, S. F.
101,805.	MERCURY CONDENSER.—W. H. Long and A. W. Castle, San Jose, Cal.
101,812.	ENGINE VALVE.—Eugene O'Neill, S. F.
101,835.	CHAIR BRACE.—J. W. Collins, Laramie City, Wyoming Ter.
101,806.	TOOL HANDLE.—L. Landeker, San Luis Obispo, Cal.
101,880.	COMBINED DITCHING, GANG AND SHOVEL PLOW.—A. Pirch, Denver, Col.
101,889.	ORE STAMP.—T. Scholfield, Grass Valley, Cal.
101,601.	BOX FOR SHAPING.—J. B. Tomlinson, Black Hawk, Col.
101,011.	ENDLESS CHAIN ELEVATOR.—J. A. Woodward, S. F.
101,006.	CULTIVATOR.—O. A. Olmstead, Santa Rosa, Cal.
TRADEMARKS.	
4,733.	WHISKY.—Lilienthal & Co., S. F.
4,734.	WHISKY.—Lilienthal & Co., S. F.

Signal Service Meteorological Report.

Week Ending June 19, 1877, S. F.						
HIGHEST AND LOWEST BAROMETER.						
June 13	June 14	June 15	June 16	June 17	June 18	June 19
29.79	29.84	29.91	30.00	30.00	29.96	29.93
29.77	29.80	29.82	29.93	29.96	29.91	29.91
MINIMUM AND MAXIMUM THERMOMETER.						
66	66	67	65	63	63	62
56	55	56	56	54	55	54
MEAN DAILY HUMIDITY.						
80	72	68	75	75	72	71
PREVAILING WIND.						
W	W	SW	SW	SW	SW	SW
WIND—MILES TRAVELED.						
418	339	301	289	240	330	316
STATE OF WEATHER.						
Fair.	Fair.	Clear.	Fair.	Fair.	Fair.	Fair.
RAINFALL IN TWENTY-FOUR HOURS.						
Total rain during the season, from July 1, 1876, 11.03 in.						

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

METALS.

WHOLESALE.	
THURSDAY, M., June 21, 1877.	
IRON.	
American Pig, ton.....	32 00 @ 33 00
Scotch Pig, ton.....	32 50 @ 34 00
White Pig, ton.....	31 00 @ —
Oregon Pig, ton.....	34 00 @ —
Refined Bar, 100 lb.....	5 00 @ 5 50
Horse Shoes, keg.....	— @ 7
Nail Rod.....	— @ 7
Norway, Oval.....	— @ 7
Rolled Iron.....	— @ 7
COPPER.	
Copper Tinned.....	37 00 @ 40
Sheathing, lb.....	37 00 @ 40
Sheeting, Yellow.....	37 00 @ 40
Sheeting, Old Yellow.....	10 @ 11
Composition Nails.....	21 @ —
Composition Bolts.....	24 @ —
STEEL.	
English Cast, lb.....	14 @ 25
Anderson & Woods, ordinary sizes.....	16 @ —
Drill.....	16 @ —
Flat Bar.....	15 @ 20
Plow Steel.....	8 1/2 @ 12 1/2
TIN PLATES.	
10x14 C Charcoal.....	9 00 @ 9 50
Banca Tin.....	24 @ —
Australian.....	19 @ 20
ZINC.	
By the Cask.....	11 @ —
Zinc Sheet 7x3 ft, 7 to 10, lb.....	11 @ —
7x3 ft, 11 to 14.....	11 @ —
8x4 ft, 8 to 10.....	12 @ —
8x4 ft, 11 to 10.....	12 @ —
NAILS.	
Assorted sizes.....	3 25 @ 3 75
QUICKSILVER.	
By the lb.....	41 1/2 @ 42

LUMBER.

WEDNESDAY M., June 20, 1877.	
CARGO PRICES OF PUGET SOUND PINE.	
REDWOOD.	
Rough M.....	14 00
Refuse.....	10 00
Clear.....	10 00
Clear Refuse.....	10 00
Rustic.....	27 50
Refuse.....	20 00
Surfaced.....	24 00
Refuse.....	14 00
Flooring.....	16 00
Refuse.....	14 00
Beaded Flooring.....	25 00
Refuse.....	14 00
Half-inch Siding.....	20 00
Refuse.....	16 00
Half-inch Surfaced.....	20 00
Refuse.....	20 00
Half-inch Batts.....	22 50
Pickets, Rough.....	22 00
Refuse.....	14 00
Fancy, Pointed.....	18 00
Shingles.....	2 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]
SAN FRANCISCO, June 20, 13 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 95 1/2. SILVER, —@84.
Gold in New York 105 1/2.
Gold Bars, 850 @ 890. SILVER BARS, 10 @ 15 1/2 cent. discount.
EXCHANGE ON NEW YORK, 50 @ 55—100 cent. premium for gold; on London bankers, 48; Commercial, 42; Paris, five francs @ dollar; Mexican dollars, 94 @ 95.
LONDON CONSOLS, 94 1/2; Bonds, 107 1/2.
QUICKSILVER IN S. F., by the fask, @ 1b, 42 @ 42 1/2.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Booth Gold Mining Company.—Location

of works, Auburn, Placer County, California.
NOTICE.—There are delinquent upon the following described stock, on account of assessment No. 2, levied on the thirtieth day of April, 1877, the several amounts set opposite the names of the respective shareholders:

Names.	No. Certificate.	No. Shares.	Amount.
Chenery, R. trustee.....	12	100	5 00
Chenery, R. trustee.....	14	100	5 00
Chenery, R. trustee.....	15	100	5 00
Cahill, R.....	158	60	2 50
Day, Thos trustee.....	148	500	25 00
Fry, E. M.....	88	750	37 50
Graves, R. N. trustee.....	25	250	12 50
Gilman, Henry.....	38	300	15 00
Gordon, Thos H. trustee.....	52	100	5 00
Gordon, Thos H. trustee.....	68	1000	50 00
Gordon, Thos H. trustee.....	112	100	5 00
Gordon, Thos H. trustee.....	114	100	5 00
Gordon, Thos H. trustee.....	110	100	5 00
Gordon, Thos H. trustee.....	117	100	5 00
Gordon, Thos H. trustee.....	118	100	5 00
Gordon, A. C. trustee.....	122	1000	50 00
Gordon, A. C. trustee.....	123	100	5 00
Gordon, A. C. trustee.....	124	100	5 00
Gordon, A. C. trustee.....	125	100	5 00
Gordon, A. C. trustee.....	126	100	5 00
Miller, G. A. trustee.....	43	50	2 50
Richardson, E. A. trustee.....	159	100	5 00
Spinney, Geo R. trustee.....	28	100	5 00
Spinney, Geo R. trustee.....	82	312	15 60
Spinney, Geo R. trustee.....	95	1000	50 00
Spinney, Geo R. trustee.....	100	100	5 00
Spinney, Geo R. trustee.....	100	100	5 00
Spinney, Geo R. trustee.....	101	100	5 00
Spinney, Geo R. trustee.....	102	100	5 00
Spinney, Geo R. trustee.....	103	50	2 50
Spinney, Geo R. trustee.....	104	50	2 50
Spinney, Geo R. trustee.....	105	50	2 50
Spinney, Geo R. trustee.....	106	50	2 50
Spinney, Geo R. trustee.....	149	500	25 00
Van Brunt, R. N. trustee.....	7	100	5 00
Van Brunt, R. N. trustee.....	8	100	5 00
Van Brunt, R. N. trustee.....	9	100	5 00
Van Brunt, R. N. trustee.....	10	100	5 00
Van Brunt, R. N. trustee.....	11	100	5 00

And in accordance with law and an order of the Board of Trustees, made on the thirtieth day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the salesroom of J. Middleton & Son, No. 310 Montgomery Street, San Francisco, Cal., on the twenty-fifth day of June, 1877, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office, No. 320 California Street, Room No. 5, San Francisco, Cal.

Consolidated Bonanza Gold and Silver Mining Co.—Location

of principal place of business, San Francisco, California. Location of works in Eagle and Washoe Valley Mining District, Ormsby county, Nevada.

NOTICE is hereby given that at a meeting of the Board of Trustees, held on the fourth day of June, 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 19 First Street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on Tuesday, the tenth day of July, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the thirty-first day of July, 1877, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Trustees. WM. MARTIN, Secretary.
Office No. 19 First Street, San Francisco, Cal.

Empire Mining Company.—Location

of principal place of business, San Francisco, California. Location of works, Silver City, Owyhee County, Idaho Territory.

NOTICE.—There are delinquent upon the following described stock, on account of assessment No. 13, levied on the 26th day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Balcom, C. F. trustee.....	243	100	\$100 00
Miner, A. P. trustee.....	490	100	100 00
Miner, A. P. trustee.....	578	20	20 00
Schmiedell, Hochstadter & Co, trustee.....	907	100	100 00
Fisher, E. trustee.....	908	25	25 00
Warrin, J. E. trustee.....	986	5	5 00
Schmiedell, Hochstadter & Co, trustee.....	1007	100	100 00
Schmiedell, Hochstadter & Co, trustee.....	1116	10	10 00
Schmitt, C. A. trustee.....	1186	10	10 00
Woods & Freeborn, trustee.....	1205	20	20 00
Fisher, E. trustee.....	1234	100	100 00
Swick, Frank.....	1315	5	5 00
Fisher, E. trustee.....	1348	25	25 00
Dixon, T. H. trustee.....	1435	150	150 00
Noble & Co, H. H. trustee.....	1445	100	100 00
Noble & Co, H. H. trustee.....	1446	100	100 00
Noble & Co, H. H. trustee.....	1457	100	100 00
Johnson, J. M. trustee.....	1511	50	50 00
Johnson, J. M. trustee.....	1512	40	40 00
Swift, Frank.....	1538	5	5 00
Dodge, Geo S.....	1539	3	3 00
Classen, J. M.....	1540	2	2 00
Noble & Co, H. H. trustee.....	1544	2	2 00
Willis, William, trustee.....	1582	100	100 00
Callaghan, Lynch & Co, trustee.....	1677	20	20 00
Brooks & Lee, trustee.....	1706	50	50 00
Schmitt, C. A. trustee.....	1730	20	20 00
Hickox, Kohl & Co, trustee.....	1746	50	50 00
Noble & Co, H. H. trustee.....	1748	100	100 00
Hosmer & Bourne, trustee.....	1763	35	35 00
Major, D. G. trustee.....	1769	400	400 00
Hall & Charles, trustee.....	1783	100	100 00
Gordon, C. P. trustee.....	1796	50	50 00
Carroll, James, trustee.....	1806	25	25 00
Willis, William, trustee.....	1824	50	50 00
Willis, William, trustee.....	1831	50	50 00
Willis, William, trustee.....	1833	50	50 00
Willis, William, trustee.....	1834	100	100 00
Willis, William, trustee.....	1835	50	50 00
Willis, William, trustee.....	1846	100	100 00
Willis, William, trustee.....	1852	100	100 00
Willis, William, trustee.....	1865	100	100 00
Willis, William, trustee.....	1866	100	100 00
Willis, William, trustee.....	1870	100	100 00
Hubbard & Co, trustee.....	1885	50	50 00
Willis, William, trustee.....	1893	50	50 00
Hill & Kilgour, trustee.....	1894	50	50 00
Wakefield, S. B. trustee.....	1895	50	50 00
Taylor, A. C. trustee.....	1902	25	25 00
Taylor, A. C. trustee.....	1903	25	25 00
Hargrett, L. T. trustee.....	1907	50	50 00
Noble & Co, H. H. trustee.....	1908	100	100 00
Noble & Co, H. H. trustee.....	1909	50	50 00
Willis, William, trustee.....	1910	50	50 00
Willis, William, trustee.....	1920	100	100 00
Willis, William, trustee.....	1923	100	100 00
Willis, William, trustee.....	1924	100	100 00
Willis, William, trustee.....	1928	100	100 00
Willis, William, trustee.....	1929	100	100 00

Names.	No. Certificate.	No. Shares.	Amount.
Willis, William, trustee.....	1930	100	100 00
Willis, William, trustee.....	1933	100	100 00
Willis, William, trustee.....	1940	100	100 00
Willis, William, trustee.....	1944	100	100 00
Willis, William, trustee.....	1944	100	100 00
Willis, William, trustee.....	1944	100	100 00
Willis, William, trustee.....	1947	100	100 00</

Iron and Machine Works.

PACIFIC ROLLING MILL COMPANY,

SAN FRANCISCO, CAL.

Established for the Manufacture of
RAILROAD AND OTHER IRON

Every Variety of Shafting,

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames,

Hammered Iron of Every Description and Size.

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The highest price paid for Scrap Iron.

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Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,

SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

Directors:

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Wm. Norris, Wm. H. Taylor, J. B. Haggin,
James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

THOS. PENDERGAST.

HENRY S. SMITH

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, Bet. Howard and Folsom

SAN FRANCISCO.

FULTON FOUNDRY AND IRON WORKS.

HINCKLEY & CO.,

Manufacturers of

STEAM ENGINES, Quartz, Flour and Saw Mills,

Hayes' Improved Steam Pump, Brodie's Improved Crusher, Mining Pumps, Amalgamators, and all kinds of Machinery.

N. E. corner of Tehama and Fremont streets, above Howard, San Francisco.

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Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

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37 Fremont St., cor. Mission, S. F.

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PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

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MANUFACTURERS OF

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING AND MINING MACHINERY, INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS, CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES, FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES, RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES, SUGAR MILL MACHINERY, WATER WHEELS, Etc., ALL OF THE LATEST AND MOST IMPROVED CONSTRUCTION.

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Steam Engines and all Kinds of Mill and Mining Machinery.

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Manufacturers of all kinds of

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ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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Light and Heavy Castings of Every Description Manufactured.

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Lynch's Ventilating and Illuminating Tile, The Only Illuminating Tile Manufactured for Lighting Cellars, Basements and Dark Rooms which provides proper ventilation for such places

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Machinery and Castings of all kinds.

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BOILER MAKERS AND

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Howard between Fremont and Beale Sts., San Francisco

San Francisco Pioneer Screen Works,

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Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

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Machinery.

The Ingersoll Rock Drill



Is Extensively Used in the East and

TAKES THE PLACE OF ALL OTHERS,

Wherever introduced, because it can be run with less power, labor and repairs, and do more work than any other Drill in the market. It has but few parts, is easily handled, being light, and has AUTOMATIC FEED, which saves labor. WE ASK FOR TRIAL AGAINST ANY COMPETITOR. For particular information regarding Drills or Air Compressors, send for circular to

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THE O'HARRA CHLORIDIZING FURNACE

Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing 20 Tons in 24 Hours by this Process:

One man.....	\$ 4 00
One man.....	3 00
Wood—2½ Cords at \$3 per cord.....	6 25
Salt—1,600 lbs at 2½ cents.....	40 00

Cost of 20 tons.....\$52 25
Cost of one ton.....2 61½

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Consolidated Co.'s mines, in Peavine District, Nev., and at the Exchequer mill, Alpine Co., Cal. For further information, apply to

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THE ONLY PERFECT

BALANCE SLIDE VALVE

That is made. Applied without extra charge to Engines manufactured by us.

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This machine is so simple in its construction that any person can understand and run it. The DOUBLE GOUGE BIT, patented with this Drill only, is one of its specialties, as it feeds and cleans itself. The machine is a hand Drill and can be operated by two men, who will do the work of ten in the ordinary way. In a word, it is a labor-saving machine which has no parallel, and as such we offer it to the public. For State or Territorial rights, or machines, apply to

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The Gardner Automatic Safety-Stop Governor.

MORE THAN TEN THOUSAND NOW IN USE. EVERY ONE WARRANTED.



SEND FOR DESCRIPTIVE CIRCULAR AND PRICE LIST.

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Sole Manufacturers of

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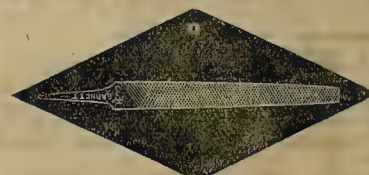
For Chloridizing, Desulphurizing and Roasting Ores.

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STEAM ENGINES, SAWMILLS, SHAFTING, GEARING AND MINING MACHINERY.

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G. & H. BARNETT,

Manufacturers of Files of every Description,

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Sold by all the principal hardware stores on the Pacific Coast. LINFORTH, KELLOGG & CO., General Agents for the Pacific Coast.

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Established in 1720.

Cash Assets - - \$14,993,466

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Incorporated 1851.

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Used in Connection With PURVINE

Wooden Amalgamating Pans and Settler.

This is a complete, perfect and economical adaptation of the humid method to the treatment of Gold or Silver ores, associated with

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And other base metals, or to ores free from base metals. It can be adapted to any first-class Gold or Silver mill, at a reasonable additional expense.

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For Steam Boilers, Pipes, etc. Best non-conductor of heat in use. It effects a LARGE SAVING OF FUEL, LASTS AS LONG AS THE IRON to which it is applied, and is reasonable in cost.

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Its use in mines brings about

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SUCCESSION TO EAGLE WORKS MFG CO
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At the highest prices; also, treated on Commission at low rates.

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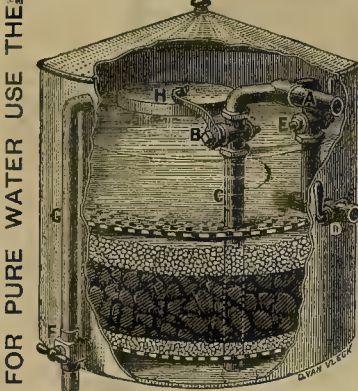
We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes: Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

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\$55 a Week to Agents. \$10 Outfit Free. P. O. VICKERY, Augusta, Maine.

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It is self-regulating, will last many years without renewing filtering material. Is simple, durable, easily cleaned, and not liable to get out of order. A sure preventive against snakes, worms, bugs and all other impurities in the water. It will filter all the water required for any dwelling house, and is not expensive. These filters are expressly designed to use in place of a tank. May be connected to any tank and through the usual pipes supply all the house, or the water may be used direct from the filter, where no tank is required for other purposes. Every house should be provided with one and thus avoid one of the most fruitful sources of disease. Full satisfaction guaranteed and filters kept repair free of expense. For sale by

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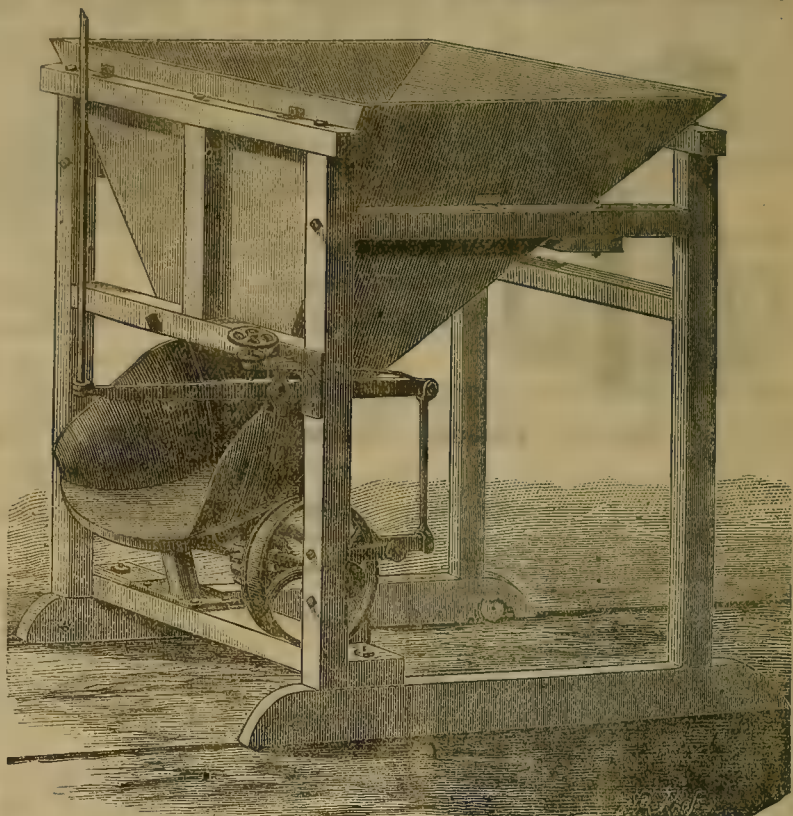
50 MIXED CARDS, with name, for 10c. and stamp. One pack (20 styles) Acquaintance Cards, 10c. Samples for 3c. stamp. M. DOWD & CO., Bristol, Ct.

50 FINE CARDS, Damask, Repp, Etc., with name on, 13 cents. CLINTON BROS., Clintonville, Conn.

\$1,000 Challenge Ore Feeder,

AWARDED FIRST PREMIUM

At the Tenth Industrial Fair of the Mechanics' Institute.



It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

REFERENCES.

A letter received from the Julian Mill, Newcastle, says of the Carrier Feeder: "It is the most perfect Feeder we have ever seen; don't see how any mill can do without them."—A letter from Mr. C. C. Belding, of Amador County, speaks in the highest terms of them. Two of the machines were shipped to the Bunker Hill Mill, also Gover Mill, Amador County. Mr. Stevenson, of Boston Mill, Gold Hill, Nevada, says they are the best Feeder he has ever seen. Salsby Mill, Tuolumne County—California Company, Nevada City. Omaha Gold Mining Company, Grass Valley.—St. Patrick Mill, Placer County.

\$1,000 CHALLENGE.

Backward in Coming Forward.

C. P. Stanford Fails to Come to Time on the Challenge of \$1,000 to Test the Merits of His Ore Feeder as Against Mine. The Challenge is Still Open to Him or any one else. GENTLEMEN, Put up or Shut up.

A letter has been received from the Crescent mine, Plumas County, in which it states that the Tulloch is a failure as against the \$1,000 Challenge Feeder of Hendy's.

We warrant the machines to give perfect satisfaction, and to be a better and more durable Feeder than any other in the market, and will sell them as cheap as any other of its class.

For Description, Send for Circular to

J. HENDY, Sole Manufacturer,

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Where it Can be Seen in Operation.

ALSO, MANUFACTURER OF

HENDY'S IMPROVED AMALGAMATOR and CONCENTRATOR,
AND DEALER IN
QUARTZ MILL MACHINERY.

PATENTED

CAST STEEL SHOES AND DIES.

Guaranteed Cheaper than the Best Iron.

IMPORTANT NOTICE.

Reduction in Price from 16 Cents to 12 Cents Per Pound.

Owing to our largely increased business, the present low price of Iron from which our Steel is manufactured, and the improved facilities for casting and forging, we take great pleasure in announcing that from and after this date we will supply our IMPROVED CAST AND FORGED STEEL SHOES AND DIES FOR QUARTZ MILLS at twelve cents per pound, delivered at San Francisco or Sacramento, instead of sixteen cents, as heretofore.

We also furnish Steel Plates for Blake and other Ore Crushers, Steel Gut Gearing, etc., for Mills and Hoisting Works, Steel Pan Shoes, Battery Cams and Tappets, etc., etc.

Address all orders, with dimensions or drawings, to

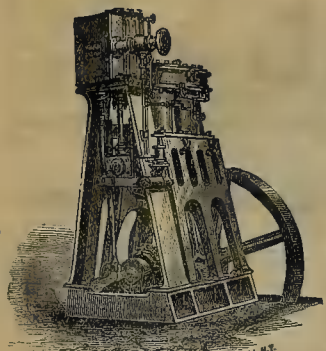
CAST STEEL SHOE & DIE CO.,

59 Nevada Block, S. F.

Dewey & Co. { 224 Sansome St } Patent Ag'ts. | If you like this paper, recommend it.

MINING MACHINERY DEPOT,

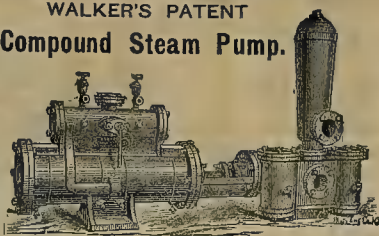
PARKE & LACY, 417 Market Street, S. F.



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Compound Steam Pump.

ECONOMY IN COST.
ECONOMY IN FUEL.

POSITIVELY UNEQUALED FOR
SIMPLICITY AND DURABILITY.



Air Compressors,
ROCK DRILLS
—AND—
Tunneling Machinery.

Burleigh's.

Machinists' Tools,
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Putnam's.

COMPOUND STEAM PUMPS — WALKER'S.

Plunger Steam Pumps—Cope & Maxwell's.

BUCKET PLUNGER PUMPS—WRIGHT'S.

Centrifugal Pumps—Heald & Sisco's.

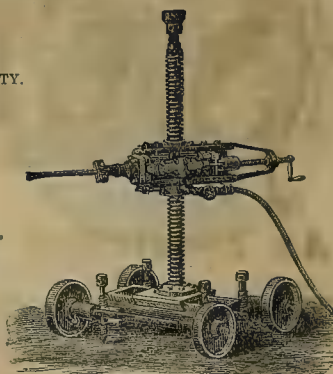
Vertical Steam Engines, All Sizes—Haskin's.

Emery Wheels—Cosmopolitan.

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BATTERY FOR BLASTING—FARMER'S

EXPLODERS—HILL'S.



Portable Hoisting Engines, for Use in Mining Districts, with Compressed Air or Steam.

VILLAGE HOOK AND LADDER TRUCKS,

Chemical Engines Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.

Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners' and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome Street, San Francisco.

Questions of the Times.

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HAMILTON, N.Y., May 28th, 1876.

To Messrs. Dewey & Co., Patent Agents:
GENTLEMEN:—I write to acknowledge the receipt by express of the U. S. letters patent, on my invention for breech loading ordnance, and to tender you again my very sincere thanks for the careful attention you have bestowed upon my application since I first placed it in your hands, for the evident great interest you have manifested in it, and for the uniform patient and cheerful courtesy which has constantly marked your correspondence in reference to it. I have had some dealings with other agencies in the same line in times past, and I can assure you that my correspondence with yours has been more pleasant and satisfactory than with any others, and I shall always take great pleasure in recommending your agency to any and all my acquaintances without hesitation or reservation, as I should certainly prefer to entrust my own business in your hands should I have any to transact in the same line hereafter. Yours, etc.

J. R. N. OWEN.

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UNITED STATES Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
B. W. CROWELL—Amador, Placer, Calaveras and Tuolumne counties.
G. W. MCGREW—United States.
A. C. KNOX—Plumas, Sierra, Lassen, Placer and Nevada counties.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.
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ED. T. PLANK—Dakota Territory (Black Hills).
JOSEPH DIMICK—Mendocino, Humboldt and Del Norte counties.

"Faith and Confidence."

LIVERMORE, Oct. 1st, 1875.

MESSRS. DEWEY & Co., Patent Solicitors: Gentlemen:—Yours of the 29th ult., containing my patent to Elevated R. R. duly received, and I hereby return my sincere thanks to the MINING AND SCIENTIFIC PRESS Patent Agency for your promptness and honesty in regard to our business connections. I have received a flood of circulars from Eastern firms, desiring to deal with me, but I have declined any communication with them and prefer to see circumstances will permit, to negotiate with and patronize a home institution; one in which I have faith and confidence—DEWEY & Co.

Again thanking you for your promptness in securing my patent, I remain, obediently yours,
WM. H. HARRISON.

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MINING AND SCIENTIFIC PRESS.

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BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JUNE 30, 1877.

VOLUME XXXIV.
Number 26.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

IMPROVED DEMIJOHNS CASE.—Carlton Newman, S. F. The necessity of protecting such large bottles or demijohns as are intended to contain corrosive, dangerous or valuable liquids, has resulted in establishing encased bottles as an article of commerce. These encased bottles consist of an outside wooded case or boxing, inside of which the bottle or demijohn is placed and surrounded with suitable elastic packing, which protects it from being broken by ordinary jolts and jars, etc. A necessary feature of this business is that the box or case shall be so constructed that the contents of the bottle or demijohn can be poured out without taking the bottle or demijohn out of the case, and without spilling any of its contents. This has been accomplished heretofore by narrowing the top of the box on two sides, from a point opposite the swell of the bottle upwards towards its top and leaving a side opening through which the liquid could be poured when the box or case was tipped upon its edge; or by making the top of the box flat and allowing the neck of the bottle to project above it through a hole in the top. In the first named class also the fastening screw which secured the cover to the box was left to project above the cover. These cases are, however, objectionable, because they cannot be placed one on top of the other, so that in packing them in cars or other vehicles the cost of transportation is heavy. The object of Mr. Newman's last invention in this direction therefore, is to construct the cases or boxes of a uniform size from bottom to top, and leave this top perfectly flat and unobstructed, and at the same time provide means by which the contents of the bottle or demijohn can be poured out without removing the bottle or demijohn. The invention also includes other improvements. Mr. Newman as proprietor of the glass works in this city has use for a large quantity of these cases.

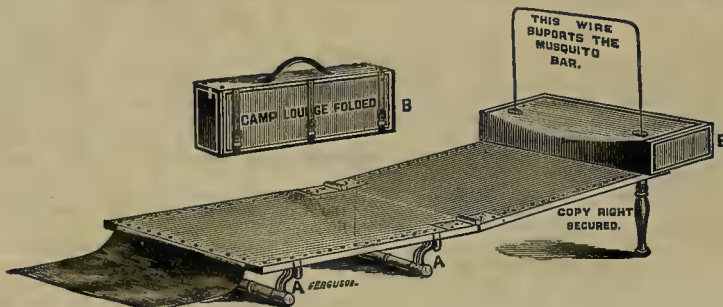
CONDENSERS.—Wm. H. Long and A. W. Castle, Santa Clara. In the condensation of mercurial vapors it has long been customary to perform this work in dry chambers, which are kept cool in various ways, and in some instances a spray of water has been showered down through a tower to meet the upwardly rising vapor so as to condense it. It has not hitherto been found possible to introduce mercurial vapors beneath water so as to condense them by actual contact, on account of the difficulty in properly discharging such vapors at the bottom of a tank, and because of the pressure necessary to overcome the weight of the water and the consequent back pressure and attendant leakage of fumes between the furnace and condenser. These difficulties these inventors design to overcome by the use of this invention. The condenser consists of a vessel where the vapors are conveyed beneath the surface of the water contained therein, by the centrifugal force caused by the motion of hollow open-ended arms which unite with the central hollow conveying tube, and are caused to rotate with it by suitable mechanism. A supply of cold water is kept up, a suitable trap is provided for, withdrawing the metallic mercury without the water, and stops are placed within the condenser to prevent the rotation of the water by the action of the arms. Each chamber is provided with its own exhausting or vacuum-producing mechanism, so that as many as desired can be used without producing any back pressure or influence upon any of the others.

Of 810 acres in the city boundaries of St. Johns, N. B., 400 acres are burned over, and 20,000 residents are rendered homeless. They have left the city or are under tents. The loss is still estimated at \$20,000,000, and the insurance, so far as known, is about \$8,000,000. It is said all the offices will pay. The Imperial, Etna, etc., lose \$2,000,000; North British, \$1,000,000; Queen, \$800,000; Northern, \$500,000; Royal, Stadacona and others, heavy but not ascertained; Commercial Marine, \$300,000.

Pacific Coast Coal Mines.

We have received from Bancroft & Co. "The Coal Mines of the Western Coast of the United States," by W. A. Goodyear, M. E. This work is a most valuable addition to our industrial literature, filling, as it does, a hitherto neglected but important field. The reputation of the author is sufficient guarantee that the book is no trashy compilation, but has been written with care and an intelligent and scientific knowledge of the subject. Mr. Goodyear was for a long time connected with the State

first treats of the California mines, the Mount Diablo coal field and details concerning it, the Corral Hollow field, the Livermore mine and other coal localities. The second chapter treats of the Oregon coal fields, the third describes the coal mines of Washington Territory, and the fourth gives the cost of production at the Mount Diablo mines, statistics of production and trade, and relative values of different coals. In speaking of the Coos Bay coal mines, Mr. Goodyear gives some striking examples of the recklessness with which the money of stockholders is squandered by ignorant men, and costly works put up before they were sure of



THE "SHERIDAN" CAMP LOUNGE.

Geological Survey, and his professional duties have given him exceptional advantages for obtaining information concerning the coal mines of the coast. The volume before us is mainly the result of his own work, travels and observations, extending over a period of nine or ten years, during which period he has done more work in, and been personally

any mines. He states that in the immediate vicinity of Coos Bay not less than a half million of dollars have been lost in this way, nine-tenths of which might have been saved if the advice of a competent engineer had been sought and followed. Mr. Goodyear concludes that the days of the old Mount Diablo mine are numbered. Since the miners strike in October, 1876, the Pittsburg Co. ceased operations on the Clark bed entirely, and withdrew the pump from the lowest level of that bed. Since that time their mining has been confined to the "little vein" in the old Eureka ground, and to the Black Diamond bed. The Union mine was entirely closed on the 1st of December, 1876, and the mine entirely abandoned. Of the old companies, there only remain at work the Pittsburg and Black Diamond companies. In the face of heavy and increasing cost of mining, these mines must succumb to the better quality, and eventually, the lower cost of production and transportation of the coals of Washington Territory and British Columbia. Outside of the hitherto unworked eastern portion of the Mount Diablo coal field, Mr. Goodyear thinks there is no other coal field yet known in California which gives promise of being able to compete, to any reasonable extent, with the northern mines. In conclusion, the author says:

Neither is it probable that the mines of Coos bay, the only ones yet worked in Oregon, will be able many years longer to continue work at a profit in the face of the Washington Territory coals. For, though the distance from San Francisco to Coos bay is only about one-half as great as it is to Puget sound, yet the shallow and often unsafe character of the bar at Coos bay, the small size of the vessels that can go there at all, and the uncertainties which often attend the movements of even these small vessels, are such that the rates of freight from Coos bay have generally ranged as high and have often been actually higher than they were from Seattle; while it is more than probable that a company that owned and ran its own suitable steam colliers, could transport coal from Seattle to San Francisco at a considerably lower cost per ton than they could do from Coos bay. Moreover, the cost of mining at Coos bay is greater than it is at Seattle, while at the same time the quality of the Coos bay coal, for domestic purposes as well as for steam, is decidedly inferior to the more northern coals. It is unquestionably to the mines of Washington Territory and of British Columbia that this Pacific coast must look hereafter both for its chief domestic and its nearest and most reliable foreign supplies of that indispensable necessity of all civilized communities—a good article of coal.

A FEARFUL tornado occurred in Iowa, Missouri and Illinois on Sunday night, destroying a great deal of property.

Improved Dumping Device.

The illustration on this page shows an improved dumping device, invented by Wm. Willes, of Salt Lake City, which is excellently suited for loading and unloading carts and other vehicles, vessels, etc., when the same are used for transporting any substance which may be dumped without injury, such as ore, earth, stone, coal, and grain. The invention will also be found useful in building operations, for handling mortar and concrete. It consists of a receptacle, triangular in section, and shaped either as shown in the engraving, or in forms slightly modified therefrom. This is suspended by a looped bail from the sides, as shown. One side, A, Fig. 1, is secured to a rod which enters apertures in the adjacent ends, so that said side, A, is pivoted or hinged so as to swing open, and thus allow the contents of the vessel to escape. To the middle of side A, is pivoted a bar, B, the motion of which is limited by long keepers, and the extremities of which, when the side is closed, fall into hooks on the ends of the bucket. One of these hooks turns upward, the other downward, so the bar B, by being simply turned on its pivot, becomes engaged with them. It may then be fastened (so as not to be dislodged by any chance shock), by a pin passing through the bill of one hook, as shown at C. Of course, while the earth, etc., is in the bucket, the side, A, is kept closed; but when it is desired to dump the contents, the pin, C, is removed, the bar moved out of the hooks, and the side, A, is forced open by the weight of the material above it, which is thus discharged.

In the bucket shown in Fig. 2, a partition D, is used inside the swinging side, A, so that the orifice made by the opening of the latter is thus rendered smaller. This arrangement is best suited for buckets used for sacking grain, where the discharge is made into a comparatively small aperture. For further particulars address Messrs. Willes & Rowe, Salt Lake City, U. T.

Comfort in Camp.

During the hot weather that has prevailed of late we doubt not that many a dweller in the city has wished that he could take to the woods and for a time imitate the life of the "noble savage."

There are some things, however, about camp life that are not altogether agreeable, as, for example, rheumatic twinges from sleeping on the ground, and in some places the mosquitoes are an intolerable nuisance at night.

We give herewith an illustration of the "Sheridan" camp lounge, which is coming into very general use among military men, sportsmen, prospectors and others who wish to carry a light bed that can be set up anywhere.

The frames are of wood and iron, covered with strong canvas. The support for the mosquito bar is made of copper wire, so that it also can be folded for packing.

The "Sheridan" camp lounge has jointed side rails, mosquito bar canopy and pillow attachment. Size of case, two inches by seven inches by 23 inches. A beautiful, compact, comfortable and convenient lounge.

Mr. C. H. Mosely, of 415 Sansome street, is the agent for these goods upon this coast.

The main points of excellence which he claims for them are strength, comfort and portability.

The testimonials from purchasers include many names of prominent persons who use them in almost every situation; in houses, on the lawn and in the wilderness. The article is so compact and light when folded that it can be sent by mail or express to any address.

PATENT SUIT.—An action has been brought in the United States Circuit Court by W. T. Garratt, the owner of the Hooker pump patent, against W. C. Wilcox and B. F. Baker, manufacturers of the Wilcox steam pump, to enjoin the defendants against infringing upon a certain patent granted to William D. Hooker on the 6th of December, 1870, for "an improvement on direct-acting steam engines, constructed with auxiliary valves," and for an accounting, etc.

WILLES "LIGHTNING DUMPER."

more familiar with the actual condition and workings of the various coal mines of the Pacific coast than any other engineer has done. Mr. Goodyear says in the preface that the object he has had in view has not been so much to discuss the geological character of the Pacific coast coal fields as to give, what has never yet been published, a full and intelligible description of the mines themselves, as they exist to-day.

The book is divided into four chapters. The

The Palisade Coal Vein.

We have duly chronicled, says the *Eureka Sentinel*, the developments made in the coal mine recently discovered at Palisade, and are pleased to learn that the prospect for opening and developing a large and permanent vein is daily increasing. Messrs. Ferguson and Young, the discoverers of the mine, are both old coal miners; Mr. Ferguson having worked for a number of years in the Pennsylvania coal fields, and Mr. Young has served his apprenticeship in the coal mines of England. Soon after the finding of the Palisade vein, a company, consisting of the most prominent citizens of that burg, was organized and sufficient capital to sink a shaft and prospect the find was subscribed. The vein is situated about four miles north of the town, and a shaft has been sunk on it to a depth of 30 feet, and from the surface down the coal has increased in quantity and quality. A large quantity has been brought into Palisade and submitted to various tests, such as burning in a forge, under a locomotive boiler and in heating stoves. All these experiments have resulted satisfactorily, the coal burning freely, giving a welding heat in the forge and leaving but little ash. There is but very little sulphur in it, and the specimens we have seen have the gloss and luster of bituminous coal, clearly distinguishing it from lignite. The prospecting shaft is very small, but besides the large quantity sent into town, the company have a number of tons on the dump, and on Wednesday extracted one lump that will weigh over a ton. As an evidence of the faith that the company have in the mine, we learn that they refused a cash offer yesterday of \$5,000. The stock is divided into 11,000 shares, and a small number of 100-share lots have been disposed of at \$1 per share. These were sold to friends of the original owners, but there are none in the market even at that price. We have in former articles dwelt upon the advantages that would accrue to the Central Pacific railroad if coal in any quantity should be developed by future explorations, and we understand that the offer yesterday was made by the authorized agent of that company. They are very desirous of escaping from the clutches of the Union Pacific, who now exact a tribute for every ton of the vast quantity used on the Central Pacific road. The railroad runs through a treeless desert for a length of 500 miles, and the existence of a coal bed at a central point in this waste would save a large amount in transportation, while if the deposit should come under their control, the first cost would be reduced to that of extraction. There is another view of the matter that effects Eureka. As the mountains in this vicinity are denuded of their timber growth, the charcoal supply in the near future becomes a serious question. There is no present scarcity, but the price of the article is the heaviest item of expense encountered in the reduction of our ores. The contiguity of a large coal deposit of a quality that will coke readily, would solve the question, and render valuable the millions of tons of low grade ore that at present cannot be worked at a profit. Our furnace men have been impatiently awaiting developments out at Pancake, and their attention will now be drawn to the Palisade coal fields. Of course these are mere speculations, but the owners of the vein are very sanguine, and feel sure that they have got a good thing, notwithstanding that Prof. Frank Stewart denies the possibility of the existence of any black diamonds in the sage brush. Scientific theories are apt to be upset (the silver deposits in Leeds district, for instance), and if he puts on his spectacles he will find several tons of the article at the Palisade coal mine. If ten tons of coal can be found in that mine, there is no cogent reason for denying the occurrence of ten million tons in the same neighborhood. Facts are hard things for would-be scientific theorists.

Like a Romance.

Stephen Lanehart died two weeks since at Rush creek, Trinity Co. He was an old resident of the county, having gone there in 1851. His death, says the *Trinity Journal*, recalls an incident in his life which would be a good foundation for a romance, as indeed it has been. Lanehart was pretty well posted as to Indian character, and on one occasion turned this knowledge to good account. The old Indians, who were grown before the county was settled, retained many of their old habits and customs, one of which was upon the death of a person to bury or destroy everything of which he died possessed. Prior to March, 1852, there was constant war between the whites and Indians, and none can ever know how many of the adventurous spirits who crossed the mountains in search of the golden treasure of the Trinity and its branches, fell beneath the noiseless arrows of the treacherous natives. It was not until years after peace had been established that the Indians outgrew their fear of vengeance, and told of some of their exploits in which little parties of miners and solitary travelers had fallen victims to their vengeance, and many a spot along Trinity river was marked by them as the scene of such an occurrence. Among others told of was a man traveling on a white horse. Somewhere near Point Bar he was attacked and killed, his horse eaten, his rifle thrown into the river, and his body buried or concealed. But he made a brave fight, and wounded one of his assailants in the arm. The Indians had no knowledge of surgery, and the wounded arm mortified and fell off. The dead man had a large sum in gold dust with him,

which was taken possession of by his captors. When the wounded man's arm and hand came off it was buried in a little flat half a mile or more below the mouth of Rush creek, and the gold dust taken from the white man's body sown broadcast above the buried hand. Lanehart heard the Indians talking of this many years after, and set himself to work to find out the place where the hand was buried and the treasure strewn. This was not an easy task by any means, for Indian superstition prohibits them from talking of the dead in any manner, believing that to mention a deceased Indian by name would bring his spirit around. He and others finally succeeded in getting them to divulge the fact that the hand was buried in a field belonging to Sherrin Chamberlain. They went to work and were ultimately rewarded by finding the strewn treasure. We never learned the exact amount recovered, but it was over \$1,000.

The belief is prevalent among those old residents who know the Indian characteristics, that many other places in the county have been enriched with treasure stolen from the whites during the first three years after the mines here were discovered. Certain it is that there have been some marvelous "strikes" which can be accounted for in no other way, of places that yielded unexpected large sums for a day or two and then came down again to the old standard. But the case we have mentioned and that of Jenkins, who took some \$900 from an Indian grave on one of the forks of Grass Valley creek, are the only instances in which it was known to a certainty that the treasure had been buried by the Indian thieves who took it from the original owners.

Working Flue Dust.

Last February, says the *Eureka Sentinel*, Mr. L. Colbath, a Salt Lake mining operator, and owner of large smelting works some six miles from Salt Lake City, came to Eureka and bargained with the Eureka Consolidated company for the purchase of the immense accumulation of flue dust at the Consolidated reduction works. A sale was effected at the rate of eight dollars per ton, and it was calculated that the amount to be delivered would reach 10,000 tons. It was known that the flue dust was very valuable, samples of it assaying from \$40 to \$50 per ton in gold and silver, and carrying a large percentage of lead and iron. A great many experiments have been made at the different furnaces to find some method of working the article so as to leave a margin of profit, but with very little success, and the dust carried off by volatilization and caught in the condensing flue has at most of the furnaces been allowed to accumulate on the dump pile. The Richmond company was an exception to this rule, that company having reworked it in the form of slime, but experienced smelters have been of the opinion that nothing was gained by this method, the added moisture and increased fuel more than counterbalancing any profit derived from the second working. Be this as it may, the sale to Messrs. Colbath & Co. was consummated, and Mr. Clark, one of the Salt Lake firm, having negotiated special rates with the railroad companies—\$13 per ton freight from Eureka to Salt Lake—commenced shipping the article. The Utah ores lack iron necessary for smelting and fluxing, and it was calculated that as the dust carried 20 per cent. of that metal, it would in a great measure dispense with the necessity of buying iron ore and leave the precious metals as a profit on the speculation. In this way was the fact accounted for that Salt Lake smelters could ship the dust from Eureka and work it at a profit. Mr. Clark shipped 500 tons, when the forwarding was interrupted for a period. This was in consequence of certain discoveries having been made in regard to methods of working it, a discovery that dispensed with smelting entirely, and introduced an old and very simple process. Mr. Colbath, in conjunction with one of the best experts in the Territory, Mr. Wallace, tried a number of experiments as to the best method of reduction. Finally the idea occurred to them that the pan process, the same as used in an ordinary quartz mill, might solve the problem. Five tons of the dust were shipped 40 miles to a distant mill, and we understand that it was treated the same as the pulp from underneath the stamps. We will not be positive on this point, as the discoverers are very reticent, but the dust was run through the pans and the result was that the working process gave a return of within \$1.43 of the fire assay. As soon as this experiment proved successful, Mr. Clark proceeded to San Francisco and opened negotiations with George C. Clark, wholesale paper dealer in that city, and principal stockholder in the Lemon mill of Eureka, for the lease of the mill property. The negotiations have been pending for a month past, during which time we have been in possession of the facts, but under a pledge of secrecy. A. D. Haskell, a stockholder in the mill, and authorized agent of the Lemon company, has leased it to Messrs. Clark & Wallace, who will at once renovate and put the mill in order. We understand that they will not only work the dust by their process, but also any free ores that may be found in the vicinity.

The importance of the enterprise to Eureka can hardly be exaggerated. The loss by volatilization is estimated at 13 per cent. on every ton of ore that goes into the furnace, and if this process of working that wastage is a success, it adds that much to the value of all the ore extracted, less the difference between the returns and the fire assay, a very small one, as shown.

Private Railways.

A new line of railway to connect the seaside village of Felixstowe with the Great Eastern system has just been opened to the public, having been surveyed by Captain Tyler on the part of the Board of Trade. The new line differs from all others in England in being the property of a single owner, Col. Tomline, formerly M. P. for Grimsby, who has not only constructed it at his sole cost, but is also working it himself, with his own engines and rolling stock. The line is 14½ miles long, and joins the Great Eastern at Westerfield, about 10 minutes' run from Ipswich. The line presents no engineering difficulties, running almost on a level throughout, and on a dry and easily-worked soil, so that it has been completed within 20 months of its commencement. Until very recently it was intended to be worked by the Great Eastern Company, but this arrangement could not be carried into effect, and the new engines and rolling stock have been built by the Yorkshire Engine Company, and delivered in eight weeks from the receipt of the order. Putting aside colliery lines, it is believed that the only other example in the United Kingdom of a line of railway owned by a single proprietor is furnished by one section of the Highland railway, which belongs to the Duke of Sutherland. But this piece, although it is his Grace's property, is worked by the Highland Company, and is continuous with the other sections of their lines, in which its identity is merged, or almost lost. Col. Tomline stands alone in having a railroad which is not only his property, but also under his control. He has spent, it is said, a quarter of a million sterling in the undertaking. Mr. J. Babington Macaulay, agent to Mr. Edward Cropper, writes to the *Times*: "Perhaps you will allow me a small corner of your influential columns to correct the paragraph referring to ownership of passenger railways by single proprietors. The Maelochog railway, now working into the heart of North Pembrokeshire, and terminating at his slate quarries, a few miles from Fishguard, is the entire freehold property of Mr. Edward Cropper, and worked entirely by his servants, engines and rolling stock, for both passenger and goods purposes. As regards public spirit and enterprise, there is strong affinity between the two cases in point; but where Col. Tomline's efforts have led him through 14½ miles of dry and easily-worked soil to his goal, those of the other gentleman were met by deep rock cuttings and valleys, mountain and moorland, river and forest, in the course of nine miles of railway, forming a variety of difficulties and of scenery in such a short distance almost unparalleled."

Mr. J. Grover, M. Inst. C. E., also writes from 9, Victoria Chambers, S. W.: "As you have drawn attention lately in your columns to Col. Tomline and the Duke of Sutherland as individual proprietors of railways, I take the opportunity of stating that Col. Yolland, the government inspector, has finally passed the Hemel Hempstead railway, a line nine miles long, connecting the Midland and Northwestern systems in Hertfordshire, which has been constructed by me for a single proprietor, Mr. J. J. Barrow. The line has some heavy works upon it, and will be of great service to the district through which it passes; therefore I think the name of the gentleman at whose cost such an important local undertaking has been carried out deserves to be recorded among those to whom the public are indebted for useful public works of magnitude."—*Iron*.

Idaho Mines.

The *Owyhee Avalanche* in a recent issue says: One of the principal drawbacks to the success of mining operations is often found in the rivalry of feeling exhibited by parties in their desire either to get control and possession of property or figure in some position in connection with the management. Rival factions have their particular friends whom they are anxious to supply with places, and the ill feeling too frequently engendered by such contests has a demoralizing effect upon the progress and stability of the work in hand. This cause, combined with that of incompetent management, having been instrumental in the past in seriously retarding the progress of mining operations in this vicinity, it is to be hoped that every citizen interested in mining property and the welfare of the place, will do his utmost towards discountenancing dissensions. Idaho is entering upon a new era of prosperity we hope, and the men who have borne the brunt of misfortunes attached to past failures are those who have stood by us and remained with us, possessing an abiding faith in the great resources we have at our command. These are the men in whose hands the future welfare and management of our mines may be safely entrusted. Our citizens, generally, who have been compelled to make great sacrifices, growing out of past failures, have evinced their readiness to make heavy pecuniary concessions with a view to having work resumed on some kind of a fair basis, and these are the men whose wishes and opinions should be respected in such matters. Give us honest and efficient management, and a judicious development of the mines, and Idaho with moderate capital will, in a short time, take her place as the foremost mining region of the Pacific coast.

The Salinas Quicksilver Mines.

On Saturday a representative of the *Index* took a trip to the works of the Salinas quicksilver mine, located in the McLeod mining district, San Benito county. The mine is 14 miles from Hollister. It was located by Geo. Shriver in June, 1875. He formed a company and placed the number of shares at 40,000. The company was composed of people living mostly in and around Salinas. The first prospecting was done in August of the same year, but the first real work commenced in March, 1876, and has been continued without interruption ever since. There were two tunnels run and one shaft sunk in prospecting, in all of which good, well-defined ledges of antimony were found.

The "Delta" Tunnel.

Mr. Shriver satisfied himself where the best place was to commence to tap the lead at some depth, and accordingly began driving a tunnel which was named the "Delta." He found good indications of antimony from the start, and when in 100 feet struck the ledge. It was found to be well-defined and was from four to six feet wide. On the east side is a wall of talc formation and on the west a sandstone wall. The ledge dips east at an angle of about 40°. The tunnel was continued in 200 feet after tapping the ledge, the antimony continuing good all the way. Mr. S. now determined to sink a shaft. He came back to within 166 feet of the mouth of the tunnel, made a station and began to sink a shaft, which was sunk right on the lead and runs with the same incline. It has gone down through good metal all the way. At a depth of 40 feet the formation began to change. Where had been antimony now came cinnabar. Through the antimony there was no water, but with the cinnabar came water; slowly at first, but steadily as the formation changed came an increase of water. Mr. Shriver's courage was now doubled. His theory had been that at a given depth the antimony would disappear and quicksilver take its place. The shaft was continued down 53 feet after the cinnabar came in and at the bottom they had to hoist three buckets of water to one of ore. The shaft was a little over four feet wide, and the ledge was fully that thick and growing richer every foot it went down. It now became necessary to make a change of base. The company would either have to erect hoisting works and put on pumps of sufficient capacity to keep down the water or run a new tunnel to tap the shaft. Mr. Shriver had demonstrated that he had metal in paying quantities and that it was no longer an experiment. He was safe in continuing work. The company could still go ahead and do work to the value of \$20,000, and if no further developments were made, by taking out what they had in sight, ship and sell it, the mine would pay a dividend to the stockholders. It was decided that the best plan to open the mine was to run a new tunnel that would strike some distance below the bottom of the shaft. On the 20th of February of the present year work was begun on a tunnel which was called

The "Georgia."

Work has been pushed night and day ever since—three eight-hour shifts being run—and the candles have never been blown out except Sundays. Mr. Shriver has never allowed any Sunday work except once to keep the water down while sinking the shaft. On Saturday last the tunnel was in a little over 500 feet, thus having made a uniform progress of about 40 feet per week. It is calculated that the shaft will be struck in 600 feet, and thus 100 feet more will put the tunnel in. When in it will be 60 feet below the bottom of the shaft, and with no bad luck the 1st of July will see the tunnel completed and the connection made, when stopping will be at once commenced. Two men will be enabled to take out 20 tons of ore per day from the tunnel, whereas it would take seven men to do the same amount of work from the shaft and tunnel above. One of the main objects of the tunnel now being run will be to ventilate the mine. It will also drain it, which is a great desideratum, as there is now 30 feet of water in the shaft.

The Buried Cities of Central Asia.

It is said that an expedition for exploring the buried cities of Central Asia is being planned in British India. It is not impossible that treasures like those of Mycenae may be found in the sands of Mongolia. According to tradition, the tomb of Ghengis Khan, with the fabulous wealth it incloses, is to be found to the south of Lake Tabasun-Nor. The quaint old legend concerning this mausoleum asserts that within lies a man who seems asleep. Every evening a sheep or a horse is tied near the spot, and in the morning the animal has been eaten. In 300 years, say the Mongols, the sleeper will awake and lead countless hosts of his children to victory and dominion. The old story is said to be circulating more and more widely every year. Then the Mongols say that frequently the drifting sands disclose, here and there, gold and silver treasures, which they have a superstitious dread of touching. The buried cities under the sands of the Gobi are affirmed to be mines of incalculable wealth, guarded by gnomes and fearful spells, while all the deserts around the hidden ruins are peopled by myriads of howling ghosts. But if the cities really exist, it will take more than a garrison of ghosts to defend them against the curiosity and the greed of modern explorers.—*Journal of Chemistry*.

MECHANICAL PROGRESS.

Corrosion in Steam Boilers.

The Hartford Steam Boiler Inspection and Insurance Company continues its investigation into the causes of boiler explosions. Its report for the year 1876 has lately been issued. From the many causes of destruction and death which are described, we select a few points on corrosion: During the past year the company found 1,026 cases of external corrosion, 442 of which were regarded as dangerous; also 542 cases of internal corrosion, 131 of which were regarded as dangerous. The causes of these defects are various. Where boilers are bricked in leaks occurring up near the water line are not easily discovered, and corrosion may go on insidiously until the sheet is largely worn away. This defect, in its early stages, can only be discovered by careful inspection when the boiler is cold, and to do this the inspector must make a careful examination externally underneath, and if he discovers indications of corrosion, the brick wall should be removed and the boiler be very carefully examined at the point where the leak is supposed to be. We have found cases where the boiler was so badly corroded that the steam was kept in place mainly by the brick wall. This is not a very reliable method of confining steam under 60 or 80 pounds pressure. External corrosion is not uncommon in iron and coal mines, and iron works where boilers are frequently used with no covering over them. This is a very dangerous way to deal with boilers, and probably accounts for many of the accidents which occur in such places. In a neighboring State a boiler was corroded to the thinness of sheet iron where it rested upon a brick wall and had probably not been inspected for some years. It was little to be wondered at that it exploded, and much damage resulted, and several persons were killed. Internal corrosion results from entirely different causes, usually from some impurity in the water. The report gives an interesting case: The inspectors were called to examine the boilers of a tallow factory, which were supposed to be in fair condition, and were running at a pressure of 60 pounds to the square inch. An internal examination revealed the fact that the feed water was contaminated with the refuse of the works, and that internal corrosion was doing a dangerous work. The water was examined and found to be strongly impregnated with stearic acid. The condition of the boiler was such that it was condemned as unfit for use. The braces and stays were so corroded as to be of no use whatever.

When a weak or corroded spot is found in a boiler it should be carefully examined with reference to the best means of repairing. If the sheet is found corroded so thin that there is not strength enough to hold the rivets necessary in patching, the sheet should be entirely removed and a new one substituted. Or, if the defective spot is confined to only a portion of the sheet, the iron should be cut away until sound metal is reached, and the patch should be riveted thoroughly to the sound portions of the sheet, and the edges of the patch calked. In their anxiety to avoid delay and expense, steam-users often put on what is called a "soft patch." This consists of a piece of iron laid over the defective spot and held in place by bolts, making the joint tight with stiff putty, composed of white and red lead and a small quantity of fine iron borings. This method of patching is careless, often in the extreme. The bolts are held only by a thin portion of corroded sheet, and are liable to tear out at any time. Soft patches over fractures, where the bolts are held firmly by sound iron, are not so bad. This method, however, is not to be recommended.

A CUSHIONED HORSE SHOE.—The subject of horse shoes involves considerations which are well worthy of scientific investigation; and a shoe was given the attention of the Franklin Institute, at a recent meeting of that body. The following extract, taken from the *Journal*, will convey an idea of the device: The shoe is cast of malleable iron, of the usual shape of a horse shoe, having its lower face open, into which a slip of tarred rope is pressed (by hydraulic pressure of many tons), of larger diameter than the width of the opening; a range of prongs rises from the center of the cavity, which pierce the rope, thus uniting with the stress from the sides, hold the hemp firmly. The shoe partakes somewhat of the moccasin and also of the sandal; it absorbs concussion and retains friction, and embraces other conditions of fitness.

THE PLANIGRAPH.—An instrument for reducing or enlarging drawings, called a planigraph, has been invented by M. Marnet, of Versailles. It consists of a rule carrying two scales, which have different graduations, and are placed end to end in opposite directions. At the common origin of the scales is a needle about which the rule can freely turn. Reading on one side the vector radii of the different points of a given figure, and marking on the other side the points designated by the same numbers, you obtain a figure reduced or enlarged in the proportion resulting from comparison of the scales. These scales are fixed to the rule by screws. There are five for each side, among which choice is made according to the reduction required.

Charcoal for Gunpowder.

Some of our State gunpowder makers may be interested in the progress which the English are making in the preparation of their charcoal. At a recent meeting in London a paper was read "On an Economical Method of Manufacturing Charcoal for Gunpowder," by Mr. Geo. Haycraft, F. C. S., Assoc. Inst. C. E. By former methods of manufacturing charcoal for gunpowder it had been customary to use three retorts, side by side, heated by a furnace at the end. In some instances the gases had been utilized, but at the cost of having constantly to renew furnaces and brickwork setting, while in others the gases had been altogether lost by being allowed to escape either in a gaseous or condensed form. By the new method two sets of three retorts had only one furnace between them, and the flues were so arranged that each set had its own outlet to the shaft, which was controlled by a damper. The man in charge, by closing one damper and opening another, could utilize the heat for either set of retorts at pleasure. The gases evolved in carbonizing the wood were all collected in suitable flues, and used instead of coals for maintaining the heat necessary for producing charcoal. In practice it was found that a given quantity of wood would give off enough gas during carbonization to effect the carbonization of a similar quantity, or nearly so. In working, one set of retorts was charged with wood, and heated in the first instance with coal, and a portion of the gas given off from the wood. When about two-thirds of the gases in the wood were evolved no more heat was required, because enough was stored up in the surrounding brickwork to complete the carbonization. The surplus gas, therefore, was transferred to the other set of cylinders, which were now full of fresh wood, and comparatively cold. By the time the wood in the first set of retorts was converted into charcoal, and a new charge put in, the second set of retorts was able to spare its surplus gas, and so the process went on alternately day and night incessantly throughout each week. Therefore, after first lighting the furnace on Monday morning it was only necessary to keep the furnace bars covered with ashes, chalk, or other available rubbish. By the old method about one cwt. of coal was required each time the three retorts were charged, but by the new arrangement 56 pounds of coal would effect 50 burnings in six retorts.

Enameling Iron Ware.

The following, says the *Hardware Reporter*, are the methods and materials employed in the enameling of most of the iron ware—other than granite or marbleized iron—now in use in this country. One hundred pounds of calcined and ground flints and 50 pounds of borax, also calcined and finely ground, are intimately mixed, fused and gradually cooled. Of this 40 pounds are mixed with five pounds of potters' clay, and ground in water to a pasty mass. The vessel, first thoroughly cleaned by means of very dilute sulphuric acid and scoured with sand, is lined with a coating of this about one-eighth of an inch thick, and left to harden in a warm room. To this a new coating is next added, prepared from 125 pounds of white glass, free from lead; 25 pounds of borax; 20 pounds soda in crystals, which have been pulverized and fused together, these being ground, cooled in water, and dried. To 45 pounds of this, one pound of soda is added, the whole mixed in hot water, dried and finely powdered. A portion of this is sifted over the other coating while it is still moist, and then the vessel is dried in an oven at the temperature of boiling water. After this, the vessel is heated in a stove or muffler till the glaze appears, when it is taken out and more glaze powder is dusted on the glazed surface already in fusion. This enamel, it is stated, resists perfectly the injurious action of dilute mineral and vegetable acids and alkalis, and does not crack or scale off from the metal.

In Germany and France the following process is said to have lately come into use, more especially for enameling copper culinary vessels: Twelve parts, by weight, of white fluor spar, the same of gypsum, one part borax, are finely powdered, ground together, and fused perfectly in a crucible; when cold, this mass is again carefully ground to powder, made into a uniform paste with water, laid upon the clean metallic surfaces, dried and ground.

THE GREATEST WAR SHIPS.—English exchanges tell us that a bold advance in the construction of ironclad ships has been decided upon by the Italian government in respect to the two vessels which are to excel the *Duilio* and the *Dandolo*. The new ships are now begun, but it will probably be six years before they are complete. They are to be unrigged turret ships, propelled by twin screws. They are to be much larger than the largest ships in the British navy, and much faster, in addition to which they will be much more costly. The most powerful engines in her Majesty's fleet are those of the *Inflexible* and the *Dreadnought*, working up to between 8,000 and 9,000 indicated horse-power. But this enormous amount is to be at least doubled by the engines of the Italian war ships. According to the present conclusions, the armor will be steel, probably a meter thick, or fully half as thick again as the maximum armor of the *Inflexible*. What guns these colossal ships are to carry is as yet undetermined, but it is not unlikely that in ordnance as well as in other respects the forthcoming ships will transcend all predecessors.

SCIENTIFIC PROGRESS.

English Desires in Blowpipe Apparatus.

The English Society of Arts offers a prize of \$50 and a silver medal for the best set of blowpipe apparatus which can be manufactured and sold for about \$5. Competition is open until August 1st. Although it may not be within the convenience of our readers to compete for this reward, still it may serve as a hint to inventors to be told what the society considers desirable in such an apparatus. We read as follows: The apparatus must, at least, contain blowpipe, blowpipe lamp or candle, spirit lamp, charcoal or charcoal pistilles and holder, platinum wire, glass tubes closed at one end (matrasses), open glass tubes, platinum-tipped forceps, magnet, hammer and anvil, and four reagents, viz., borax, microcosmic salt, carbonate of soda, and nitrate of cobalt. These instruments and reagents, together with any others which may be thought desirable, must be packed in a box. It must be understood that the above list of apparatus, etc., is only intended to include such as are absolute indispensable, and it is expected that the set will contain additional instruments and reagents, the selection of which is left to the competitors. Special attention should be paid to the following points: 1. Solidity of construction; 2. Compactness and portability; 3. Facilities for packing and unpacking; 4. Number of useful instruments and reagents in addition to those mentioned. The society does not engage to give the prizes unless some apparatus appears to show sufficient merit, and some advance on what is now obtainable for a guinea.

NEW IDEAS UPON THE USE OF STEAM.—Steam at ordinary pressure, sent into saline solutions on which it has no chemical action, gives a rise of temperature that seems at first sight paradoxical, the temperature produced being always higher than that of the steam. *Nature* says that M. Muller, of the Berlin Chemical Society, has been studying the phenomenon. Chloride of sodium is one of the best salts to use. A solution of it sufficiently concentrated to have a boiling point of 127° may be raised to 125° simply by sending steam into it at 100°. Here, then, the steam produces a rise of 25° above its own temperature. The more concentrated the solution the higher is the rise. M. Muller points out, in explanation, that saline solutions at 100° absorb the steam at the same temperature, and the result is a rise analogous to that produced when a gas, like ammonia, is dissolved in water. These experiments throw new light on the controverted question, what is the temperature of the steam which escapes from a concentrated and boiling solution? Is it 100° or a temperature near that of boiling of the solution? The new results seem to be against the latter and common view.

NO LIMIT TO MICROSCOPIC PROGRESS.—As we have formerly remarked, Helmholtz and other mathematicians of the first order who have applied their methods of analysis to the subject, have alleged that the limit of visibility with the microscope has been reached. This belief is based on the theory that light itself is too coarse to permit the subdivision by which yet smaller objects may be revealed to our most powerful lenses. The limit of visibility has been named as the 180,000th of an inch. But this view is not wholly accepted by microscopists. The Rev. Wm. H. Dallinger has made experiments which point to a very different conclusion. He employs a new method of practical observation specially adapted to testing this question, and has constructed lenses which carry the limits of distinct visibility far beyond the boundary announced by the mathematicians. Much smaller objects are thus revealed than the theory referred to would indicate as capable of being seen. Furthermore, Mr. Dallinger does not believe that he has yet reached the limit of division and visibility by instrumental means.

A CORAL CURIOSITY.—A Melbourne journal describes a remarkable piece of coral taken from the submarine cable near Port Darwin. It is of the ordinary species, about five inches in height, six inches in diameter at the top and about two inches at the base. It is perfectly formed, and the base bears the distinct impress of the cable and a few fibers of the coil rope used as a sheath for the telegraphic wire still adhering to it. As the cable has been laid only four years, it is evident that this specimen must have grown to its present height in that time, which seems to prove that the growth of coral is much more rapid than has been supposed.

AMERICAN ASSOCIATION MEETING.—The 26th meeting of the American Association for the Advancement of Science will be held at Nashville, Tennessee, on August 29th. Sessions will take place in the Capitol. Special arrangements are being made for decreased railroad fares, etc., and for the accommodation of members in the city. The permanent subsections of chemistry, microscopy and anthropology are to be continued, and the co-operation of students of these sciences is requested. The Entomological club will meet on the day preceding the meeting of the association.

ELECTRIC LIGHTING.—One of the late English improvements in the application of electricity to lighting, promises to enable us to admit the lightning to our houses. We read that a novelty has been introduced which consists in placing the carbons side by side in an insulating but fusible envelope, the result being that clockwork regulation can be entirely dispensed with. The insulating material used is kaolin, which, in its solid state, is an insulator, offering high resistance to the electric current, but which, under the influence of a powerful electric current, becomes heated and liquefies, in which state it is no longer an insulator, but conductor, offering a slight resistance to the current, which, when passed through in this condition, affords a light which is soft, steady and brilliantly white, although it may be colored by mixing with the kaolin the color required. No mechanism is required to regulate this light, which, once set up, continues to burn during passage of the current until the carbons are consumed, when they are replaced by others. The electrical arrangement consists of an ordinary magneto machine, which sends positive and negative currents alternately. From this machine radiate wires by which the current evolved is conveyed to the buildings or points at which it is required for use. The illuminating arrangement is put in circuit with these wires, and on the current traversing the carbon electrodes it fuses the kaolin and produces the light. Thus, given a means of producing the necessary electric current, any number of lights may be obtained from the same electro-motor, each dependent upon itself, and all entirely independent of each other. Any one light may be brought into use at pleasure, and extinguished when required by merely connecting or disconnecting the wires in connection with them, whilst a light consumed may be replaced by another with equal ease. As many as 50 lights have been set up in one circuit with success.

GLASS FROM SLAG.—We have already noted the English process of manufacturing glass from blast-furnace slag. We learn now that the process consists in using the slag in its liquid state direct from the blast-furnace. It is found that the whole of the slag when thus employed is convertible into perfectly transparent glass of a good color. The slag, while in a liquid state, is conducted into a tank holding about 15 cwt., where it is mixed with other materials, and in an incredibly short space of time, as compared with the ordinary method, glass is produced. This glass is acknowledged by the workmen to be of an exceedingly soft or plastic nature. It is perfectly acid-proof, and capable of use for all purposes for which the best bottle glass is suitable. It cuts readily with the diamond, and is available as rough plate for roofings, skylights, green-houses, roofing tiles, and for many other uses from which glass, as heretofore manufactured, is, on account of its cost, necessarily shut out. Specimens have also been produced of this glass colored brilliantly, and suitable for the purposes to which colored glass is employed.

A REMARKABLE MONUMENT.—The Department of State at Washington is in receipt of a letter from Gen. John Meredith Read, Charge d'Affaires at Athens, reporting the discovery by M. Stephen Commanderis, the leading Secretary of the Archaeological Society of Athens, of the monument mentioned by Thucydides, as having been erected by Pisistratus, son of Hippias, and grandson of the tyrant Pisistratus. The stone, which was lying neglected on the right bank of the Ilissus, southwest of the temple of Jupiter Olympus, bears an inscription, of which the following is the translation: "This monument, upon his advent to power, Pisistratus, the son of Hippias, has dedicated in the Temple of Apollo Pythius." The discovery of this remarkable stone fixes the site of the temple of Apollo Pythius, which was hitherto unknown. The monument has been purchased by the Archaeological Society, and will be immediately transferred to the museum of Varvakion.

AN ANCIENT CALENDAR.—In digging near Ceri, Rome, there has been discovered a superb marble fragment of an ancient Roman calendar, containing the second half of the first five months of the year. Beside the usual indications of days, feasts and the different games, there is a list of the principal solemnities; some of these last are quite new; others confirm conjectures which have been made by learned men on less certain indications. The most recent date which can be read is that of the dedication of the Altar of Peace by Augustus in the 745th year of Rome.

RESEARCHES.—Forty-five scientific expeditions were fitted out during the year 1876. Of these, 24 had their field in Europe, seven in Africa, five in America and two in Oceania. The objects of the researches included archaeology, natural history, anthropology, medicine, statistics, comparative legislation, comparative history of religions, philosophy, geography, geodesy and astronomy. In addition, organized researches were also made among archives and in libraries.

A BESSEMER STEEL BELL.—The *Bethlehem Times* says, probably the first Bessemer steel bell ever cast now hangs in the belfry of the Presbyterian church, in that borough. This bell was cast in the Bessemer works of the Bethlehem Iron Company and weighs but 58 pounds. Its tone is clear and pleasant.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending June 7	Week Ending June 14	Week Ending June 21	Week Ending June 28
Alph.	11 9	154 93	19 13	11 11
Alta	40 35	75 2	1 2 05	11 11
Alta S. M. Co.	40 35	75 2	1 2 05	11 11
Bellmont	40 35	75 2	1 2 05	11 11
Best & Belcher	40 35	75 2	1 2 05	11 11
Bullion	40 35	75 2	1 2 05	11 11
Caledonia	40 35	75 2	1 2 05	11 11
Chollar	40 35	75 2	1 2 05	11 11
Confidence	40 35	75 2	1 2 05	11 11
Con Imperial	40 35	75 2	1 2 05	11 11
Crown Point	40 35	75 2	1 2 05	11 11
Dayton	40 35	75 2	1 2 05	11 11
Eureka Co.	40 35	75 2	1 2 05	11 11
Exchequer	40 35	75 2	1 2 05	11 11
Gen. Thomas	40 35	75 2	1 2 05	11 11
Grand Prize	40 35	75 2	1 2 05	11 11
Gila	40 35	75 2	1 2 05	11 11
Globe Co.	40 35	75 2	1 2 05	11 11
Knickerbocker	40 35	75 2	1 2 05	11 11
Leviathan	40 35	75 2	1 2 05	11 11
Leeds	40 35	75 2	1 2 05	11 11
Modoc	40 35	75 2	1 2 05	11 11
Manhattan	40 35	75 2	1 2 05	11 11
Meadow Valley	40 35	75 2	1 2 05	11 11
Mexican	40 35	75 2	1 2 05	11 11
North Con Virginia	40 35	75 2	1 2 05	11 11
New York	40 35	75 2	1 2 05	11 11
Northern Belle	40 35	75 2	1 2 05	11 11
New Coso	40 35	75 2	1 2 05	11 11
Occidental	40 35	75 2	1 2 05	11 11
Overman	40 35	75 2	1 2 05	11 11
Pacific	40 35	75 2	1 2 05	11 11
Phil Sheridan	40 35	75 2	1 2 05	11 11
Prospect	40 35	75 2	1 2 05	11 11
Raymond & Ely	40 35	75 2	1 2 05	11 11
Rock Island	40 35	75 2	1 2 05	11 11
Sage	40 35	75 2	1 2 05	11 11
Sierra Nevada	40 35	75 2	1 2 05	11 11
Silver Hill	40 35	75 2	1 2 05	11 11
South Chariot	40 35	75 2	1 2 05	11 11
Trojan	40 35	75 2	1 2 05	11 11
Union Con.	40 35	75 2	1 2 05	11 11
Utah	40 35	75 2	1 2 05	11 11
Yellow Jacket	40 35	75 2	1 2 05	11 11

Sales at S. F. Stock Exchange.

FRIDAY, A. M. JUNE 26	550 Belmont	1
1885 Best & Belcher	232 25	1
955 Belcher	41 24	1
3230 Bullion	6 24	1
3165 Con Imperial	1 30 21	1
1245 Crown Point	1 30 21	1
350 California	34 33	1
1150 Con Virginia	33 33	1
530 Chollar	34 33	1
550 Confidence	34 33	1
1640 Caledonia	34 33	1
2880 Exchequer	54 24	1
3195 Gould & Curry	14 21	1
2885 Hale & Nor.	6 24	1
1000 Justice	8 24	1
850 Lady Bryan	6 24	1
1330 Mexican	12 11	1
240 Ophir	12 11	1
300 Overman	12 11	1
1680 Savage	8 24	1
680 Sierra Nevada	5 24	1
200 Seg Belcher	20 24	1
730 Union Con.	15 24	1
105 Utah	15 24	1
750 Yellow Jacket	13 12	1
AFTERNOON SESSION		
280 Andes	90 24	1
400 Alpha	13 12	1
1160 Alta	1 30 21	1
50 Alps	7 50	1
1500 Argenta	1 30 21	1
150 Belmont	1 30 21	1
1025 Bullion	7 24	1
450 California	34 33	1
1170 Caledonia	4 30 21	1
Chollar	34 33	1
1150 Crown Point	1 30 21	1
8820 Con Imperial	1 10 21	1
1540 Dayton	60 70	1
350 El Dorado S.	1 11	1
200 Empire Id.	15 24	1
150 Eureka Co.	15 24	1
375 Exchequer	6 24	1
755 Grand Prize	10 21	1
2360 Gould & Curry	14 21	1
150 Golden Chariot	1 30 21	1
200 Gila	25 24	1
315 General Thomas	3 10 21	1
300 Hale & Nor.	3 10 21	1
1100 Hussey	1 11	1
525 Kossuth	1 11	1
400 Leeds	1 11	1
455 Leopold	2 12 21	1
145 Lady Wash.	1 11	1
1020 Leviathan	7 24	1
450 Modoc	2 12 21	1
130 Meadow Valley	5 24	1
730 Mexican	1 11	1
140 Morning Star	1 11	1
700 Monumental	15 24	1
425 Northern Belle	16 24	1
300 New Coso	1 11	1
500 North Con Virginia	40 30	1
500 North Con.	10 24	1
505 New York	40 30	1
200 Occidental	90 24	1
325 Ophir	17 24	1
1050 Overman	15 24	1
100 Panther	55 24	1
200 Prospect	80 24	1
300 Peytona	10 24	1
250 Phil Sheridan	10 24	1
10 Raymond & Ely	7 24	1
800 Rock Island	25 24	1
500 Rye Patch	2 24	1
290 Silver Hill	2 70 24	1
400 South Comstock	25 24	1
1200 Trojan	1 10 21	1
500 Union Con.	25 24	1
260 Woodville	4 24	1
600 Yellow Jacket	13 12	1
SATURDAY, A. M. JUNE 27		
300 Alta	1 11	1
520 Alpha	1 11	1
275 Andes	7 50	1
200 Argenta	1 11	1
175 Best & Belcher	25 24	1
700 Belcher	7 24	1
300 Bullion	7 24	1
250 California	34 33	1

2150 Best & Belcher	25 24
200 Belmont	1 11
200 Bullion	7 24
550 California	34 33
1030 Caledonia	3 85 33
435 Con Virginia	34 33
460 Crown Point	1 30 21
275 Con Imperial	1 30 21
300 Eureka Co.	15 24
445 Empire Id.	2 21 24
1305 Exchequer	54 24
200 El Dorado S.	1 11
400 Gila	30 24
150 Gen Thomas	10 24
1280 Grand Prize	12 21 24
35 Golden Chariot	1 40
2220 Gould & Curry	15 21 24
535 Hale & Nor.	54 24
215 Hussey	25 24
420 Justice	7 24
760 Leopold	2 12 24
2630 Leeds	1 50 21 40
690 Manhattan	8 24 74
50 Meadow Valley	25 24
1945 Modoc	2 21 24
730 Mexican	1 11 24
30 Northern Belle	16 24
305 Ophir	17 24 25
1780 Peytona	10 24 25
135 Raymond & Ely	7 24 25
100 Rye Patch	2 21 24
535 Sierra Nevada	5 24 25
205 Savage	6 24 25
210 Stepto	3 75 24
60 Utah	1 11 24
120 Union Con.	15 24
890 Yellow Jacket	12 21 24
TUESDAY, A. M. JUNE 22	
100 Alta	1 11
120 Alpha	1 11
270 Alpha	11 21 40
1140 Baltimore Con.	55 25 26
1510 Best & Belcher	24 21 22
205 Belcher	6 24
120 Bullion	7 24
1105 Caledonia	34 33 25
1680 Crown Point	1 40 41
3905 Con Imperial	1 10 21 25
705 Con Virginia	34 33 25
825 California	32 24 25
300 Chollar	31 21 22
Confidence	3 40
505 Dayton	5 24 25
2095 Gould & Curry	13 21 24
1090 Hale & Nor.	54 24 25
800 Julia	3 21 24
300 Justice	7 24 25
120 Kossuth	30 24 25
100 Lady Wash.	1 11 24
250 Leviathan	80 24 25
545 New York	45 24 25
250 North Con.	10 24 25
300 North Con Vir.	10 24 25
200 Ophir	15 21 24
630 Overman	14 24 41
1000 Peytona	80 1035
100 Prospect	35 24
370 Rock Island	13 24
450 Savage	54 24 25
75 Seg Belcher	21 25
550 Sierra Nevada	4 30 25
380 Silver Hill	2 21 25
120 South Con.	3 24
590 Trojan	1 10 21 15
805 Union Con.	54 24 25
220 Utah	14 24 41
760 Yellow Jacket	11 21 22
AFTERNOON SESSION	
380 Alpha	13 21 22
300 Argenta	14 21 22
765 Best & Belcher	24 25 26
1275 Belmont	7 24
715 Bullion	7 24
445 Con Virginia	34 33
140 Crown Point	1 40 41
1105 Caledonia	3 80 25
2410 Best & Belcher	24 25 26
50 DeFrees	1 125
150 Empire Id.	2 21 24
50 Eureka Co.	15 24
100 Exchequer	35 24 25
145 Gila	35 24 25
250 General Thomas	15 24
300 Golden Chariot	1 40 41
1310 Grand Prize	12 21 24
1780 Gould & Curry	15 21 24
500 Hussey	25 24 25
460 Hale & Nor.	6 24

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M. JUNE 21	THURSDAY, A. M. JUNE 28
1050 Alpha	114 21 24
1200 Bullion	12 21 24
2410 Best & Belcher	24 25 26
435 Belcher	4 24 25
2870 Crown Point	1 40 41
20150 Con Imperial	1 10 21 25
1000 Lady Bryan	6 24 25
700 Con Virginia	34 33 25
345 Confidence	5 24 25
255 Chollar	24 25 26
955 Exchequer	34 33 25
210 Golden Chariot	1 40 41
1840 Hale & Norcross	54 24 25
885 Justice	6 24 25
500 Kentucky	4 24 25
1820 Mexican	1 11 24
995 Ophir	14 21 24
170 Overman	11 21 24
1550 Savage	54 24 25
190 Prospect	35 24 25
460 Utah	14 24 41
1125 Yellow Jacket	10 21 22
AFTERNOON SESSION	
2250 Best & Belcher	24 25 26
350 Belcher	6 24 25
175 Belmont	90 24 25
170 Bullion	7 24 25
120 California	34 33 25
150 Chollar	31 21 22
150 Confidence	3 40 41
150 Con Virginia	34 33 25
150 Crown Point	1 40 41
150 DeFrees	1 125
150 Empire Id.	2 21 24
150 Eureka Co.	15 24
150 Exchequer	35 24 25
150 Gila	35 24 25
150 General Thomas	15 24
150 Golden Chariot	1 40 41
150 Grand Prize	12 21 24
150 Gould & Curry	15 21 24
150 Hussey	25 24 25
150 Hale & Nor.	6 24 25

MINING SHAREHOLDERS' DIRECTORY.

(Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.)

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
American Flat M Co	Washoe	7	May 18	July 11	July 31	C A Sankey
Alta S M Co	Washoe	7	June 7	July 12	Aug 2	W H Watson
Bullion M Co	Washoe	4	June 25	July 13	Aug 20	J S Kennedy
Caledonia S M Co	Washoe	30	June 6	July 13	July 31	R Wagoner
Crown Point M Co	Washoe	3	June 19	July 24	Aug 14	J Newlands
Con Imperial M Co	Washoe	4	May 19	June 21	July 12	W E Dean
Hussey Con M Co	Washoe	3	May 3	June 7	July 2	R H Brown
Justice M Co	Washoe	20	June 7	July 12	Aug 1	J S Kennedy
Knickerbocker M Co	Washoe	3	May 16	June 21	July 31	J H Saxon
Meadow Valley M Co	Ely District	14	June 6	July 20	Aug 13	T W Colburn
Mexican G & S M Co	Washoe	3	June 5	July 10	July 30	C L McCoy
Martin White M Co	Washoe	1	May 28	July 9	Aug 4	J J Scoville
New York M Co	Washoe	12	June 14	July 17	Aug 6	D L Thomas
New Coso M Co	Washoe	30	June 20	July 25	Aug 23	D F Verdonal
Overman M Co	Washoe	33	June 20	July 25	Aug 23	G D Edwards
Pacific Con M Co	Cherry Creek	2	June 15	July 16	Aug 13	J L Fields
Sage M Co	Washoe	28	May 23	June 29	July 18	E B Holmes
Sucon M Co	Washoe	50	May 28	June 29	July 18	W H Watson
Sierra Nevada M Co	Washoe	49	June 13	July 17	Aug 6	W W Stetson

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Bella Union Quicksilver M Co	Cal	1	June 28	July 30	Aug 25	A Halsey
Con Bonanza M Co	Cal	1	June 4	July 10	July 31	W Martin
Comanche M Co	Cal	1	May 24	July 2	July 27	W Taylor
Excelsior S M Co	Cal	1	June 6	July 27	Aug 20	W Willis
Jennie A and Black Rock M Co	Cal	1	May 22	July 5	July 31	W A Kollmer
Kennedy S M Co	Cal	14	June 5	July 9	July 30	J W Clark
Low Range S M Co	Washoe	2	May 31	June 25	July 17	A Wiswell
Lucky Rock M Co	Cal	2	May 30	June 21	July 21	F E Futy
Manhattan S M Co	White Pine	20	June 4	July 12	Aug 7	C H Hay
Maryland M Co	Washoe	1	May 9	June 10	July 2	D A Jennings
Mariposa Land & M Co	Cal	11	June 6	July 5	July 25	C A Sankey
Mineral Bar S M Co	Cal	1	June 18	July 21	Aug 14	Leander Leavitt
Occidental Reduction R & M Co	Cal	3	Apr 2	June 7	June 30	J C Riley
Silver Sprout M Co	Cal	1	May 23	June 25	July 16	A B Hammond
Ward Con M Co	Cal	1	June 21	July 27	Aug 17	T B Wingard
Young America M Co	Washoe	6	May 12	June 16	July 12	C A Sankey

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.</
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MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

MADONEY.—Amador Ledger, June 23: Mining operations on this property are at a standstill. A dispute has arisen concerning the control of the mine, which is likely to be taken into the courts.

MONTICHRARD.—The result of the crushing of Monticrhard ore at the Onoda mill is very satisfactory. Twenty stamps reduced 300 tons of rock to pulp, and the clean-up was made early last week. The yield of bullion averaged \$5.50 per ton—a very satisfactory showing taking all the drawbacks into consideration. A quantity of gouge water was passed through the mill, which materially reduced the average yield. The mill-man is of the opinion that had the crushing comprised nothing but clean ore, the yield would have reached as high as \$13 or \$14 per ton. At any rate, the paying character of the rock is now established beyond dispute. The loss of the mine and the ascertained richness of the quartz ought to induce the managers to prosecute mining operations hereafter in a thorough business-like manner. Although \$8.50 per ton is considered an excellent yield by mining men, still that sum no more than covers the actual expenses of mining and milling as things have heretofore been conducted at the Monticrhard. Negotiations are pending for the sale of the property to San Francisco capitalists.

GOVERN.—Everything moves along prosperously at the Governor. Twenty stamps are kept running, crushing at the rate of 35 tons per day. The mill is supplied from the stopes of the 700-ft level, where the ore vein is 25 feet in thickness, and every pound of the rock is milled. It is a sufficient demonstration of the auriferous wealth of the ledge to say that the last three clean-ups have panned out \$15 per ton. One and a half tons of sulphurets are saved each day, which assay from \$120 to \$150 per ton. The hoisting works are running satisfactorily. The new shaft is down 230 feet. Work is also being pushed upward from the 500-ft level to connect with the new shaft. At mine and mill steady employment is given to 56 men.

BUNKER HILL.—This mine looks better to-day than at any previous period of its history. The shaft reaches 350 feet, at which depth the ledge shows four feet thick, and extends 90 feet in the cross-cut to the eastward. The good ore is this week, the vein averaging three feet in width. Eighteen tons of quartz are put through the mill daily, paying \$13 per ton. Twenty-three hands are employed.

BONANZA.—Shaft down 270 feet in paying ore. There is enough rock in sight to keep the mill going for months.

NICHOLS GRAVEL CLAIM.—This mine is located half way up Butte mountain. Owing to the pitch of the bedrock it has been found necessary to start a new tunnel, about 40 feet lower down the mountain than the old workings. Workmen are now pushing ahead with the tunnel, and expect to strike the channel at a distance of 40 or 50 feet.

DAYTON'S SULPHURET WORKS.—Garland's new sulphuret works at Drytown are to be started up the first week in July. J. B. Phelps got through building the ovens last week. Ninety tons of sulphurets from the Governor mine are already on the ground awaiting treatment.

The canal company are laying piping from the canal over Kennedy hill with a view to supply the Kennedy and Monticrhard mines with water.

CARL BECK is running a tunnel into a hill at Hunt's gulch, prospecting for gold.

The water in the Amador canal loses much of its volume by leakage and evaporation in passing from the head of the ditch to the reservoir. The supply will not more than satisfy the demands of the quartz mills during the summer.

THE LOYAL LEAD COMPANY, whose works are near the Governor, have abandoned work. The property has been attached by the miners for \$2,000.

PHENIX.—It is said that the prospect in the Phenix is so good that it is considered certain that the Alpine mine will start up in a short time. Plymouth is a live place, and her citizens are not to be crushed by one destructive fire. We learn that the Phenix mill will shut down the first of next month, and all the hands who are not wanted for the sinking of the two shafts will be given work on the ditch. The company have decided to enlarge the ditch from Plymouth to the Consummes river. They will also raise the embankment on the reservoir 10 feet higher and cut the race at the mill 10 feet deeper, so as to increase their motive power.

CALAVERAS.

CLEANING UP.—Calaveras Chronicle, June 23: Emerson, Veith, Moser & Co., and Cook & Co., all noted hydraulicists, are cleaning up and will get through next week. Emerson, we believe, has finished. In our next issue we hope to be able to unfold a tale relative to mineral wealth that will even astonish the natives.

NEW PUMP.—A new pump is to be put into the Chapman mine of Railroad, the one now in the shaft being incapable of keeping the mine free of water.

UPPER COUNTRY BELIER.—Eight tons of ore taken from the mine belonging to Monsieur Monson, at West Point, yielded an average of \$45 per ton. Good ore continues to be taken from the Lacey tunnel. Champion, sinking and stopping. Zacetero mill not yet ready to start. All the other mills in the district are in active operation.

EL DORADO.

RICH YIELD.—Mountain Democrat, June 23: At the Church-Union mine, near Logtown, this county, a clean-up was made on the 1st inst., after a ten days' run, and \$3,200 realized. On the 15th, after a 12 days' run, there was another clean-up of nearly \$5,000. At the point of present working the show is good and strong, and the ore averages about \$35 per ton.

HUMBOLDT.

NEW RIVER.—Eureka Star, June 22: B. P. Parker, Percy Parker and Henry Parker, all sons of the late B. P. Parker, are about to start a new mine on the New River. They will take with them a stock of goods for the purpose of establishing a trading post in the mines. Enough has already been ascertained to make it certain that there are good mines in that section; but how extensive or permanent they are can of course only be determined by time.

INYO.

KEARSARGE DISTRICT.—Cor. Watsonville Pajaroner, June 21: In the last two or three years there has been some capital employed in developing the mines of this section, and with remarkable success. I know of one company—the Rex Montis—that was organized only about one year ago in San Francisco, to open a mine in the Kearsarge district, about six miles from Independence, the county seat of Inyo county. They bought three lodes or three distinct mines for \$20,000, gold coin, not, however, until they had prospected the mine enough to take out about \$13,000 in bullion. The ore from which this money was extracted was taken from but a single vein, and put through a 144 stamp mill in about 20 days. For the benefit of other corporations interested in the company is a private institution, keeps its own count and controls its own stock; they don't propose to place their stock upon the board for fear of its losing caste. As for the richness of these ores there can be no doubt. This same company sent 287 pounds of average ore to San Francisco, had it reduced, and got out of that amount of ore \$10,000. This ore came out of the Rex Montis lode. They also own two other lodes, the Arctic and Boomerang. They now propose to work the Arctic, which is thought by experts to be a richer mine than the Rex Montis, and in order to facilitate the work, they have set aside a few thousand shares which they will sell at the nominal price of \$1 per share. The money raised on these shares will be expended in taking ore from the Arctic, and all above the expenses of reducing the same will be paid to the holders of the shares. This heretofore much

neglected mining district, I am happy to say, is beginning to attract the capitalists. Since 1874 there has been business in this locality. Silver has been taken from the Surprise Valley quartz mills, at an aggregate cost of \$120,000, and many others are in course of erection.

PANAMINT.—Coso Mining News, June 23: Mr. John P. Du Bedat, Secretary and cashier for the Surprise Valley mill and water company at Panamint, came over from there last Tuesday and went below on Wednesday. He corroborated the reports of the strikes made in the Hemlock and Wyoming mines of that company at a depth of 650 feet, and says there is not a doubt but that active operations upon both mines will be resumed at an early day.

NEVADA.

NEW ENGLAND.—Nevada Gazette, June 22: The New England mine continues to pay liberally. The ledge is 18 or 20 inches in width. The last crushing at Keith's mill of 100 tons yielded something over \$80 to the ton, we believe. Another hundred tons was commenced on at the California mill on Wednesday. The rock from this mine has averaged over \$80 since crushing on it commenced. Few mines in the county can show a better record than the New England.

THE QUINN.—Nevada Transcript, June 23: A few days ago a wonderfully rich find in quartz was made near this place. Three men of Rough and Ready township, Grant, Reese and Early, were prospecting on the headwaters of Squirol creek, near the Brown Brothers' gravel claims. A lot of float quartz was found, and it showed well in free gold. Grant and the others began to search closely, thinking that there must be a rich ledge in that vicinity, and the result was right. A ledge has been found that is immensely rich in the brightest and heaviest kind of gold. They have sunk a hole about seven feet in depth, and from that about 800 pounds of quartz have been taken. All the rock is filled with gold, and good judges say that these men have not less than \$20,000 worth of the precious metal in that 800 pounds of rock. The location where this "find" exists has always been famous for nuggets, but regular ledges, that pay well, do not seem to be found there. The boys are certainly in luck. One of them, Reese, made a big find two or three years ago on Randolph flat.

HOWARD BOUND.—Foothill Tidings, June 23: All the machinery is set and everything in good trim about the new shaft. The consideration of proposals for sinking the shaft is now going on, the work to begin on Monday. The ledge in the bottom of the shaft—15 feet below the old level—looks better than ever before, and a big strike may be looked for any day.

YUBA RIVER.—This, the pioneer among the new river mining enterprises, is progressing very favorably, considering the entire novelty of the work, and therefore lack of definite knowledge as to the rock likely to be encountered. The drift has been going through very hard rock, but is said to be in better ground now. Water was still coming most at the face of the tunnel, which has caused the continuance of the drift further in than was intended—the channel evidently being still ahead. Much, very much is depending upon the result of this trial, and much anxiety is felt all through the country. Yuba owners all feel sanguine of success.

PLACER.

REMINGTON HILL MINES.—Dutch Flat Forum, June 21: The Rhode Island company have turned out and are cleaning bedrock, which is said to be paying splendidly. The Wide West company is opening two breasts east of tunnel No. 2, where the gravel is found to pay \$20 per ton to the man, consequently but one of the main tunnels is being advanced at present, which is also said to be paying well.

LOWELL HILL MINES.—Work in the Swamp Angel continues to be prosecuted with energy and skill. The payment of which is the disbursement of monthly dividends. Their supply of water is taken from the Little York company's ditch, and as the latter company will require all of it themselves during the balance of the season, the Swamp Angel company are making preparations to build a large tank or small reservoir, which, when completed, will enable them to catch a sufficient supply of water from the springs to wash in the future. The contract for running bedrock tunnel in the Placer gravel mine was awarded to S. S. Shaffer & Co., and the work of extending the same is now progressing day and night. The running of the Wild Cat tunnel has been incubated considerably of late by encountering a large vein of serpentine rock, and in passing through it, it was found necessary to timber it closely with heavy posts and caps, also using skills. The work is now progressing under favorable circumstances, with the expectation of tapping the channel next month. The various other channels being run in this vicinity are said to be making good progress. The Liberty Hill company continue to wash steadily, and the progress made in removing the many boulders encountered is said to be astonishing.

LITTLE YORK MINES.—The Empire company turned off and cleaned up last week, giving satisfactory results. They are now running a powder drift, which will be completed, charged and exploded in one week, when washing will be resumed again.

CLOSING DOWN.—The continued warm weather has affected the water supply in the various ditches and the quantity is gradually diminishing. Most of the claims in this section are drawing their operations to a close for the season. The Star and Union and Baker claims continue washing, as last reported. It is the expectation of the Superintendent to keep these claims washing for some months yet. The latter is making good headway, and has removed nearly all the material loosened by the large blasts, all of which will probably be washed off by the 1st proximo. Powder drifts are nearly completed, extending back into the hill about 100 feet beyond the shaft. It is supposed the next blast will open the pit into softer gravel, which will be a great relief to the channel next month. The Franklin is working and washing, using water a few hours each day. The Polar Star and Southern Cross have been kept constantly at work, one using the water while the other is removing the boulders. The Elmore Hill claim is washing again. It has been off a number of days preparing and exploding another blast. The Pacific is idle, owing to the scarcity of water. The claim of the Illinois is being cleaned up, but is to have turned off this morning, to clean up for the season. The Bonanza and Sachs claims are still washing. The North Star will run a short time longer, when it will wind up. The Illinois has made its final clean-up for the year, after a very successful season. This claim has proved to lie in quite a rich piece of gravel.

SHADY RUN MINES.—The Wild Yankee company turned off and are making a general clean-up. The channel bedrock the crevices are found to be very rich, as high as \$75 in specimens having been taken from one. The North American company, in extending their main tunnel 300 feet farther through bedrock, tapped an extensive channel, which is said to be paying well.

BLUE CANYON RAVINE MINES.—As the work progresses in the Roaring Blunder the indications for an extensive channel are favorable, and the drift is being washed, and is very rich. Several other claims have been taken up in this vicinity recently, and there is considerable prospecting being done.

PLUMAS.

CRESCENT.—Plumas National, June 23: Supt. Jewell, of the Crescent Plumas, says that the well, which reports everything flourishing in his neighborhood. He says the work underground daily shows better, and the fact that the company have a permanent mine and a good one is established beyond a doubt. We are glad to record the good prospects, and hope they may "increase and multiply."

SANTA CLARA.

THE GUADALUPE QUICKSILVER BONANZA.—San Jose Mercury, June 22: The new developments on the 600-ft level of the Guadalupe quicksilver mine, in this county, are proving of such an extensive and permanent character that Supt. Thayer has determined to sink the main shaft 500 feet deeper, or to the depth of 1,100 feet. The work will be commenced at once, and pushed forward as rap-

idly as possible to its completion. The shaft has three compartments, one of which is used for the pumps, and the two others for the regular hoisting business of the mine. The machinery is ample for any depth of shaft. A winze is being sunk on the newly-discovered ore body, and the construction of lower levels is necessary for the economical working of the mine.

SIERRA.

HETTER.—Mountain Messenger, June 23: We had not supposed it possible to find any richer rock than had already been taken from the North Fork, but we learned yesterday that the richest rock yet struck in that claim was found the night before. This bids fair to be the richest claim ever found in this State.

CURRY CANYON.—Some Chinamen on Kanaka creek recently brought to Forest City a piece of solid gold weighing 30 ounces.

WATER WHEEL.—S. D. Hill is putting a water wheel in the river below his claim on Dargan flat. He has a large crew of Chinamen working there, and the ground pays well.

DITCH.—Geo. Cox has purchased Dr. Mussey's ditch and claims at Gibsonville. The ditch will be immediately commenced and used by Mr. Cox. Goarly will superintend the work.

COLD CANYON.—McFarland and McNece are working nine men in their diggings, the old Sierra claim, and more men than paying expenses. Hope they will do well.

SISKIYOU.

LOOKING AT THE MINES.—Yreka Union, June 23: During the past week two different parties have been in Yreka from San Francisco looking at our mines. The first party, Messrs. Holbrook and Richardson, went over on Humbung with Jas. Quinn and Wm. McConnell to look at a claim at the mouth of Humbung, owned by the latter parties, and being well satisfied with it at the price asked, they made arrangements to buy it at a set price, or put up the machinery necessary for the proper working of the claim, in consideration of half of it. They then went to Happy Camp, and calculate to return below to-day. It is not known positively what the other party, Messrs. Bowie, Farrish and Whitaker, are after, but it is generally supposed that they are looking at the Yreka creek property. We are glad to see these gentlemen among us, for they are men of business, and there are plenty of good mines here that only await the capital necessary to open them, to prove themselves such.

SONOMA.

THE COAL PROSPECT.—Sonoma Democrat, June 23: C. W. Frost, Supt. of the Santa Rosa coal mine, informs us that the prospect is most encouraging. The main tunnel has been run into the hill 100 feet, and an incline has been sunk from the end of this tunnel to a depth of 60 feet. At this depth they have a vein of coal-bearing matter eight inches thick, through which seams of excellent coal run. This is considered very encouraging.

TULARE.

MINERAL KING MINES.—Cor. Visalia Delta, June 23: Here, preparations are being made to start up the furnace. The snow has left the valley, but is coldly abundant on the mountains all about. The assay building is well under way, and will be completed soon. President Baker went to Visalia yesterday, and expects to return this week with the assay outfit that was sent from San Francisco. Work has commenced on the Empire, and the tunnel claim above here. Three tons of the finest ore was roasted for 48 hours in the furnace. A lack of chemicals for making necessary assays prevents further intelligent experimenting until the arrival of the remainder of the assay outfit. A few of the claim holders are working out their assessments, a few are prospecting, all expect to go to work soon.

TUOLUMNE.

THE SWEENEY MINE.—Tuolumne Independent, June 23: Active operations have commenced on the Sweeney mine, Quartz mountain. Mrs. Hill, the owner, has let a contract to sink 100 feet deeper. The shaft is now down 90 feet, and the last rock taken from this point milled \$26 per ton. This is undoubtedly one of the best mines in the county, and it only needs development to prove its true worth.

Nevada.

WASHOE DISTRICT.

CROWN POINT.—Gold Hill News, June 27: The south drift from the main east drift on the 2000-ft level is being forced rapidly ahead to reach and connect with the Crown Point-Belcher drain shaft. This drift is being run easterly, outside of and west of the ore vein.

UTAH.—The south drift on the 1150-ft level, running to connect with a like drift from the Sierra Nevada, is being forwarded with all energy possible, the face in a fine character of quartz and ledge matter. The prospects of the Utah are steadily brightening.

CROWN POINT.—Daily yield, 110 tons of ore, the assay value of which is \$25 per ton. During the first part of the week a streak of somewhat softer rock was struck in the bottom of the combination shaft, which, however, was passed through in a few feet, and yesterday the bottom was again in rock so hard that it rings when struck, like metal.

WEST BELCHER.—Work is resumed in this mine under the most favorable auspices. All the indebtedness of the company is being paid off, and under the superintendency of Mr. William Lee the works are being started up and the explorations and development of the mine will be proceeded with.

SUCCESS.—Sinking the main shaft is being pushed ahead with all the force that can be brought to bear. The Success mine has never in the past been worked in a manner so favorable to the owner, as the payment of the regular LEVIATHAN cross-cutting gas from the south drift at the 600-ft level is suspended, and drifting south is continued, with the face of the drift principally in quartz, carrying streaks of low grade ore.

CON. VIRGINIA.—Daily yield, 550 tons of ore. The mills are kept steadily running, and the yield of bullion for June is already \$100,000 in excess of the yield for the five months preceding. The payment of the regular dividend of 8¢ per share, and will leave a surplus to be carried over to the next. The mine is looking splendidly at every point, and the ore breasts show no signs of exhaustion. The ore stopes on the 1650-ft level continue of the finest character. The bottom of the joint winze below the 1650-ft level is still in fine ore. It is now down 42 feet. The east drift from the south winze on this level is still being pushed ahead, and is said to be of the best quality. On the 1550-ft level the main south drift connecting with the Gould & Curry is being rapidly enlarged. Two winzes have been started on this level to penetrate to the 1650-ft level and assist in the better ventilation of the mine. On the 1400-ft level the ore stopes continue their regular yield of rich ore. The south drift from the shaft on the 1800-ft level has completed the connection with the No. 5, which is entirely east of the ore vein, greatly assists the ventilation in that portion of the mine. Sinking the C. & C. shaft is steadily progressing. The huge new air compressor is nearly completed, and will be ready to start into full operation in a day or two more.

CALIFORNIA.—Daily yield, 600 tons of ore. The ore stopes and breasts are showing splendidly at every point, and the ore is being shipped to the coast. The mine is richer than it is to-day. The 1650-ft level is opening up rich in almost every quarter, and the double joint winze now being sunk near the south line of the mine is now down 42 feet, the entire distance having passed through rich ore. On the 1600-ft level the stopes continue to look well and yield rich ore. The several winzes now being sunk below the 1600-ft level are in ore, with the exception of the No. 5, which is entirely east of the ore vein. The yield of bullion is already \$200,000 in excess of the yield for May, so that the payment of the regular dividend of 8¢ per share is an assured fact. The mills are all kept running at the very top of their speed.

YELLOW JACKET.—The main drift east, cross-cutting the ledge at the 2200-ft level, is now in 126 feet and still continues in bird's-eye porphyry, hard and dry. The south

drift at the same level is in 130 feet in somewhat softer material, with small streaks of quartz running diagonally across it to the southeastward. The new working shaft, to the eastward is now down 766 feet. There is no decrease of the heavy flow of water encountered.

OVERMAN.—The main east drift on the 1300-ft level is being steadily driven forward. The ledge at this point has great width, this drift having already penetrated the ore vein a distance of 300 feet, with no indications whatever of being through it.

OPTIMA.—Daily yield, 40 tons of ore, keeping the Winfield mill running and crushing to its full capacity. The main incline is down 44 feet below the 1900-ft station, and is being continued downward to increase the capacity of the pump in case water is struck on the 1900-ft level.

KEYSTONE.—This mine, although an old and valuable location, lying just north of the Utah mine, has for a long time laid idle on account of the impetuous condition of the owners. A short time since the control, however, passed into the hands of able capitalists, who, on the 11th of this month, commenced its development in a manner commensurate with its worth.

LADY WASHINGTON.—Work is resumed in this mine. The machinery being overhauled and put in complete order, the water is being raised from the shaft.

COX.—The prospecting drifts, both north and south, from the station at the bottom of the winze below the 1300-ft level, are making steady progress.

JULIA.—The main south drift on the 1800-ft level is steadily advancing, the face still in quartz and ore. The prospects for pay ore in this drift are better than they have been at any time in the past.

SAVAGE.—The pumps are gradually gaining on the flow of water, which is now reduced to a point 100 feet below the 1200-ft level.

BULLION.—The drift north at the 1700-ft level continues advancing in favorable vein matter.

BECHER.—Daily yield, 65 tons. The face of the east drift at the 1600-ft level continues in quartz and porphyry. At the 1600-ft level the east cross-cut from the main south drift is in 223 feet and still running in low grade ore.

DAILY YIELD.—Daily yield, 450 tons. The various ore-producing sections are yielding and holding out finely. The winze being sunk below the 800-ft level continues in very fine ore, and the excellent ore developments at the 1000-ft level are showing better and better as further advanced.

MEXICAN.—The drift north at the 1465-ft level to connect with the drift south from the 1450-ft level of the Sierra Nevada, is advancing favorably in good working material.

SIERRA NEVADA.—At the 1600-ft level the south winze is sinking in very favorable material, with considerable quartz, and the face of the south drift is in good looking vein matter.

GOULD & CURRY.—Sinking the main incline is resumed. The winze being sunk below the 1800-ft level has reached the 16-ft level, and drifting north and south from it toward the Best & Belcher and the Savage is being commenced.

SILVER HILL.—At the 650-ft level the drifts both north and south are driving ahead lively.

NEW YORK.—The repairs to the drifts at the 800-ft level both east and west are progressing, and the pump stations in the shaft are about completed.

HALE & NORRIS.—The water is being steadily reduced in 100 feet below the 800-ft level. The incline below this point is found to be filled with debris from the old cave.

SUTRO TUNNEL.—Very good advancement is now being made in this elongated tunnel, one of the longest in the world. The header is running through regular ledge matter, composed of hard porphyry with streaks of quartz and clay. This material blasts well and allows of a good rate of progress.

W. P.—Preparations are being made to soon resume both the sinking of the shaft and the south prospecting drifts on the 1600 and 1800-ft levels of the Julia mine.

Arizona.

NEW MILL.—Arizona Enterprise, June 20: The Turkey creek mill has reached the Point of Rocks, eight miles east of town, from which place it is the intention to haul it by ox teams to its destination.

THE PECK COMPANY have decided to move the Aztlan mill to the mine. The requisite machinery to put the old mill in first-class order has been ordered.

In Hasavampa district a great deal of steady work is being done at present, and the yield of dust and bullion which is finding its way to Prescott speaks convincingly of the richness.

Many other quartz claims are being worked in this district and all are looking well. The facilities for mining in this part of Yavapai county cannot be surpassed by any camp in the Territory.

Among the courses of the Hasavampa placer miners are all at work and doing well. Although this creek has been worked for over 12 years, it still keeps up its well merited reputation.

In Walnut Grove district the situation is most promising. A five-stamp gold mill is now on the way, and will be erected on Arastra creek.

In Mohave county mining affairs are about as last reported. The yield of bullion is steadily on the increase, and the opening of many new claims is giving a look of assured prosperity to the numerous camps in this rich mining region.

In Maynard district, Mr. Shoultes on the American Flag is taking out rock as rich as any that has ever been taken out in the country. He has now ready for shipment 14 tons which sample \$2,000 per ton. This is hard to beat in any country. The other claims in the district are all showing well and turning out their regular quantity of ore.

From the Sandy country we learn that the new mill brought on by Mr. Leet will shortly be up and in running order. With 30 stamps in this camp we expect it to take the lead in the bullion yield of the Territory. But a hundred stamps would not be enough to reduce the ores from the wonderful McCrackin.

Desamoy work is now the order of the day. What the miners of Arizona long prayed for—mills for the reduction of their ores—are now here; they will help the cause much more than the empty talk of so-called capitalists.

Idaho.

MINING NOTES.—Owyhee & Valance, June 23: The most important movement pertaining to the mining prospects of this vicinity is the contemplated sinking operations in the Golden Chariot, the arrangements for which have been completed, and the work, we understand, will be prosecuted with as little delay as possible. This is cheering news, and the value and importance of such a movement cannot be overestimated at this particular time. By sinking 200 feet and driving the prospects to extract the ore, a life insurance will be furnished of the future prospects of this mine and the grand outlook that is in store for old War Eagle mountain, whose treasure leads, notwithstanding they have turned out millions of wealth, have as yet scarcely been tapped. No movement yet undertaken in this camp can possibly give a greater impetus to work along the whole line of this immense lode and improve the prospects of the O'Fino and South Chariot, which two mines alone under skillful and judicious management can be made to turn out enough rich and paying ore to supply the milling capacity of the camp. The character of the developments on the 13th level as far as prosecuted fully justifies the most sanguine expectations pertaining to the existence of the bonanza so clearly outlined in the prospect of the O'Fino and South Chariot, which will revive the hope of all interested in the camp. The recent work outside of the main vein has been attended with the most satisfactory results. The large amount of bullion produced from working the lateral and parallel fissures, extending from the third to the seventh levels, and converging in the Chariot, prove conclusively the existence of the great lode of the mountain in this vicinity.

The Old and the New.

Thoughts for July Fourth.

[It is according to usage to contrast the past and present each time the National Holiday comes round. Seldom are thoughts of this kind more truly and pleasantly expressed than in the following lines of Benjamin F. Taylor:]

The world stood still for a thousand years
And crept for a thousand more,
This wonderful world with wings for ears,
Like the Messenger god of yore—
And winged feet and winged wand,
And a wing on its either hand,
And more than Mercury wore.

It bridle and rides a furnace's foal
With iron and hammer for sire,
Great clouds of white from their nostrils roll,
And it feeds its horses fire!
They are blooded stock, the engines swift,
Beneath their heels the distances drift
Like snows from the Arctic Pole!

They rattle across meridian lines
And down the parallels play,
They marry together the palms and pines,
A thousand miles in a day!
The world has trained a wonderful wire,
A nerve of a route for articulate fire,
And taught the lightnings to say:
"Dear Mary, be mine!"—"Carload of swine"—
"One ton of cheese!"—"Maria dead!"—
"Joy! It's a boy!"—"I'm coming to dine!"—
"Send soap!"—"She's married to Fred."
The humblest of words like angels fly
A thousand miles in the flash of an eye,
You hear before they are said!

What's happened at ten you know at nine,
And you away in the West,
They distance along the lightning line
The sun in his golden vest
They talk to-day in audible tone,
The telegraph turns the telephone
And parted lovers are blest!

Think of a girl in a lonely hour,
No beau in a forty miles,
She sits by the tube of talking power,
She thinks a minute and smiles.
"I'll call my John," you fancy her to say,
"He lives but a hundred miles away,
And banish the weary whiles."

Behold them at the ends of the line,
This John and his black-eyed boon,
His head and hers to the wire incline
And she sings him "Bonny Doon."
He sighs for the only thing amiss,
He has a voice but then he can't—kiss!
He might as well be in the moon!
For emptier than an East wind's laugh
Is a lover's kiss by telegraph!

The old world rocked the harvests to sleep
And cradled the drowsy wheat,
The scythes that went with a rasping sweep
As they mowed their narrow street,
And the new-moon knife they used to reap—
Sickle and cradle and scythe and all
Are hid in the garret's rafters hall
With cradle for twins when they dared repeat—

Hid with the bonnets of Leghorn flare
And the distaff's head of tow,
The old foot-stove and the rush-wrought chair,
And bell-crowned hats of the ancient wear,
The warming-pan and the little wheel,
The dusty ghost of a clock-tick reel
And the trundle bed so low.

It hid by day 'neath the family bed,
A chicken under a hen!
I love the wrecks of the days long dead,
The times of the home-spun men;
I love to think of the hearthstone fire
That opened its heart like a large desire,
And room at table for ten.

The swift world reaps with a tireless thing
And mows with a hundred knives,
Of the golden year legitimate king,
And the strength of a hundred lives!
They rout the wheat and they wreck the grass,
Like whirlwinds come, like whirlwinds pass,
They hurl the grain like creatures of wrath
And hustle the harvests out of their path,
A slash, a toss and a fling!

Torrents of grain and tempests of chaff!
The thresher comes in its might,
Crunches the straw with a grate of a laugh,
Clouds like the thick of a fight—
A thousand-man power, it takes its rank
With presses that smite the world in flank,
With type-shed thoughts in splendid line
That march abreast to music divine
For day that never comes night!

A century after Christ was born,
The brooks ran idle as the wind,
And women ground creation's corn
For the molars of mankind;
Five thousand years no wheel for a mill
E'er foamed a flume or ruffled a rill,
But women ground and they pined
Till lordly men had all dined!

This world declared for a cycle or two
The best of things were the old,
Did as its grandfathers used to do—
About as Adam was told!
And thought those sewing machines the best,
[And so would I were I to be pressed,]
In clouded hose and calico dressed
And hearts far richer than gold.

So husbands wore out a couple of lives
That stitched their shrouds as they wrought,
Ordered a slab for each of their wives,
And two willows to weep they bought,
And wondered what the "providence" meant,
That seamstresses and grew weary and went
And set their comfort at naught.

They threshed a few oats with a flail
To club grief out of their heart,
Pulled down the sweep to get at the pall,
Its hoops all ready to start,
Tugged at a ton for the sake of a pound,
Wished for a well on top of the ground,
And locked the barn with a rail.

Ah, had they married a "Singer" or "Howe,"
"Remington," "Grover and Baker,"
"Wilson," "Wheeler," "Domestic," they now,
Should the creak for not suit them to sew,
Might buy direct from the maker
An attachment without any heart,
That if broke could be mended by art,
That would sing to the needle's go-come,
Hum, ever hum! "There's no place like" hum,
No widower's sorrowful brow!

Ah, had they married a sewing machine
And given some woman the doubt,
Not a man of them all would have been
Two graves and two monuments out!

They plow to-day with a wooden crook
Where Orient empires rule,
They drive a team with a Jersey look,
A mother-in-law and a mule!

They sickle the grain about their knees,
They fan the chaff with a Northern breeze
And scorn the use of a tool.
The ugly crook yet elbows the earth
As bad boys nudge at school,
We find at last what teaching is worth
With nothing to learn but a fool.

Where they shingle sheds with old pea straw
And it rains between the showers,
We sent a plow, according to law
Curved like the statutes of powers.
"Here is a god," the savages said,
They set it on end and painted it red,
And crowned it with garlanded flowers.

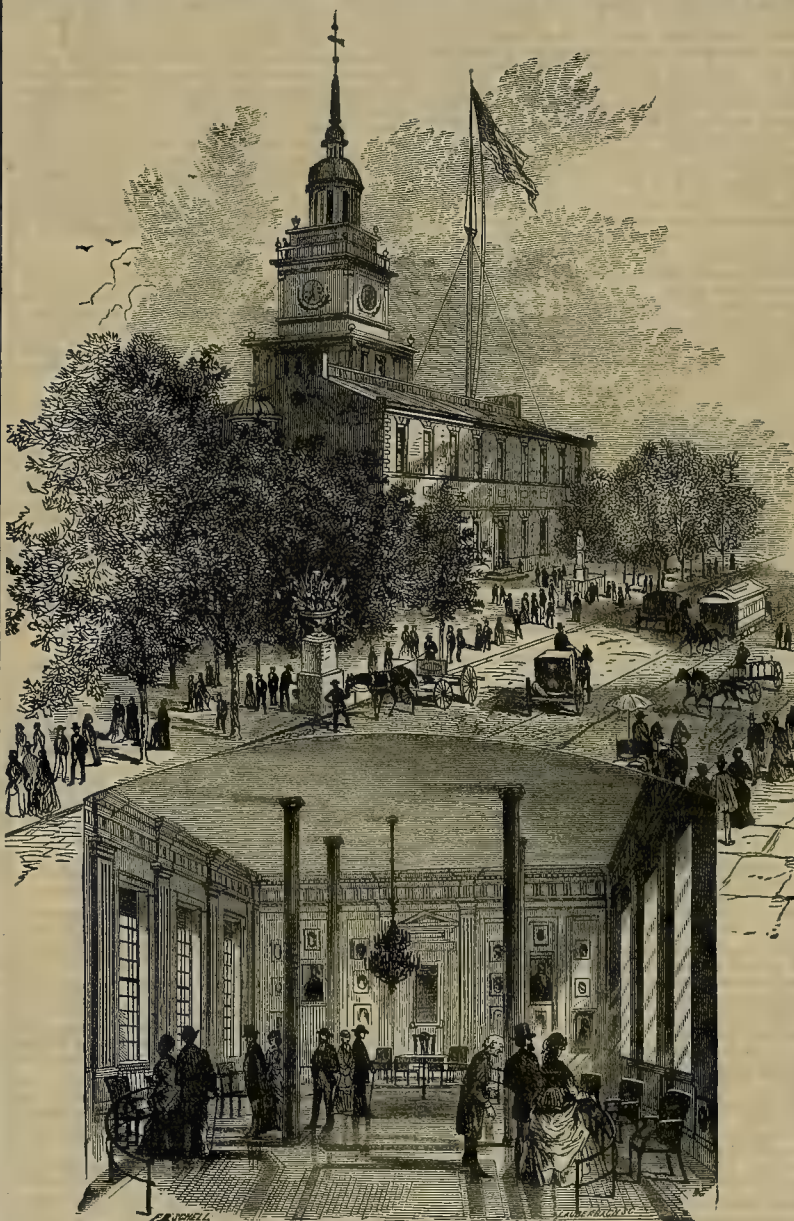
The Responsibility of Americans.

This lovely and this glorious liberty, these benign institutions, the dear purchase of our fathers, are ours; ours to enjoy, ours to preserve, ours to transmit. Generations past and

The Fourth of July.

We enter this year upon the second century of the Fourth of July. Thus the years are carrying us farther and farther away from the old heroic time when brave men unflinchingly placed their names to a document which would have cost them their lives had the oppressors triumphed, but which, as the right prevailed, gave them undying honor. We would not lose sight of these early, noble deeds. We would not forget that the Fourth of July is not a mere opportunity for fun and fireworks, but that the prototype of the day we celebrate was indeed the birthday of the nation.

To aid the thought in the recollection of the incidents of the brave Declaration, we give an engraving of the exterior and interior of the historic building which has been often called the "Cradle of Liberty." It is old Independence hall, in Philadelphia, of which and the



INDEPENDENCE HALL, PHILADELPHIA.

generations to come hold us responsible for this sacred trust. Our fathers admonish us with their anxious paternal voices; posterity calls out to us from the bosom of the future; the world turns hither its solicitous eyes—all conjure us to act wisely and faithfully in the relation which we sustain. We can never, indeed, pay the debt which is upon us; but by virtue, by morality, by religion, by the cultivation of every good principle and every good habit, we may hope to enjoy the blessing through our day, and to leave it unimpaired to our children. Let us feel deeply how much of what we are and of what we possess we owe to this liberty and these institutions of government. Nature has, indeed, given us a soil which yields bounteously to the hands of industry; the mighty and faithful ocean is before us, and the skies over our heads shed health and vigor. But what are lands and skies and seas to civilized man without society, without morals, without religious culture; and how can these be enjoyed in all their extent and all their excellence but under the protection of wise institutions and a free government? There is not one of us who does not at this moment and at every moment, experience in his own condition and in the condition of those most near and dear to him, the influence and benefit of this liberty and these institutions. Let us then acknowledge the blessing; let us feel it deeply and powerfully; let us cherish a strong affection for it, and resolve to maintain and perpetuate it.—Daniel Webster.

deeds done therein the poet Taylor has written these stirring lines:

A century ago this royal Duke of Years,
A hush fell down on Independence hall,
No rounded phrase, no ringing roll of cheers,
No clash of voices and no sound of feet,
But whilst as spiders on a cob-webbed wall
Festooned with fabrics from their filmy loom,
But whilst as steals a mignonette perfume,
But whilst as surges when two shadows meet,
The brown fly's drone that boomed around the room
Like dream of drummer in a distant street,
The rasping of a pen—and these were all
But waiting breaths on any ear to fall.
That pen was dipped in honor, not in ink,
The men that used it stood on glory's brink.
Name after name went down upon the roll
And lent at last the declaration soul!
Each signed the deed and passed the pen along,
That bound for good and all three millions strong!
That letter stands, I care not what you bring,
Of all mere human words my Lord the King!

Within two thousand years one other thing
Alone has roused the drowsy world and wrought
A revolution grand in human thought,
Endowed the truth with most puissant wing
And Right with Might; the Sermon on the Mount,
The Declaration scroll—the twin complete the count!

A painting hung behind the Speaker's chair
But not more silent than the signers there.
Then Franklin rose, that grand old king of types,
Of fame enduring as the Stars and Stripes,
And said: "I knew not what the artist meant,
A morning sunrise or an evening set,
I could not tell which way the shadows went—
The deed we do this day has strangely let
A light upon the scene no painter lent,
See where the beams of morning westward run!
The sun is ours! It is the rising sun!"

Independence hall is preserved with jealous

care, so that coming generations may share with us the inspiration of entering its portals and recalling the old scenes. Interest centers on the building and its contents, and in connection with the engraving we give the following description from the pen of a recent visitor: The east hall has a goodly number of historic relics, most worthy of note among which is the famous old Liberty bell, which rang out melodies for the sons and daughters of the new land a hundred years ago, but now shows the fingers of time in a huge fissure. Here is the old front door belonging to the Chew mansion, which was battered and splintered at the siege of Germantown. Dresses of "ye olden time" are abundant, showing that loving descendants of the men and women of those days have guarded them carefully. A piece of one of "Lady Washington's" dresses is a flowered cambric—quite like the gay chintz so much in vogue for lounge coverings now. Here are portraits of all the signers of the Declaration, officers of the Continental army and members of the first Congress. The Georges are there, too. Is it prejudice, or do their faces look out from the canvas crafty, sensual and selfish? Jars and chairs and tables used by Gen. Washington, have a charm about them from the thought that they have been part and parcel of his plain household—a thought which redeems their excessive homeliness.

The original Declaration of Independence, with paper brown with age, ink faded and dim, has a mysterious awe about its immortal wording. Close by is the veritable inkstand into which those grand men dipped their quills, one after the other, as they traced those names which the tongue of history shall ever be proud to repeat. The inkstand is heavy and cumbersome, is made of solid silver, and bears the maker's name—Philip Syng, 1752. The first draft of the Constitution hangs in a frame, a conspicuous object of attention.

There are several portraits of Washington, taken at different ages. William Penn is here, in company with his second wife—a wholesome, plain, sensible sort of a lady. The face of Francis Key, the author of the Star Spangled Banner, is sparkling and refined. Marquis de Lafayette, the noble Frenchman, is gentle, courteous and soldierly. In this hall, in a case, are numerous articles of the toilet—dresses, stomachers, towels, stockings, high-heeled slippers, laces, over-dresses, ribbons, etc., all of great antiquity; also table articles, such as spoons, knives and forks, sugar bowls and similar things.

Here is the celebrated painting by Benjamin West, depicting Penn's treaty with the Indians. The subject is true to life. In the shade of the lofty woods, the Indians and whites have gathered to listen to their "pale brother," as he stands there, earnestly setting forth the conditions of the treaty. The old chiefs are gravely listening, while their eyes are turned calmly upon him, as he stands there, surrounded by his friends. The women of the tribe have drawn near to hear the "big talk," while the half-naked boys and girls, with their symmetrical limbs, are amusing themselves near. The figures are clear, bold and natural. Here, too, are many original letters of Benjamin Franklin, written in the troublous days of our country, when his heart was full of forebodings lest her leaders went not right. How his great soul would be troubled could he have a chance to observe them now! With a long look at the many treasures this room contains, I cross the hall to a room filled with old portraits of the prominent men of those days; look at some old, stiff and uninviting chairs and settees, and ascend to the two halls above, in which the present city council hold their sessions. Both these rooms are fitted up in modern style, with rows of desks and a few easy chairs. It was for, merely one room, known as the banqueting hall—where, on all state occasions, the festivals were held. Here Washington delivered his farewell address to the Continental Congress, whose deliberations took place in this hall. There is a splendid painting representing him in the act of making this last speech, which hangs over the very spot where he stood. The city of Philadelphia paid \$30,000 for it, and they claim that it is the most accurate likeness of him in existence.

Our Country's Origin.

Our fathers came hither from a land to which they were never to return. Hither they had brought, and here they were to fix their hopes, their attachments and their objects. Some natural tears they shed as they left the pleasant abodes of their fathers, and some emotions they suppressed when the white cliffs of their native country grew dim in their sight.

A new existence awaited them here; and when they saw these shores, rough, cold, barbarous and barren, as they then were, they beheld their country. Before they reached the shore they had established the elements of a social system, and at a much earlier period had settled their forms of religious worship. At the moment of their landing, therefore, they possessed institutions of government and institutions of religion. The morning that beamed on the first night of their repose, saw the pilgrims already established in their country. There were political institutions, and civil liberty, and religious worship. Poetry has fancied nothing in the wanderings of heroes so distinct and characteristic. Here was man, indeed, unprotected

and unprovided for on the shore of a rude and fearful wilderness; but it was politic, intelligent and educated man. Everything was civilized but the physical world. Institutions containing in substance all that ages had done for human government were established in a forest. Cultivated mind was to act on uncultivated nature; and, more than all, a government and a country were to commence with the first foundations laid under the divine light of the Christian religion. Happy auspices of a happy future! Who would wish that his country's existence had otherwise begun? Who would desire the power of going back to the ages of fable? Who would wish for other emblazoning of his country's heraldry, or other ornaments of her genealogy, than to be able to say that her first existence was with intelligence; her first breath the inspirations of liberty; her first principle the truth of divine religion.

The Disinterestedness of Washington.

To the pen of the historian must be resigned the more arduous and elaborate tribute of justice to those efforts of heroic and political virtue, which conducted the American people to peace and liberty. The vanquished foe retired from our shores, and left to the controlling genius who repelled them the gratitude of his own country, and the admiration of the world. The time had now arrived which was to apply the touchstone to his integrity—which was to assay the affinity of his principles to the standard of immutable right. On the one hand, a realm, to which he was endeared by his services, almost invited him to empire; on the other, the liberty to whose protection his life had been devoted, was the ornament and boon of human nature. Washington could not depart from his own great self. His country was free—he was no longer a general. Sublime spectacle! more elevating to the pride of virtue than the sovereignty of the globe united to the scepter of ages! Enthroned in the hearts of his countrymen, the gorgeous pageantry of prerogative was unworthy the majesty of his dominion. That effulgence of military character which in ancient states has blasted the rights of the people whose renown it had brightened, was not here permitted, by the hero from whom it emanated, to shine with so destructive a luster. Its beams, though intensely resplendent, did not wither the young blossoms of our independence; and liberty, like the burning bush, flourished unconsumed by the glory which surrounded it.

To the illustrious founder of our republic was it reserved to exhibit the example of a magnanimity that commanded victory—of a moderation that retired from triumph. Unlike the erratic meteors of ambition, whose flaming path sheds a disastrous light on the pages of history, his bright orb, eclipsing the luminaries among which it rolled, never portended "fearful change" to religion, nor from its "golden tresses" shook pestilence on empire. What to other heroes has been glory would to him have been disgrace. To his intrepidity it would have added no honorary trophy to have waded, like the conqueror of Peru, through the blood of credulous millions, to plant the standard of triumph at the burning mouth of a volcano. To his fame it would have erected no auxiliary monument, to have invaded, like the ravager of Egypt, an innocent though barbarous nation, to inscribe his name on the pillar of Pompey.—*Robert Treat Paine.*

The Freedom of Science in America.

The quick and keen sense of self interest that gives such sagacity and energy to the business operations of this country, is equally propitious to the success of every art, every discovery, invention, undertaking and science, that involves in it any amount of practical improvement or power. Hence whatever of theoretical science, inventive skill, ingenious speculation or reasoning eloquence can be made to tell upon any of the multitudinous affairs making up the business of life, or to minister in any way to the increased power and enjoyment of man, will soon find ready attention for their claims. Here no prejudices in favor of time-honored usages are strong enough long to resist the advance of scientific improvement or wise innovation. Society is not divided into castes, each one of them watching with jealous vigilance against any encroachment of their several exclusive walks by any rude intruder from another class, themselves clinging to the settled usages and old forms of their own clan, with the steady pertinacity of men whose unexamined prejudices are interwoven with their earliest habits and their most valuable personal interest. If science, descending from her starry shrine in the heavens, light the student to any discovery or invention in any manner applicable to the wants of his fellow creatures, if genius prompt the lofty thought, if love of God or of man inspire the generous design, no matter how the novelty may astonish for the moment, no matter what prejudices may be shocked, no matter what interests may be alarmed and band themselves against the innovator, let him go on undismayed; he advances to certain victory.

Silver Mud.

Our readers will remember that not long since there was some little excitement in Oregon over certain mud springs said to contain silver in large amounts. Some of the "silver" mud was sent to Professor Silliman, who made an analysis of it and pronounced the whole thing a fraud, stating that it had evidently been prepared with intent to deceive. Companies were formed and some of the stock sold in Oregon. After we published Professor Silliman's letter we heard nothing of the subject until at a recent meeting of the State Geological Society, Mr. H. G. Hanks read a paper on the subject, in which he takes the ground that the production is evidently natural and not "salted." As Professor Silliman in his letter gave his reasons for thinking that the mud was doctored, we give Mr. Hanks's paper, which states his reasons for thinking to the contrary. It will be interesting to see the result of the analysis of the silver-bearing substance from Utah described by Mr. Hanks. He says:

It will be remembered that some months ago specimens were sent to this city from Oregon, purporting to be mud from certain springs newly discovered, and which were found to be rich in silver, as claimed by the parties who sent them. The occurrence of springs yielding soft mud, highly charged with free silver, is, as far as I know, new to science. Under the circumstances, such a statement could hardly fail to be doubted. Some of this singular substance was examined by gentlemen of high scientific attainments, both in this city and in the East, and was pronounced without hesitation fictitious. Specimens naturally found their way to the Microscopical Society, and were referred to me with a request that I would report on them.

My examination revealed certain features which I could not reconcile with the theory of their having been purposely prepared to deceive the public. At the same time I could not evade the suspicion that such was the case. I found the substance very rich, and on microscopic examination discovered that the silver was in a free state. By simple washing the silver could be wholly separated, and when then examined the microscope failed to reveal the source of the precious metal. Had it been filings, a single glance would have sufficed to detect that fact. Had the silver been precipitated from solution by copper, it would have been crystallized. An amalgam of silver and mercury would have yielded a sublimate if strongly heated in a glass tube closed at one end. Such an amalgam introduced into the wet mud, and the whole heated sufficiently to volatilize the mercury, would have left the substance in a hard baked state, which could not again have been reduced to the state in which it reached this city. From these conclusions I was led to state in my report to the Microscopical Society that "if the silver had been introduced for fraudulent purposes, which I could scarcely doubt, the substance was still remarkable, as the person who produced it had so skillfully covered his tracks that I could not with certainty declare it a fraud."

Subsequent examinations of other samples confirmed my doubts as to its being an artificial production. Some time after I met a gentleman, well-known in San Francisco, who has for some time resided in Oregon, who had seen many samples of "silver mud," and who firmly believed it was a natural production. In conversation, I asked him to refer me to some perfectly reliable person with whom I could correspond on the subject. He gave me the name of Richard Hurley, with the assurance that I might place implicit confidence in any statement he might make. I then addressed a letter to Mr. Hurley, asking for information. I stated in my letter that his friends here had the utmost confidence in his integrity, and that they had desired me to address him. I also asked him to send only such facts as he had learned by personal observation. The following letter in answer to mine came in due time:

"DEAR SIR:—Your letter of March 19th is received, and it will be a pleasure to me to give you all the information I can in regard to this camp. "There is no mistake as to this mud containing silver. I have been here over two months, and have assayed over 100 samples which contained silver; some as high as \$2,300 to the ton. The samples I obtained from the springs myself. I think the weather has considerable to do with the mud containing silver. I obtained the best results when the weather is warm. Sometimes in one of the larger springs when the weather is cold the mud will be of a yellow color, showing no silver, but when the day is warm the mud is blackish-blue, at least in places, and rich in silver. They seem to work more actively in a warm afternoon. Some of them contain a great deal of acid, the bones of animals that fall into them being dissolved in a few moments.

"There are old wells that assay from \$5 to \$1,200 to the ton. One assay I made from the flat, half a mile from any spring, assayed \$1,200 to the ton. There is a great deal of salt, almost pure, all over the spring flat. There are between 100 and 200 quartz leads discovered, running in two directions close to the springs. I find silver in several of them, all the way from a few dollars to \$100 to the ton. Some of

these leads run through the springs, at least they point in that direction. The altitude of this place, I should judge, is between 4,000 and 5,000 feet. I have no means of ascertaining at present the exact height.

"I will send you some of this so-called mud as soon as it stops storming. I want to take some out when the weather is warmer.

"RICHARD HURLEY.
"Silver Springs, Wasco Co., Ogn., April 19th, 1877."

In this connection I would state another interesting fact which has come to my notice. A recent discovery of a silver-bearing deposit, located in southwestern Utah, has been made public, and specimens of this interesting substance have reached this city. It occurs in the Maud mine, Toquerville, six miles from Leeds. The deposit is said to be sandstone. Some assays, as high as \$700 per ton, have been made. Some specimens have lately come into my possession and I have examined them with care. Instead of being sandstone, I found the deposit to be sedimentary, but closely resembles the Oregon mud. Under the microscope it has all the appearance of that strange substance and does not, in any way, resemble sandstone. It scratches glass with difficulty; some samples slip over the surface of a glass plate without making any impression on it. The Oregon mud, if allowed to dry in large quantities, would soon form a substance similar to the Utah mineral, in appearance at least. The silver is in the state of a chloride, and easily seen under the microscope, both amorphous and in crystals. An analysis of the two minerals will be interesting, and may throw some new light on the subject. It is possible that a study of these deposits may contribute much to our knowledge of the formation of metalliferous veins.

Arizona Mines.

Since the establishment of our Territory, 14 years ago, our mines of gold, silver, copper, iron, etc., never have shown such signs of richness and permanency as at the present time.

Pima county has a great many very valuable mines that are being sought after by English capitalists, as well as those from California and other States. The King, in Pinal, is turning out probably the richest ore of any of our many wondrous deposits, and is attracting much attention from mining men and capitalists on the outside.

Here in Yavapai, our home, where we know what we are talking about, there are hundreds of mines that pay into the thousands per ton, and are only too ready to yield up their shining wealth to the honest miner, the echo of whose hammer reverberates from every hill and dell throughout our mountains, which are bound together with threads of gold and silver. The Peck, Zalida, Black Warrior and such mines are enough to convince the most skeptical that the mountains surrounding our home, Prescott, situated in the midst of a beautiful forest of pine, juniper and oak, are one vast table of metallic wealth. Such wealth and treasure as those that surround us on every side and in every section of our fast-growing Territory are gifts that are only bestowed upon the pioneer, who severs himself from all that is dear and near to him, gives up comforts to partake of hardships, leaves peace and quiet to brave the dangers, penitence for insufficiency, etc. Such has been the case with the pioneers of Arizona, and now they are beginning to realize that a brighter day is about to dawn upon and crown their noble undertakings.—*Arizona Miner.*

THE GEOGRAPHICAL SURVEY.—Major Powell, U. S. A., in charge of the geological and geographical survey of the Territories, has already sent out five parties, all of which are at work in Utah Territory. The triangulation party, under Professor Thompson, is located on the eastern slope of the Wahsatch mountains. Three geographical parties, under Messrs. Renshaw, Wheeler and Grover, are pretty busy prosecuting their work on the Uintah, Price and Lower Green rivers, and a geographical party under Captain Dutton, of the Ordnance Department, U. S. A., is located on the central plateau. Major Powell will leave here about the 1st of July for the field, and in the meantime two other parties will be fitted out for work this season, one of which will make a specialty of the subject of irrigation in Utah. It is expected that the geographical work in eastern Utah, which has been prosecuted with vigor for some years past, will be finished this season. The survey now being made of the Pacific coast by the United States Engineer Corps, comprises all the country lying between the British possessions on the north, the boundary line of Mexico on the south, the Pacific ocean on the west, and the meridian of 100 degrees on the east. The work so far completed includes the survey of about two-thirds of Arizona, nearly the whole of Nevada, and a portion of New Mexico and Colorado. The extension of the Southern Pacific railroad to Yuma has offered such additional facilities to the survey party that the survey of Arizona will be rapidly carried on and soon completed. A number of topographical atlas maps have been prepared, embracing each an area of 80 square miles, showing the drainage basins of the different sections and the several elevations of the various mountains.

Mica and its Uses.

Mica, from the Latin "to shine," is composed of silice, alumine and potash. It is found in almost every country on the globe—America, Switzerland, Siberia, Norway, Bohemia and Russia. Siberia and the United States probably furnish the best and largest specimens. It occurs in granite and quartz, also in rubellite, green tourmaline, feldspar, lepidolite and several other minerals. It is one of the constituents of granite, gneiss and mica schist, talc-slate, etc. It sometimes occurs in granular limestone, and rarely in lava, dolomite and magnetic iron ores.

According to Dana, mica is usually in thinly foliated plates or scales; color from white through green, yellowish and brownish shades to black with a pearly luster, transparent or translucent; before the blowpipe infusible, but becomes opaque white.

There are a number of varieties. That in which the scales are arranged in plumose form is called plumose mica; that in which the leaves or scales have a transverse cleavage is called prismatic mica. The crystals are chiefly rhombic or six-sided, though not always.

The cleavage of mica is highly perfect, and, according to Prof. Henry, can be split or divided into leaves, 250,000 to the inch. It shows a tendency to associate with quartz, and in the mines recently discovered in New Mexico a coarse quartz mixed with fine white crystal formation is the sign of the mica mine. Many deposits or veins have been discovered by myself and Mr. Phillips during the winter, but a very small per cent. carry mica of a merchantable quality; the cleavage is generally transverse, or foreign coloring matter enters it to such an extent that it is worthless for market.

The uses of mica are various. Diamond dust with which court dames, and our own American ladies, powder their hair, is ground mica. The costly French silver moldings are cast from ground mica. The wonderful shower of diamonds which I have witnessed in the scenic plays of the White Fawn and Black Crook, at Niblo's, was mica scales.

As a lubricant it is perfection. Mixed with oil it wears longer than any other ingredient. Recent experiments have proven that in any swift-running machinery, where the Babbitt metal and other packing have proven at fault, mica packing is perfect; being indestructible by heat it generates none, and as soon as a good Yankee test is made, the result will be mica-packed boxes for fast, heavy-running machinery, and no more hot boxes or worn journals, being entirely free from grit.

For stoves it has now become indispensable, and the demand for clear, transparent mica is rapidly increasing.

We have opened five mines during the past three months, and out of over 40 veins, which I have examined since last November, these five are the best. The quantity which these mines can produce is unlimited, and the quality equal to any in the United States. I have carefully compared it with mica from the mines of North Carolina, of S. Royalston, N. H., and of Paris, Maine, where mines are now being worked; from what I can learn of mines in other parts of the United States, and over the water, I am led to believe that we have a much larger deposit and of larger sizes than is now found in this or any other country.

Large plates, when they could be procured, were at one time used in the Russian naval vessels for deck or dead lights, because not liable to fracture from concussion. It is in common use for lanterns, and is rapidly coming into use for lamp chimneys. On account of its transparency and toughness, and the thinness of its folia, it has been used as glass in Siberia, but is now too costly for common use.

It is not difficult to find mica in the district in which our mines are located, but after many months spent in prospecting, exploring and working, I find that to find the perfectly clear, transparent, flexible mica, free from color, veins, curves and other imperfections, is very difficult. Sizes as large as 14 inches have been found in North Carolina. We have not unfrequently sized from 18 to 24 inches. Last week we took out one book or crystal weighing fully 100 pounds. We are now able to furnish mica by the ton. Crude mica, i. e., pieces too small for cutting, and the cuttings, are too far from market and the uses of waste mica too limited to render them valuable. Sizes less than two and one-half by four or four and one-half inches are hardly worth saving. Sizes five by seven and nine inches are worth \$6.50 to \$7.40 per pound, with a rapid increase in prices for larger sizes.

I made an extended tour of observation through New Mexico with Gov. Hunt and Col. C. B. Lamborn, of the D. & R. G. railway, a few weeks ago, and returned to our mines fully satisfied that the small district in which we are now operating contains about all there is worth looking for in that line in that Territory.

Some deposits or veins are often found at a distance from us, but after a thorough investigation and an expenditure of labor and money, have been abandoned, the quality not proving satisfactory. The mica which I have so far exhibited from our mines has all been taken from within one to three feet from the surface.—*Cor. San Juan Prospector.*

THE war is already benefiting American shipmasters, as for long voyages merchants prefer chartering flags not likely to become embroiled in the present war.



W. B. EWER..... SENIOR EDITOR.

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ADDRESS all letters to the firm, and not to individual members, or others, who may at any time be absent.

Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday Morning, June 30, 1877.

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The Week.

The week just passed has been an uneventful one, as far as the mining interests are concerned. Stocks have not "boomed" to any extent, and nothing startling is reported from the mining districts. On the Comstock, several mines which lately shut down, have started up again, a result brought about by the late rise in stocks. We notice also that work is to be commenced in Panamint district on some of the big mines which have been idle for some time. This district, which created a great excitement at the time of its discovery, has long been under a cloud, but many pin their faith to it yet and are anxious to see "depth" on some of the shafts. Another event of interest to a certain class of the mining community is the appearance of Mr. Goodyear's book on the "Coal Mines of the Pacific Coast," noticed in another column. This is a very important and valuable treatise, and one long needed. We hope now that some competent person will also undertake the task of writing a work on the quicksilver interest of the State. It seems strange that this has not been done before, as these interests are larger here than anywhere in the world. The deposits are largely scattered over the State, and many inquiries are made for some work which will describe the nature of the deposits, give instructions as to prospecting and mining as well as metallurgical operations. Will not some competent practical mining engineer take this matter into consideration? We are sure a small book on this subject would be ready of sale, to a certain extent.

THE Virginia Enterprise says: "Some young men, miners out of employment, on a visit to Washoe lake, and in search of something out of which to coin funds for the Fourth of July, found in the hills east of Washoe lake recently sledge, the croppings of which assay \$42, staked their notices, and are happy."

Close of the Volume.

With this issue we close Volume XXXIV. of the MINING AND SCIENTIFIC PRESS. A glance at the capacious and comprehensive index on the last page will show what a variety of subjects have come under our observation during the past six months, and will, at the same time, be a guarantee to new subscribers that the PRESS omits mention of nothing which will be likely to be of important interest to progressive readers.

This index is a matter of considerable labor to compile, but it is of great value to those who file their papers, forming an encyclopedia which gives a complete record of industrial progress or the period covered by the volume. In a file of this kind will be found facts gained from every-day work, and hints from practical men in all industrial departments. It forms a very complete history of mining operations on this coast, so that those interested in this industry can refer at any time to what was the condition of any particular mine at any stated period.

The MINING AND SCIENTIFIC PRESS is now about to enter on the eighteenth year of its existence—a long period in a comparatively new country like this. During all this time it has been devoted to the interests of the industrial classes of the Pacific coast, and has endeavored in every way to be of benefit to them. The paper has been improved from time to time as occasion offered, and the proprietors are encouraged to believe that these improvements have been duly appreciated. We shall endeavor to continue to make the PRESS in every way worthy of the interest it represents and to add to its value at every opportunity.

To the mining community all over the coast the PRESS is of the greatest value. No one at all interested in mining matters can afford to be without it. The current mining news of the day alone, which is compiled with care from all reliable sources, is worth more than the subscription price. The "Mining Summary" which appears each week gives a birdseye view of the state of affairs in the different mining centers of the coast and any one interested in any particular camp can see what is going on there, as well as gathering a general idea of the prospects of other localities.

Our numerous correspondents, writing intelligently from various places, give details of operations in their respective localities which are widely read. Our special traveling correspondents, who write up the various camps all over the coast, manage to gather a mass of information which is not available from any other source. The letters which have appeared in this volume from Montana, Utah, Nevada and different parts of California from one of our traveling correspondents alone, have gone over a great deal of ground and conveyed a great deal of practical information gathered in different places. Many of these communications have been copied into Eastern and foreign journals, thus carrying abroad information of our rich resources.

We have, as usual, carefully watched for all the improvements in mining appliances which have come in vogue, either in this country or in Europe, and described them in detail for the benefit of our home readers. All the new inventions in this line have also been described, as have such new processes for the reduction of ores as have been practically applied.

In short, the MINING AND SCIENTIFIC PRESS forms a compendium of useful and practical knowledge and applied science superior to any other journal for the requirements of the classes it represents on this coast. Legitimate mining, no matter on how small a scale, it is its province to encourage; and, not being in the slightest degree bound to any set or clique, we are in a position to do justice to all legitimate undertakings, and, when necessary, condemn those which savor of fraud. The paper has now been so long established and its proprietors have had so much experience as publishers, that it is on a firm basis and in a position to be perfectly independent. Our advertisers, who, in a measure, co-operate with subscribers in sustaining a first-class paper, are among the best class of people in their respective lines of business, and the continuous time which a large proportion of their advertisements have appeared in the PRESS shows the appreciation in which the paper is held and proves that the investment is profitable to them.

The PRESS circulates in every mining camp on the Pacific coast, as well as largely in the cities, and those who take it once are apt to continue to do so. There are of course many who may not have had an opportunity to judge of its merits, but who would be likely to subscribe should our old subscribers who are familiar with the PRESS call their attention to it.

Miners and mechanics should support their home paper properly, and not only subscribe for and read it, but also write for it occasionally. To publish a paper of the style of the PRESS is an expensive undertaking, and it is but just to expect the hearty support of those to whose interests it is devoted. The commencement of the volume is a good time to subscribe, and we hope that our readers will assist us in drawing the attention of other persons engaged in industrial pursuits to the merits of the PRESS and induce them to subscribe. The publishers are determined to have the PRESS continue to occupy the leading position among Pacific coast mining and industrial journals, and will spare no labor or expense in furtherance of the object.

The Pioneer Press of Nevada Co.

We are requested by several old residents of Nevada county to publish the following remarks of W. B. Ewer in reply to "The Pioneer Press of Nevada County," a sentiment given at the Nevada County Reunion, held in Badger's park, Oakland, June 9th, 1877:

I feel all the more honored, Mr. President, in being called upon to speak to "the pioneer press of Nevada county," from the fact that it is well known I am no speech-maker. I have been called up simply because of the accident of my connection with the "pioneer press" and because I happen to know something about it. If there is any one thing in connection with my early California life in which I take an honest pride, it is because of my connection with the pioneer press of Nevada county.

The Nevada Journal, the first newspaper published in Nevada county, was the second established in the mountains of California. Perhaps a few words in connection with the circumstances which called it into existence, and some of the incidents connected with its early history, may be interesting at this time:

There are, no doubt, many here who well recollect the first great fire in Nevada City, which occurred on the morning of the 11th of March, 1851, and which was the first of the many great fires which, during her early years, wrought such destruction throughout the cities and principal mining towns of California.

At that time I was employed as foreman on the Placer Times, then published at Sacramento by Messrs. Pickering & Lawrence. The second morning after the fire I was called into the editorial room by Mr. Pickering and introduced to Mr. J. N. Turner—every old Nevadan will remember Nick Turner. Mr. Turner had just arrived at Sacramento, and called at the Times office to give the particulars of a great fire at Nevada City, a place with which we had already, at that early day, become quite well acquainted. After Mr. Turner had concluded his story I remarked to Mr. Pickering that it would be quite California-like for some one to rush up to Nevada and start a paper there directly upon the heels of such a calamity. The excitement of the occasion, and the bustle of rebuilding the city would act as a stimulus to the enterprise. Mr. Turner became at once very much interested in the idea, and Mr. Pickering suggested that, as I had proposed it, I should proceed at once, and without delay, to carry it out.

As a result of this interview a "solitary horseman" might have been seen the next morning, wending his way across the Sacramento valley towards Nevada, via "Johnson's ranch," that and on foot being the only modes of travel in those days toward the mountains. I arrived in Nevada while the ruins of the fire were still smoldering, presented my letters of introduction from Mr. Turner, was cordially received, and so liberally encouraged that I hastily returned to Sacramento, purchased press and types, and on the 21st day of April, 1851, issued the first number of the Nevada Journal, as a semi-weekly paper.

Some three months after the Journal had been started, a young man—a miner—came into my office from one of the neighboring ravines, and introduced himself as a printer—would be willing to do a little work at the "case," or assist in editorial labor. He soon after handed me several pages of manuscript, from the perusal of which I readily perceived that he was well qualified for editorial labor, and that he would some day act no inferior part in the political management of his adopted State. A few weeks later I met him in a caucus called for the purpose of effecting a county political organization of the party to which he was attached. This meeting, I believe, was the first attempt in the mountains of California to turn the attention of men from the all-prevailing hunt for gold, to the benevolent purpose of teaching them how to vote.

I need hardly say that the then young printer and "honest miner" is now before you and represents the State of California in the National Senate—fully the peer of any of his distinguished colleagues. I suppose Mr. Sargent would hardly care at this time to take a "case" in my printing office; although I have no doubt he could set a column of type fully as quick and quite as correctly as the general average of printers.

In the fall of 1851, having been seized with a very severe attack of "quartz fever," a condition which was so prevalent at that time, and so fatal to life and hope and pocket, I sold out my interest in the Journal to Mr. W. G. Alban, who soon after associated with himself Mr. Sargent, as editor. Mr. Sargent continued to furnish the leading editorials for the paper for some four years, until July, 1855, when he was succeeded by Hon. E. G. Waite. Mr. Waite continued in charge of the paper until its suspension in 1861. I think it will be acknowledged by all who knew the paper that no journal in the mountains of California had a wider influence, during its ten years of existence, than had the Nevada Journal—after I left it.

After a suspension of something over a year the Journal was resuscitated by Rev. Benj. Brierly, and continued for about a year and a half, when the pioneer paper of Nevada county

finally and fully gave up the ghost in the sea of fire which for the third time swept over the city of Nevada in November, 1863.

The press and a portion of the type of the Journal office possessed no little historical interest, and it is much to be regretted that the material could not have been spared by the devouring element to occupy a place which it eminently deserved to fill among the most interesting pioneer relics of California.

From the best information I can obtain, the press on which the Journal was printed was the identical one used by Walter Colton and Robert Semple in the publication of the Californian, which was established by them at Monterey, August 15th, 1846, and was the first paper printed in California—a quarto form of two columns to the page.

Mr. Samuel Brannan started the Star in San Francisco, January 9th, 1847—just six months later. The two were united as the Alta-Californian, on the 3d of January, 1849. My information and belief is that the pioneer press—the one used by Messrs. Colton & Semple at Monterey—was taken to Sacramento in the summer of 1850, by the "settlers"—squatters they were then called—of that city, and used in the publication of their short-lived organ—the Tribune. It was subsequently purchased by Pickering & Lawrence, for the Daily Index, an evening political paper, and by them sold to me as the press outfit of the Nevada Journal. If I am correct in these particulars, the pioneer paper of Nevada county was printed during its entire existence on the pioneer press of California. That press was destroyed by fire, as already stated, in 1863.

The Brannan press was taken to Sacramento by Mr. Lawrence, and used for a while in the Placer Times office, and subsequently taken to Sonora, where it was soon after destroyed by a mob.

But whatever may have been the facts in regard to the press, it is quite certain that a large portion of the type first used in printing the Nevada Journal was the identical type on which the pioneer paper of California was printed at Monterey. There was also a wooden composing-stick in the Journal office which was taken from a few printing materials constituting a primitive job office used by the Spanish mission at Monterey, and probably made by one of the mission fathers, as it was evidently not the work of mechanics accustomed to such manufacture. Probably the first printing ever done on the Pacific coast was done at that office.

A similarly primitive office found its way, as early as 1843, to a Protestant missionary station among the Nez Percés Indians, in the Walla Walla valley, near where Walla Walla City now stands, in the southeastern portion of Washington Territory. Portions of the Scripture were printed at that office in the native Indian tongue.

The first paper ever issued on the Pacific coast was the Oregon Spectator, which made its first appearance at Oregon City in February 1846—some six months earlier than the Monterey paper already alluded to.

Printing materials were very scarce on this coast, both before and for some time after the advent of the gold-seekers, and printers were often compelled to resort to various substitutes for lack of better material. The first printing done at the mission station in the Walla Walla valley, already alluded to, was done on a press made by the man—not a printer—who owned the office. I have been told that this press is still in existence. Mr. Brannan's material came out with not a single composing stick, and a couple of wooden ones were manufactured to supply the deficiency. While in the Placer Times office I ran short of leads, and manufactured a lot from tin, which soon rusted so badly that I could not use them. I subsequently made some from a sheet of zinc, which answered a very good purpose. Some of those zinc and tin leads were taken to Nevada. I also made several fonts and parts of fonts of wooden job type, which I used both at Sacramento and Nevada.

Soon after starting the Journal, I found it impossible to get any printer's ink in the State. So to keep the office running I got a lot of lamp-black and boiled oil and improvised a printer's ink factory. It didn't succeed very well, and I quit the business. But I made ink, and printed several numbers of the Journal with it, and used it for several weeks in all of my job work. Yellow and brown wrapping paper were also used for several issues of the Journal, when white could not be obtained.

The second paper started in Nevada county was the Young America, which made its first appearance in September, 1853. Many here present will recollect the circumstances under which that journal came into existence. It fell to my lot, in connection with Mr. T. H. Rolfe, now deceased, to act as its printer, but not publisher or editor. The new paper, under the editorial management of R. A. Davidge, became at once a very active opponent of the Journal. It soon changed its name and proprietors, however, and became the Nevada Democrat, a name retained, under various changes of ownership and editors, until its decease in the spring of 1863.

The publication of newspapers in Nevada City at that time was occasionally attended with some little unpleasantness. Our honorable Senator, here present, has no doubt some recollection of this fact, and probably will remember the old oak tree, which for many years formed quite a prominent object in the middle of Broad street. He didn't go up that

tree, however; neither did he dodge behind it.

I have myself a very distinct recollection of another affair, in which the Senator bore no part, but in which two gentlemen who could not quite think alike, and when other argument failed, resolved to settle their differences by an appeal to the pistol, but outside of the "code," however. They each emptied a six-shooter, with no worse result than a ball buried in a calf of a leg of each. The second shot from one of the parties entered the *Young American* office directly in front of the "stand" at which I was at work, and spent itself in perforating a half-inch piece of hard wood, which formed a portion of an upper case of type in the "rack," but for which intervention I should have received the missile with nearly its full force, centrally, and a little below the belt. I sprang to the door to learn the cause of the shooting, and as quietly as was consistent with circumstances, suggested that the middle of the street was a better range for such practice, that an intervening printing office was quite too much of an obstruction between combatants to make such an affair interesting. One of the combatants had sought the friendly cover of a corner of the building.

In November, 1853, about two weeks after the *Young America* made its appearance in

Printers, as toilers, are quite unlike other industrial classes. Their work and their toil is for the ages. The printer has been, not inaptly, called "the adjutant of thought." Men in a printing office, whether they set type or prepare "copy," are ever behind the scenes. They know how reputations are made and unmade. They know that what appears the golden crown is often but pasteboard. Life to them is stripped of its illusions; it is unidealized, real. The realm of the press is an enchanted one. When we see a printer picking up his little types one by one, and marshaling them side by side in solid rows, we behold the veritable foot-prints of thought, as it steps out with undying impress into the world of intelligence. Those types are the elements of perpetuity. By them we bridge the chasm of ages, over which those who are to come after us, and who may live myriads of years in the distant future, will be able to travel surely back through the mazes of the wonderful years which have witnessed the birth of the steam engine, the railroad, the electric telegraph, the sewing machine and the power printing press.

The newspaper is the institution of the age. It is the great modern repository of useful knowledge. By it the thoughts of men go forth, weaving silently, thread by thread, the

The Pliocene Rivers.

Generally speaking, miners care very little about geology and know very little about it, although the subject is so intimately connected with their every day business. There is one department of the science, however, in which the miners of California take great interest. Those who have ever had anything at all to do with gravel mining are desirous of becoming acquainted with the wonderful geological events which preceded and led immediately to the present configuration of the country embraced within the Pacific States, and during which the immense deposits of auriferous gravel now being worked were formed. Unfortunately the State Geological Survey was stopped before the work was accomplished, and a great deal of the information which was gathered remained unpublished.

Among other things unpublished, but prepared, was the map of the Pliocene rivers of California—something of the greatest interest to gravel miners. This map was all completed several years since, and the State should see that it is published. It will be seen by the letter of our special correspondent from Nevada

The Celebration in the City.

Active preparations are being made by the different committees having the matter in charge, for a successful celebration of the Fourth of July in the city. The feature of the day will be, of course, the procession. The military companies, are, as usual, all ready for the parade and a large number of the societies of the city are also making preparations, having signified their intention to turn out. The procession in San Francisco has always been a success and there is no reason to believe that there will be any exception this year.

The literary exercises will take place at the California theater. Henry George has been chosen as orator of the day; Geo. H. Jessop, poet; and Henry Edwards, reader of the Declaration of Independence.

There will be no exhibition of fireworks in the evening, experience having proven that the winds prevailing at this season of the year are apt to spoil the exhibition and also add to the danger of fire. The Board of Supervisors have before them an order amending the present or-



THE FOURTH OF JULY BY MOONLIGHT.

Nevada, the *Telegraph* was started in Grass Valley, by Messrs. Oliver & Moore. That paper may also be considered as one of the pioneer papers of Nevada county. It came into my hands at the commencement of the second year, and was continued as a weekly until 1861, when its name was changed to the *Grass Valley National*, under which name it ceased to exist in 1870.

And now a few words in regard to the press, and printers in general, and I have done.

Printers, Mr. President, are very modest and unassuming men; they profess but little and claim but little for themselves, but the world freely accords them much. Neither the wealth of knowledge which they garner up from year to year, nor the vast benefits which they confer upon the world, inure much to their own advantage. It usually either lies dormant or is used to the credit and advantage of others. Printers are not aspiring men. Their highest ambition is to benefit others. If, by force of circumstances, they chance to be separated from their profession and brought into public life, their garnered and varied knowledge stands them in good account, whether in the forum, in the lecture room, or in the legislative hall. The education gained in a printing office, though not so thorough and complete as that of the school or college, is far more practical and gives its possessor an advantage which many covet, but which few possess.

great web of human intelligence. Away across the water, over the prairie, up the mountain side and down the river valleys, everywhere go the white-winged messengers of the press to furnish thought for the million, to tell men how to mine, how to sow, how to reap, how to think, and how to vote. To teach them whatever is useful, whatever is good, and to warn them against evil and the evil doer. Princes and potentates own the sway of the press; there is no mightier power in all the world than printer's ink rightly used.

As the printer stands at his case, weary and worn, or sits at his table burning the midnight oil in the preparation of his "copy," though he may not be able to command the meanest servant, and has not an acre on God's footstool to call his own, he nevertheless knows that he is a power in the world. With his fingers he is putting thoughts into shape that will penetrate everywhere; with his "mallet" he is "locking up" "forms" that will make an "impression" on rings and on powers. His "shooting irons" are far more powerful than any which Colt or Remington, or even the great Krupp himself, ever fashioned.

ONE THOUSAND to 1,500 men are now on a strike in the iron manufacturing establishments at Schuykill, Lehigh and Susquehanna valleys, against a reduction in wages. The number will shortly be increased.

county that a private individual is at work on a smaller scale with a map of the same sort, showing the need of such a map as was compiled by the survey. Nothing could be published which would be of greater benefit to California miners than the Pliocene river map, and some of our rich mining men might make an offer to the State to publish it, as the "Botany of California" was published. The letter from Nevada county, in another column of the issue, gives some interesting items in relation to the subject.

On the 18th inst. a body of oil yielding, according to report, 40 barrels a day, was struck in a well 400 feet deep in the San Fernando oil district, 17 miles northwest of the town of San Fernando and five miles from the Andrew station on the Southern Pacific railroad. Five other wells, all of them, including the new one, within an area of one acre, had previously reached a flowing supply of oil, but the quantity from the five was only 40 barrels in the aggregate, so that the new one equals in importance all the others together. The cause of its superiority is probably to be found in the fact that it goes down twice as far as the older wells, and is the first to reach so great a depth.

A VERY destructive fire occurred at Marblehead, Mass., on Monday. Nearly the entire business portion of the town was destroyed. Loss about \$500,000.

dinance prohibiting the discharge of cannon and fireworks, so as to include all kinds of fireworks in the prohibition, within city limits. An addition has been made to the order declaring it the duty of the Chief of Police and every member of the Department to enforce the ordinance.

The route of the procession will be as follows: Start from corner of Folsom and Third streets at 10 A. M.; thence to Market street, to Montgomery, to Montgomery Avenue, to Kearny, to Market, to Seventh, counter-march on Market to Powell, to Sutter, to Kearny, to Bush. At this point the procession will break up and those who desire to attend the literary exercises will go to the California theater. The Brigade review will come off before the procession forms, at 9.20 A. M., the line forming on New Montgomery street.

The engraving on this page gives a good view of a Fourth of July celebration by moonlight. It is an occasion of promenade, lemonade and fusillade. The populace is devoted to recreation and enjoyment. The figures show boys and girls handling the fiery cracker and spouting candles of Rome. Their elder brothers and sisters celebrate rather with the flash of sentiment and the warmth of sprouting affections. The old people wander about in aimless ways and will rejoice when the time comes to draw the unwilling children to their homes. The scene is one which will be reproduced all over the country on next Wednesday night.

Secure Your Patents.

Miners should not forget that it is necessary to procure a government patent to their mining claims before they can be sure of an undisputed right to the premises. They should also remember that the longer they delay their application for a patent, the greater is the probability that there will be trouble with adverse claimants.

Our country has a good reputation among Eastern capitalists, and during this and each succeeding year a large amount of money will be brought to San Juan for the purpose of being invested in mines and mining stocks. After becoming satisfied as to the value of a mine, the question with the capitalist is the title. If the patent has been secured, that settles it. If not, the chances are that the would-be purchaser will look elsewhere, or that he will not be willing to give anything like a fair price for the property in question.

If the miner does not desire to sell his property, it is far better to settle the question of title and be done with it. He is thereby relieved of all anxiety as to future possibilities, and will be relieved of the necessity of the regular annual expenditures in order to hold his claim. A miner may have expended ten thousand dollars in developing his claim, and yet should he fail for but for a single year to do a hundred dollars' worth of work on it, the claim is liable to be relocated as abandoned property, and certainly would be if it was worth anything.

If a mine is worth having, it is certainly worth paying for at the very low rate of \$5 per acre. We therefore urge upon miners the necessity of securing their patents at the earliest day possible.—*San Juan Mining Reporter.*

Hydraulic Engineering.

Manufactories are located with reference to convenience to fuel, raw material, power and transportation. Since the introduction of railroads and the discovery of coal, cheap transportation has taken the raw material and fuel to convenient points without reference to power, as coal furnishes both power and fuel. Since the application of steam, water power has not been considered as necessary for the location of manufactories. Nevertheless, the presence of water power is an additional reason for the location of manufactories, and water power is most economical and the power equally steady. Where natural waterfalls exist they have been largely taken advantage of in the Eastern States, and the raw material and the food for the operatives have both been transported there, and then the product transported back to the source whence the food and raw material came. As an instance of what has been done to occupy the power thus afforded, the dam across the Connecticut river at Holyoke, Massachusetts, is said to have supplied that city with the enormous amount of 300,000 horse power. The water is taken by canal from the river along the highest practicable terrace, and there used through mills on the lower side of the canal, emptying into a canal on a terrace below, when it is again used, and again emptying into other canals upon other terraces further below. Where a few years since was but pasture lands, is now a large and rapidly growing city.

SWANSEA REDUCTION WORKS.—We find in an exchange a description of the celebrated reduction and separating works of Wales. We give space to a brief extract: "The Swansea works are mostly subterranean, extending for about a mile underground, the compartments each separated from the other, and the man who has charge of any one apartment is completely walled out from his neighbors on both sides, so that no one knows what the other person next to him is doing. The employees live in such prisons all their lives, have no communication with each other, or the outside world, hence, if one quits, he knows nothing, except that he was required to use certain proportions of chemicals to extract a given metal, as the rivulet of molten matter passed through his chamber. This is the reason why no one can be found that knows the *modus operandi* of the entire Swansea works, from personal observation, for no one but the proprietors themselves understand it, and they will not impart the information for the simple reason that all the world pays tribute to them. Yes, the little Welsh corner by the sea has cargoes of mineral from every country on the globe unloaded at her wharves."

IRON CEMENT.—Take four or five parts by weight of dried and finely-powdered brick earth, and one part of peroxide of manganese, and mix them with two parts of fine iron filings, which must be free from rust, one-half part common salt and one-half part borax. Grind all fine together and mix intimately, then make into a stiff mass with water. The cement must be applied as soon as made; it is first gently warmed, and then exposed to a heat just short of whiteness. It is stated to be thus converted into a slag-like material which stands boiling water and all common heats. Another recipe is: Equal parts of finely-sifted peroxide of manganese and finely-triturated zinc, which are rubbed up to a thickish fluid with common water glass; this must be applied as soon as ready, and makes as hard a cement as the foregoing.

Summerville.

A reporter of the *Sunshine* (Col.) *Courier* visited this prosperous camp last week, and found things far beyond his expectations. New and commodious dwelling houses are being erected, and many people are compelled to live in tents on account of the scarcity of houses. There are already thirty dwelling houses erected and occupied.

This is the location selected by the Black Cloud mining company for their mill, which is now being erected, and twelve carpenters are as busy as they can be at work, with but seventeen days to complete their work. The building will be 102x39 feet, with five floors in the mill, and to be the same as Collom's works.

The Black Cloud mine, owned by the same company, is located up the gulch from the mill, with a dump of ore that is estimated at 1,000 tons; however, there is enough ore to prevent men from doing any more work until the ore is removed to give them a chance to work. The company will have the mill and mine in full operation about the first of August.

There are several other mines in the immediate neighborhood of Summerville that will commence work at once; among the number we mention the famous Hoosier.

BARTHOLOMI'S COLOSSAL "LIBERTY."—In an article entitled "France to America," in *Scribner* for June, occurs the following description of Bartholdi's colossal "Liberty," which is to stand in the harbor of New York: Allowing twenty feet for the height of the island above the water, the pedestal is to be one hundred and ten feet high, and the statue, to the flame of the torch, one hundred and forty-five. This makes the torch at least two hundred and seventy-five feet above the level of the bay. It will equal in height the column in the Place Vendôme at Paris, and will be larger than the colossus of Rhodes, so much celebrated by antiquity. Like that statue, it will have to be cast in pieces of manageable size, and built up after the manner of an armored frigate. The construction will be a curious specimen of engineering skill, for which the sculptor and Mr. de Stuckle will be responsible. At night it is proposed that a halo of jets of light shall radiate from the temples of the enormous goddess, and perhaps the flame of the torch may be fashioned in crystal, in order that it may catch the light of the sun by day, and at night form a glowing object illuminated by electricity.

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- One second-hand Stationary Engine, 8x20 inch, with or without hoist gear.
- One Upright Boiler, Horizontal Engine on wheels, Eastern make, 7x12.
- One Upright Boiler, Horizontal Engine, San Francisco make, 6x12.
- One small Stationary Engine, 3½x7 inch.
- One Steam Boiler, 40 inches diameter, 16 feet long.
- One 8x10 Straw-Burning Portable Engine.
- One Traction Engine, three wheels, rubber tires, double cylinder, 6x10 inch; Thompson's patent, D. D. Williamson, builder, New Jersey.
- One Stationary Engine, 10x20, just had a thorough repair, almost as good as new.
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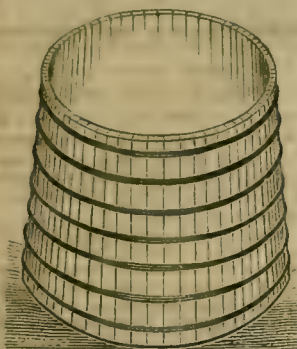
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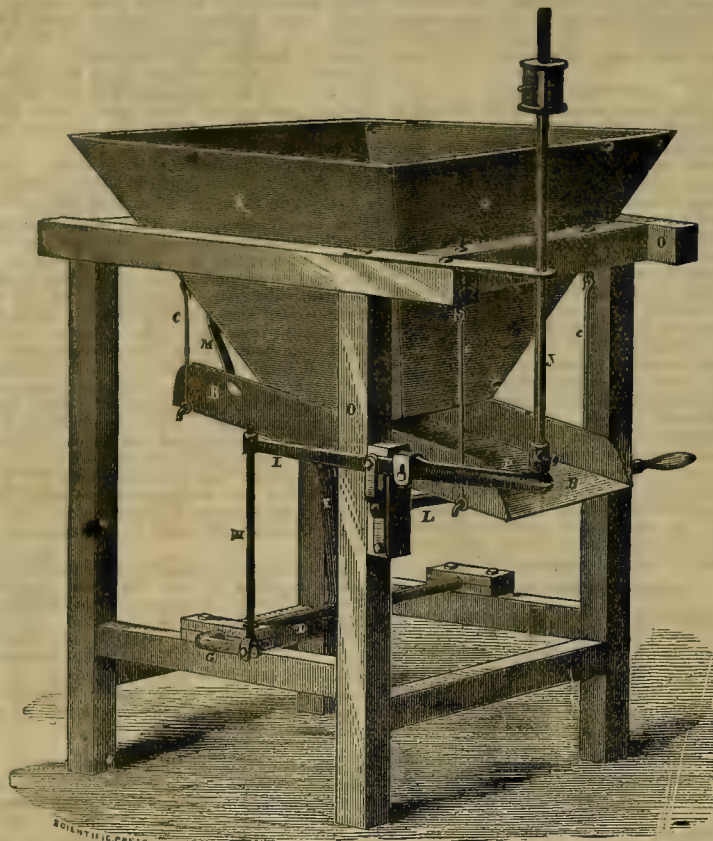
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 ward movement of the tray, thus insuring the perfect feeding of all classes of ore, whether it be dry or wet.

We append a few extracts from the many testimonials which we have received from mill men and practical
 mining men, of the effectiveness and positive action of the Tulloch Feeder. We do not depend solely upon these
 testimonials, as we are aware that testimonials are easily secured for almost any machine, but the high character of
 the parties certifying to those herewith given, will establish their value and genuineness:

Mr. Jas. G. Fair has 28 in use; says: I regard them superior to any Feeder with which I am acquainted; I con-
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Mining in the Upper Part of Nevada Co.

(From Our Traveling Correspondent.)

Pre-science is the best mark of a true scientific theory. When results are predicted from it with any degree of certainty and in instances sufficiently numerous to preclude the idea of chance or coincidence, the hypothesis begins at once to take the form of an established law. In view of the value and vastness of the rich auriferous gravel deposits found in this locality in connection with the thousands of broad acres all along the western slope of the Sierras from Oregon on the north as far south at least as Fresno county, many an attempt has been made to arrive at the causes that evidently at one time operated here on a scale by no means diminutive, and to solve or more definitely settle the question as to the age and mode of the deposit. The ultimate and most important end to be attained has been the discovery of some law by which locations could be made and at the same time opened, not at mere hap-hazard, but with something of that degree of certainty and success invariably accompanying Dame Nature's footsteps when carefully traced out and faithfully followed. Some of these efforts have not been entirely unproductive, and richer harvests may yet be expected. Without going into the facts, the different views may be briefly summed up about as follows:

1st. There is the oceanic hypothesis, from the belief of its few advocates that the gravel was an ocean deposit similar to the rich sandbanks of Gold Bluff and other points on our northern coast.

2d. The glacial, held by certain scientists of repute, who claim the effects to have been produced in some mysterious way by the action of ice, either in the form of some floating Lapland iceberg or slower moving Swiss glacier; and, to do the assumption justice, accounts well for some of the later facts, and so far not conflicting with the 3d and most generally received view, known as the

Old River Channel Hypothesis.

This has been found to so fully answer to all the facts in the case, and has so far fulfilled the predictive characteristics expected from a well-grounded theory, as to be fast assuming both the form and dignity of a well determined law. But few of our most intelligent, practical miners now question its correctness. Some of the closest observers and acutest thinkers in other pursuits and professions have come to a like conclusion.

Claims have been located and tunnels run on the strength of the belief, resulting in a further verification and stronger conviction of its truth. The case of the Hidden Treasure in Placer county, referred to in our last year's correspondence, is a striking instance in point. All the calculations for running the tunnel were based on the ascertained course and grade of the channel as found at Damascus, fully five miles from the new location. As it turned out, the best possible selection was made both for reaching and working the gravel. As much as has been accomplished, the work may be said to have just begun.

Serious Difficulties

Are in the way, requiring time and patience to overcome. While the advocates of the underground river system are wholly in accord as to the forces originally employed, they are by no means agreed even as to the general direction of the main channel, to say nothing of minor differences. This is nothing more than might be expected at the present stage of the inquiry, more particularly in view of the obstacles that might naturally be anticipated on entering a great unexplored field of physical geography, such as is here presented for exploration.

It must be remembered that numerous and wonderful changes have taken place on the coast since the waters of what is known as the old Blue lead first began to treasure up these golden sands for the benefit of future ages. Imagine the elevations and depressions that have since taken place; the number of blazing volcanoes that have poured down their fiery streams, filling the channels to overflowing, causing them to run at higher or lower levels, or force a passage towards old ocean in a new and different direction, and these wearing away portions of the mother lead, to be in turn afterwards partially obliterated by the same or a similar process.

Differences of opinion have arisen in some cases also from a lack of opportunity for making proper observations and also from drawing conclusions from a limited number of facts or from indications as presented in special localities. For instance, an observer in Plumas county might come to the conclusion that the general flow of the main channel had been southerly; one in Yuba westerly, and another in Placer that it ran northerly into Oregon, each judging from his particular point of observation. Each might be in possession of the facts for his individual locality, yet his inference for the direction of the channel its entire length might not be correct. The whole of the observations, at the same time, might be in harmony, and dovetailed so well together as to go far towards the formation of a true theory. Without undertaking to say that the facts as at present arrived at are sufficient to fully justify such a view, it is not unreasonable to suppose

that one great branch came from the north and another from the south, making a junction, if you please, somewhere in Nevada county, and flowed thence westwardly. Such is substantially the ground taken in the year 1875 by Mr. C. J. Brown, Esq., your correspondent from Dutch Flat, who has given much attention to the question in general and to this point of the belt in particular. He has ventured so far into this "terra incognita" or dead river series as to draw.

A Provisional Map,

Showing the great western trunk, formed by the confluence of the two main northern and southern channels, together with the chief branches of each, going even into the minutia of locating some of their smaller tributaries. It is a step in the right direction and ought to be published for further confirmation, corrections and additions. This could be done with little labor and expense by the miners at work at the different points along the line of the belt, and the general questions, at least, could be soon settled, thereby greatly advancing the interests of science, and likely to lead to practical results, possibly valuable beyond all computation.

In this connection, room must be asked for one fact from personal observation, called to mind by the map and confirmatory of the view just presented.

At Damascus, alluded to above, the channel has been followed by a tunnel for more than a mile, where the old current gives every evidence of having set in a northerly direction, a matter readily determined by the grade on the bed-rock and by the relative position of boulders and gravel or other marks equally easy of interpretation by the practical eye of the miner.

Gravel and Drift Mining.

The operations in this portion of the county are on a grand scale. Millions have been invested in ditches and reservoirs. The outlays have been for the most part judicious, giving large returns for the capital employed, and, at the same time, supplying the needful sinews for opening and working the vast gravel deposits that everywhere abound.

From French Corral on the west as far north and east as Eureka South, including the vicinities of Sweetland, Cherokee, Columbia Hill, North Bloomfield, Moore's Flat and points intermediate, the channels are everywhere giving evidences of their richness by regular monthly shipments, or by the richer promise foreshadowed by the present developments.

As an able and exhaustive article appeared in your last issue, taken from the Nevada Transcript, in regard to the gravel mines of this ridge, much that had been written up is withheld as superfluous, and only a few claims noticed by way of illustration.

The Milton M. and W. Co.

Own a ditch right of 40 miles in length, taking water from the Middle Yuba. Their bedrock tunnel at French Corral is 3,500 feet long, with sluices discharging into the South Yuba. The mine is in full blast, the gravel represented to be very rich, and paying them handsomely.

The Manzanita at Sweetland, the property of same company, is also running at this time with a full force. Tunnel, 1,700 feet in length, and sufficiently deep to exhaust the gravel, with flume-way three-fourths of a mile long, dumping into the main Yuba. Their mines, inclusive of a claim at Birchville and another at Badger hill, are numbered among the best in the county.

The American M. Co.

Have 2,000 feet of ground at Sebastopol yet to be worked. The claim is situated 600 feet higher than the Middle Yuba, giving them admirable dumping facilities. They have four working tunnels, the main lower coming out of the hill 240 feet above the river. It is 3,920 in length and makes connection with a vertical shaft, 177 feet deep, in the bedrock. Below its mouth there are 20 under-currents and no less than 30 more above, connecting with the other tunnels, and from 40 to 80 feet in length by from 20 to 40 in width, with a grade of 15 inches to 14 feet; main flume, five feet wide; grade, 10½ inches to 14 feet.

The natural facilities as well as the mechanical appliances for saving the gold are excellent, the loss being estimated at less than 10%. The company are employing over 60 men, using 1,600 inches of water under an outlay of from \$10,000 to \$12,000 per month for running expenses, and are said to be making it pay.

The North Bloomfield M. Co.

Their ground at a place of the same name consists of 1,650 acres; length of channel, two miles; height of bank, 360 feet, the whole, except a streak of pipe clay, from 2 to 20 feet thick, containing gold in paying quantities, the depth of blue gravel being about 120 feet. The claim has been opened by a tunnel one and one-half miles in length, at a cost of \$500,000, their entire property at this point costing about \$1,500,000. The fall from the mouth of the tunnel to the South Yuba is 500 feet, giving room for all the dumps and undercurrents that may be required. The quantity of water used the present season varies from 2,500 to 3,000 inches, and realizes from 45 to 75 cents per inch for 24 hours, while the total expenses per month are not far from \$10,000; from all of which it will be seen that the capital has been well employed and is already beginning to pay a good per cent. on the investment.

The opportunity was here afforded of again witnessing the practical working of the new deflecting nozzle alluded to in a late letter from Plumas, and learning more of the principle of

its operation from Mr. H. C. Perkins, the Superintendent of the mine and the inventor of the machine. Being movable and working on a universal joint, it is operated by a lever, the water passing through the pipe being used as the power for moving the monitor, and it is truly wonderful to see with what ease one of these large monitors, throwing from 1,800 inches of water under a pressure of 375 feet, could be handled, the force exerted by the movement of a single finger being sufficient for the work. It was understood also that the new Judson powder had been tried here—9,000 pounds at a blast—doing fine execution and giving entire satisfaction.

Quartz in the upper part of the county is now attracting more than ordinary attention.

The Republic M. and M. Co.

Was incorporated but little more than one month ago, since which they have run over 100 feet of tunnels, and have a 20-stamp mill far on the way toward completion. The claim is situated two miles from Eureka South, on the old Henness pass road, and was worked to some extent many years ago. The company, before purchasing, sent 10 tons from different parts of the mine to Nevada City as a test, that yielded at the rate of \$9 per ton. One tunnel previously driven 200 feet, cutting in its course some small rich veins, and one four feet in width, had tapped the main ledge and passed into it 30 feet or more, which is known to be fully 53 feet wide. Another had followed along the foot wall 135 feet, and was expected to make connection with the cross tunnel early in July, or by the time the mill would be in readiness for crushing.

For driving power, a head of water of 120 feet is supplied at very low rates from the Bloomfield ditch. The quartz, mixed somewhat with talcose slate, is estimated to run from \$5 to \$10, the gold being pretty evenly distributed. It will not be difficult to mine or deliver at the mill, and there is every reason to believe that it may be made to pay well. The cost of mining and milling ought not to exceed \$3 per ton.

The Bulldoser,

A little above Graniteville, or Eureka South, is owned by Messrs. Rooker & Fairweather. Work was commenced in March by sinking a shaft. It has since been laid open at different points for 750 feet, averages a width of three feet, and is in a granite formation. Tests made of the quartz by arasta show a value of \$12 per ton, taking no account of the sulphurets of iron and lead with which it is highly charged. It has all the advantages of free water, timber in abundance, and plenty of fall for mill and machinery. It was being vigorously worked.

The Rocky Glen,

From one to two miles south of Graniteville, and at this time the property of Mr. J. Hibbert, has an average width of six feet, the whole of the quartz being extracted and worked. It carries a considerable quantity of free gold with sufficient sulphurets for one pan, and pays from \$6 to \$15 per ton. The mine under the present management has yielded in the gross for the two past years about \$14,000, more than paying all expenses for developing and improvements. The rock from the upper level is here conveyed to the mill by water through a small flume lined with blocks for the double purpose of protecting its bottom and saving the free gold contained in the mud and sand. A similar method might be adopted to advantage wherever water is at hand, as 40 tons can be delivered at the mill by two men in 10 hours, at a saving over hauling of more than \$1 per ton, and at the same time furnishing the rock to the stamps free from all mud and sand.

The Centennial,

Six miles south, averages two and one-half feet, the quartz assaying from \$200 to \$300 in gold and silver and the sulphurets as high as \$1,240 per ton of same. A small lot tested by Mr. S. McCurdy at the Canyon Creek mill, worked up to \$168 in gold. Such is the confidence of the company in the value and quantity of the ore already extracted and in sight, that they have engaged the machinery for the mill, which is expected to be in running order by the 1st of August.

The Yuba gold mining company, Mr. Geo. Lord, Superintendent, have done a large amount of work six miles above Washington, where they have located half a dozen parallel ledges near the South Yuba.

The country rock is a species of granitic syenite and the vein on which the greater part of the labor has been performed is found to vary from three to five feet in thickness. Four different tunnels have followed along the lode, the lowest entering 30 feet above the river and running a southerly direction into the mountain, reaching a depth from surface of 450 feet or a point 2,300 feet lower than the summit.

A second level has been driven 200 feet above; a third, 1,000 feet higher and a fourth, full 400 feet above the last, so that the mine is pretty thoroughly prospected and in a condition to furnish ore with dispatch and in quantity.

The rock from wall to wall is represented to work from \$6 to \$30 per ton. The company have a 25-stamp mill, driven by an overshot wheel, 36 feet in diameter, with a 6 foot breast, and possesses enviable advantages in the way of water power.

They are vigorously driving every department of the business, giving employment at present to nearly 50 men. The aspect of affairs, taken all in all, presents an air of thrift and prosperity not often found in the older mining districts

and the highest hopes for its future are entertained.

As the mountain here rises at an angle of 45°, the quartz glides down to the mill from the upper tunnel simply by force of its own gravity.

The chute is 2,000 feet in length, made of lumber and bottom lined with iron.

A mile above is

The Yuba Canyon Mine,

The property of Messrs. McCurdy Ogden & Co., showing a lode from three to five feet in width. It is thought that the rock will work as much as \$30 per ton just as it comes from the mine, selected specimens yielding by hand mortar as high as \$1,000.

Favorable accounts were received of the Lindsay, Harris, Piper, Erie, California and others on the same belt, so that the outlook for Graniteville and Washington may be looked upon as better than it has been for years.

A. C. K.

Suspension Bridge in Mendocino County.

Mr. R. W. Gorrill, Treasurer and Engineer of the Pacific Bridge Co., gives us the following particulars of a new steel wire suspension bridge which he is erecting in Mendocino county for Mr. W. R. Miller. It is located at Cottonova, on the coast, and extends from the main land to a rocky island where a chute is to be built for shipping lumber.

The distance from center to center of the saddles on the towers is 270 feet. The deflection or fall of the cable is 23 feet, six inches. The cables are built in the same manner as those of the Clifton bridge, at Niagara. The steel wire is about No. 11 Birmingham gauge, and is protected against rust by immersing in a bath which gives it a fine coat of zinc. There are 11 wires in each strand, seven strands in each one and one-half inch rope, and seven ropes in each cable. The ropes are not twisted together to form the cables, but gathered up every six feet by the suspender bands. Each rope is warranted to bear a strain of 60 tons. Each rope is made fast to an independent anchor-bar, one by three inches in diameter, and forming links 18 feet long, until connection is made with the anchors. The anchors are of cast iron, three and one-half by three feet in surface, weigh 1,000 pounds each, and are placed 14 feet below the surface of the rock.

Great care was taken in securing these anchors in place by means of cross I beams which run under the rock on either side. The lower part of each pit was enlarged so as to form a hemispherical chamber, and the rock-work, set in Portland cement, which is built upon the anchor, is so constructed that the upward strain is transmitted to its sides. The towers are of redwood. There are four posts 10x10 inches, and two 10x12 inches, giving an effective area of 640 square inches to withstand the strain of the cable on the tower. The wooden truss to prevent vertical vibration is eight feet high and of the Howe truss pattern. The 270 feet of the bridge is divided into 45 panels. The longest suspenders, 44 in number, are of seven-eighth-inch steel wire, the 42 shorter ones are of one and one-eighth-inch solid iron.

The estimated dead load of the bridge is 1,000 pounds per linear foot; live load, one ton per linear foot; in all, one and one-half tons, or one-fifth of actual breaking load. The bridge will be completed in about 30 days, and promises to be a structure which the builders may well be proud of.

We were shown a portion of an iron bar from the Ashtabula bridge, which was so crystalline in its structure that probably not one-twentieth of its substance had any greater strength than pig iron. This unfavorable condition was undoubtedly produced by the rearrangement of the molecules, produced by the vibrations of the bridge under passing trains and changes of temperature. Mr. Gorrill prefers a combination of wood and iron in the truss bridges, as the elasticity of the former saves the iron from the severe strain which is put upon it when all parts are rigid. He also insists upon a factor of safety of five in ordinary bridges and six for railways. We hope to illustrate this subject with a good cut of the bridge and some of its more important details before long.

Items of Interest from the Mines.

We give below items of interest from prominent mines, most of which are collated from letters of the respective Superintendents on file at the offices in this city:

The Condor mill at Pioche was burned on the 22d inst. The mill was leased by the Alps company and the lease had one month to run.

The various ore bodies in the Eureka Con. all show decided improvement in extent and quality. The furnace continues to turn out 13 tons of bullion per day.

They are taking out 50 tons of ore a day from the Belcher.

They now have good air in all parts of the El Dorado South.

A valuable strike has been made in the Look-out ground of the Modoc Con. mine. The ore gives promise of a large body and assays \$229.34.

Car samples of Chollar ore assay \$23.50 per ton.

The ore breasts in the Con. Virginia 1650-foot level continue to look finely.

The several ore stopes on the various levels of the California mine look well.



Sansome Street.

DEWEY & CO.'S PATENT OFFICES, MINING AND SCIENTIFIC PRESS AND PACIFIC RURAL PRESS newspaper offices, and the SCIENTIFIC PRESS ENGRAVING establishment will be found at the above place, (No. 202 Sansome Street, N. E. Corner of Pine, opposite the Pacific Bank), after July 4th, 1877. Just three-fourths of a block south of our old location.

PATENTS AND INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

WEEK ENDING JUNE 10TH, 1877.

192,062.	HYDRANT.—W. T. Garratt, S. F.
192,063.	SPARK ARRESTER.—J. Gates, Portland, Ogn.
192,069.	SAW TERTH.—N. W. Spaulding, S. F.
192,090.	SAW TERTH.—N. W. Spaulding, S. F.
192,121.	FANERINO DEVICE FOR MAIL BAGS.—J. Metz and E. Himmann, Denver, Colo.
192,140.	COMPOUND FOR THE MANUFACTURE OF PORCELAIN FOR DENTAL PLATES, TERTH, ETC.—A. B. Cady, Ronton, Ogn.
192,162.	FOUNTAIN.—W. J. and W. H. Clark, Salem, Ogn.
192,165.	COMPOUND STEAM BOILER.—R. R. Hind, Hobaia, Hawaii, Hawaiian Islands.
192,182.	DEMOLITION CASE.—C. Newman, S. F.
192,191.	ORE SEPARATOR.—J. Richards, Battle Mountain, Nev.
192,314.	CAR-PROPELLER.—M. A. Wheaton, S. F.

General News Items.

ROBERT DALE OWEN died at Lake George on Sunday last.

NEARLY all the silk weavers at Paterson, N. J., are out on a strike.

THE Turks and Russians are having some very lively fighting on the Danube.

THE Chico soap factory has been burned again. The incendiaries have not been caught.

FOURTEEN "Mollie Maguires" were hung on Thursday of last week in Pennsylvania.

THE Lick monument is to be set up at once in the cemetery at Fredericksburg, Lebanon county, Pa. It contains seven large statues, and cost \$20,000.

THE court of inquiry into the loss of the steamship *City of San Francisco* has rendered a decision depriving Captain Waddell of his certificate as Master for a period of 12 months.

A DISPATCH from Omaha says that Sidney Dillon and Jay Gould have returned from the West. It is said on good authority that the road to the Black hills will not be commenced this year.

UNDER the apportionment by the Commissioner of the General Land Office of the gross sum of \$300,000 appropriated by Congress for land surveys during the next fiscal year, for the survey of private land claims, New Mexico gets \$35,000; Colorado, \$2,000; California, \$6,000; Arizona, \$5,000. For the survey of public lands, Colorado gets \$35,000; Utah, \$16,000; Nevada the same; Washington the same; Arizona, \$8,850.

NOVELTY IRON WORKS.—These works, which are situated at 215 and 217 Front street, in this city, have come under a new management. Mr. G. L. Pierce, mechanical and hydraulic engineer, is the new proprietor. Mr. Pierce was one year engineer at the Mechanics' Institute fair. He has for some time been engaged in hydraulic engineering enterprises, and was the person who put up the large pumping apparatus at Grand island. He is now prepared to do general work of all kinds at the Novelty Works, being well provided with necessary tools, etc.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

BLUE BIRD M. & Co.—June 21. Location: Arizona. Capital stock, \$100,000. Directors—W. H. Knight, Jos. Daly, E. Bannison, West Evans and Andrew Luckey. FRESNO G. M. Co.—June 25. Location: Fresno Co. Capital stock, \$5,000,000. Directors—Wm. De Fresco, C. W. Tozer, D. M. Sinton, Geo. P. Terry and Daniel Buck. MONARCH GRAVEL M. Co.—June 22. Location: Calaveras county. Capital stock, \$1,000,000. Directors—A. G. Bradbury, H. P. Wakelee, J. M. Streeten, G. H. Bradbury and Robert Barron. CALIFORNIA ELECTRICAL WORKS.—June 25. Capital stock, \$600,000. Object: to engage in and carry on the business of manufacturing and dealing in telegraphic and electrical machinery, apparatus, etc. Directors—George S. Ladd, Dr. Cornelius Herz, James Gamble, Russell J. Wilson and James E. Boyd. The officers of the company are George S. Ladd, President; Dr. Cornelius Herz, Vice-President; Joseph Herz, General Manager.

WOODWARD'S GARDENS has the following new attractions: The buffalo cage; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

Signal Service Meteorological Report.

Week Ending June 26, 1877.

HIGHEST AND LOWEST BAROMETER.											
June 20	June 21	June 22	June 23	June 24	June 25	June 26					
30.02	30.07	30.07	29.97	29.94	29.92	30.06					
29.93	30.03	29.95	29.86	29.88	29.90	29.99					
MINIMUM AND MAXIMUM THERMOMETER.											
03	03	03	71	68	64	05					
52	53	55	55	55	53	52					
MEAN DAILY HUMIDITY.											
72	74	65	61	62	66	77					
PREVAILING WIND.											
SW	SW	W	SW	W	W	W					
WIND—MILES TRAVELED.											
335	270	271	214	235	280	446					
STATE OF WEATHER.											
Fair	Cl'dy	Clear	Clear	Clear	Clear	Cl'dy.					
RAINFALL IN TWENTY-FOUR HOURS.											
Total rain during the season, from July 1, 1876, 11.03 in.											

METALS.

WHOLESALE.

THURSDAY, M., June 28, 1877.

IRON.—		
American Pig, ton	\$2.00	@ 33.00
Scottish Pig, ton	\$2.50	@ 34.00
White Pig, ton	\$1.00	@ —
Oregon Pig, ton	\$1.00	@ —
Refined Bar	31	@ 51
Horse Shoes, keg	5.00	@ —
Mail Rod	—	@ —
Norway, Oval	—	@ —
Rolled	—	@ —
COPPER.—		
Copper Tinned	37	@ 40
Sheathing, lb	21	@ —
Sheathing, Yellow	21	@ —
Sheathing, Old Yellow	20	@ —
Composition Nails	10	@ —
Composition Bolts	24	@ —
STEEL.—		
English Cast, lb	14	@ 25
Anderson & Woods, ordinary sizes	16	@ —
Drill	16	@ —
Pig Steel	15	@ 20
Pig Steel	8 1/2	@ 12 1/2
TIN PLATES.—		
10x14 I C Charcoal	9.00	@ 9.50
Bacon Tin	24	@ —
Australian	19	@ 20
ZINC.—		
By the Cask	11	@ —
Zinc Sheet 7x3 ft, 7 to 10, lb	11	@ —
7x3 ft, 8 to 10, lb	12	@ —
8x4 ft, 8 to 10, lb	12	@ —
8x4 ft, 11 to 10, lb	12	@ —
QUICKSILVER.—		
Assorted sizes	3.25	@ 3.75
By the lb	41	@ 42

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Bella Union Quicksilver Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Napa County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-eighth day of June, 1877, an assessment, (No. 2), of ten cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 312 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the thirtieth day of July, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the twenty-fifth day of August, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, ABRAHAM HALSEY, Sec'y.

Office, No. 312 Montgomery Street, San Francisco, Cal.

Booth Gold Mining Company.—Location of works, Auburn, Placer County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment, No. 2, levied on the thirtieth day of April, 1877, the several amounts set opposite the names of the respective shareholders:

Names.	No. Certificate.	No. Shares.	Amount.
Chenery, R, trustee	12	100	5.00
Chenery, R, trustee	14	100	5.00
Chenery, R, trustee	15	100	5.00
Cahill, R	158	50	2.50
Day, Thos trustee	148	500	25.00
Fry, E. M.	88	750	37.50
Graves, R. N, trustee	25	250	12.50
Gilman, Henry	38	300	15.00
Gordon, Thos H, trustee	52	100	5.00
Gordon, Thos H, trustee	63	1000	50.00
Gordon, Thos H, trustee	112	100	5.00
Gordon, Thos H, trustee	114	100	5.00
Gordon, Thos H, trustee	116	100	5.00
Gordon, Thos H, trustee	117	100	5.00
Gordon, Thos H, trustee	118	100	5.00
Gordon, A C, trustee	122	1000	50.00
Gordon, A C, trustee	123	100	5.00
Gordon, A C, trustee	124	100	5.00
Gordon, A C, trustee	125	100	5.00
Gordon, A C, trustee	126	100	5.00
Gordon, A C, trustee	127	100	5.00
Gordon, A C, trustee	128	100	5.00
Gordon, A C, trustee	129	100	5.00
Gordon, A C, trustee	130	100	5.00
Gordon, A C, trustee	131	100	5.00
Gordon, A C, trustee	132	100	5.00
Gordon, A C, trustee	133	100	5.00
Gordon, A C, trustee	134	100	5.00
Gordon, A C, trustee	135	100	5.00
Gordon, A C, trustee	136	100	5.00
Gordon, A C, trustee	137	100	5.00
Gordon, A C, trustee	138	100	5.00
Gordon, A C, trustee	139	100	5.00
Gordon, A C, trustee	140	100	5.00
Gordon, A C, trustee	141	100	5.00
Gordon, A C, trustee	142	100	5.00
Gordon, A C, trustee	143	100	5.00
Gordon, A C, trustee	144	100	5.00
Gordon, A C, trustee	145	100	5.00
Gordon, A C, trustee	146	100	5.00
Gordon, A C, trustee	147	100	5.00
Gordon, A C, trustee	148	100	5.00
Gordon, A C, trustee	149	100	5.00
Gordon, A C, trustee	150	100	5.00
Gordon, A C, trustee	151	100	5.00
Gordon, A C, trustee	152	100	5.00
Gordon, A C, trustee	153	100	5.00
Gordon, A C, trustee	154	100	5.00
Gordon, A C, trustee	155	100	5.00
Gordon, A C, trustee	156	100	5.00
Gordon, A C, trustee	157	100	5.00
Gordon, A C, trustee	158	100	5.00
Gordon, A C, trustee	159	100	5.00
Gordon, A C, trustee	160	100	5.00
Gordon, A C, trustee	161	100	5.00
Gordon, A C, trustee	162	100	5.00
Gordon, A C, trustee	163	100	5.00
Gordon, A C, trustee	164	100	5.00
Gordon, A C, trustee	165	100	5.00
Gordon, A C, trustee	166	100	5.00
Gordon, A C, trustee	167	100	5.00
Gordon, A C, trustee	168	100	5.00
Gordon, A C, trustee	169	100	5.00
Gordon, A C, trustee	170	100	5.00
Gordon, A C, trustee	171	100	5.00
Gordon, A C, trustee	172	100	5.00
Gordon, A C, trustee	173	100	5.00
Gordon, A C, trustee	174	100	5.00
Gordon, A C, trustee	175	100	5.00
Gordon, A C, trustee	176	100	5.00
Gordon, A C, trustee	177	100	5.00
Gordon, A C, trustee	178	100	5.00
Gordon, A C, trustee	179	100	5.00
Gordon, A C, trustee	180	100	5.00
Gordon, A C, trustee	181	100	5.00
Gordon, A C, trustee	182	100	5.00
Gordon, A C, trustee	183	100	5.00
Gordon, A C, trustee	184	100	5.00
Gordon, A C, trustee	185	100	5.00
Gordon, A C, trustee	186	100	5.00
Gordon, A C, trustee	187	100	5.00
Gordon, A C, trustee	188	100	5.00
Gordon, A C, trustee	189	100	5.00
Gordon, A C, trustee	190	100	5.00
Gordon, A C, trustee	191	100	5.00
Gordon, A C, trustee	192	100	5.00
Gordon, A C, trustee	193	100	5.00
Gordon, A C, trustee	194	100	5.00
Gordon, A C, trustee	195	100	5.00
Gordon, A C, trustee	196	100	5.00
Gordon, A C, trustee	197	100	5.00
Gordon, A C, trustee	198	100	5.00
Gordon, A C, trustee	199	100	5.00
Gordon, A C, trustee	200	100	5.00

And in accordance with law and an order of the Board of Trustees, made on the thirtieth day of April, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the salesroom of J. Middleton & Son, No. 310 Montgomery Street, San Francisco, Cal., on the twenty-fifth day of June, 1877, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

GEO. R. SPINNEY, Sec'y.

Office, No. 320 California Street, Room No. 5, San Francisco, Cal.

Consolidated Bonanza Gold and Silver Mining Co.—Location of principal place of business, San Francisco, California. Location of works in Eagle and Washoe Valley Mining District, Ormsby county, Nevada.

Notice is hereby given, that at a meeting of the Board of

Trustees, held on the fourth day of June, 1877, an assessment, No. 1, of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary at the office of the company, No. 19 First Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Tuesday, the tenth day of July, 1877, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the thirty-first day of July, 1877, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees, WM. MARTIN, Secretary.

Office No. 19 First Street, San Francisco, Cal.

Empire Mining Company.—Location of principal place of business, San Francisco, California.

Location of works, Silver City, Owyhee County, Idaho Territory.

Notice.—There are delinquent upon the following described stock, on account of assessment, No. 13, levied on the 26th day of April, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

trustee.....	1116	10	10 00
Schmitt, C. A. trustee.....	1186	10	10 00
Woods & Freeborn, trustee.....	1205	20	20 00
Fisher, E. trustee.....	1234	100	100 00
Noble & Co. H. H. trustee.....	1315	5	5 00
Fisher, E. trustee.....	1343	25	25 00
Dixon, T. H. trustee.....	1433	150	150 00
Noble & Co. H. H. trustee.....	1445	100	100 00
Noble & Co. H. H. trustee.....	1446	100	100 00
Noble & Co. H. H. trustee.....	1457	100	100 00
Johnson, J. M. trustee.....	1511	50	50 00
Johnson, J. M. trustee.....	1512	40	40 00
Swift, Frank.....	1538	5	5 00
Dodge Geo S.....	1539	3	3 00
Glassen, J. M.....	1540	2	2 00
Noble & Co. H. H. trustee.....	1544	20	20 00
Willis, William, trustee.....	1582	100	100 00
Callaghan, Lynch & Co. trustee.....	1677	20	20 00
Brooks & Lee, trustee.....	1706	50	50 00
Schmitt, C. A. trustee.....	1736	20	20 00
Hickox, Kuhl & Co. trustee.....	1746	50	50 00
Noble & Co. H. H. trustee.....	1748	100	100 00
Hosmer, J. H. trustee.....	1753	25	25 00
Major, D. G. trustee.....	1769	400	400 00
Hall & Charles, trustee.....	1783	100	100 00
Gordon, C. P. trustee.....	1796	50	50 00
Carroll, James, trustee.....	1806	25	25 00
Willis, William, trustee.....	1830	50	50 00
Willis, William, trustee.....	1831	50	50 00
Willis, William, trustee.....	1833	50	50 00
Willis, William, trustee.....	1834	100	100 00
Willis, William, trustee.....	1835	50	50 00
Willis, William, trustee.....	1840	100	100 00
Willis, William, trustee.....	1852	100	100 00
Willis, William, trustee.....	1865	100	100 00
Willis, William, trustee.....	1866	100	100 00
Willis, William, trustee.....	1879	100	100 00
Hubbard & Co. trustee.....	1885	50	50 00
Willis, William, trustee.....	1893	50	50 00
Hill & Kilgour, trustee.....	1894	50	50 00

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PACIFIC ROLLING MILL COMPANY,

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Every Variety of Shafting,

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ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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Light and Heavy Castings of Every Description Manufactured.

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Cost of Roasting and Chloridizing 20 Tons in 24 Hours by this Process:

One man.....	\$ 4 00
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Cost of 20 tons.....\$52 25
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In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

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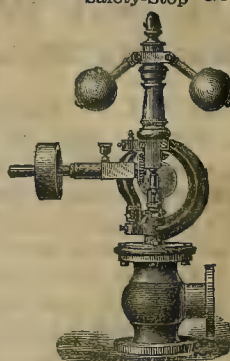
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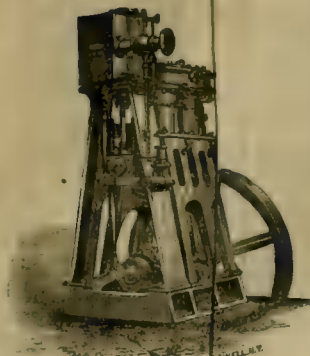
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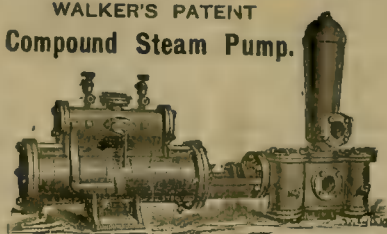
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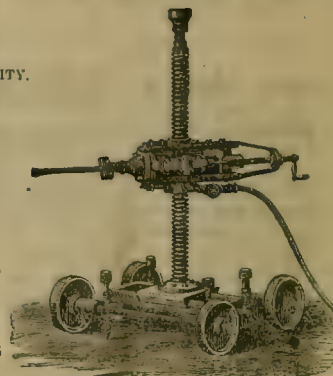
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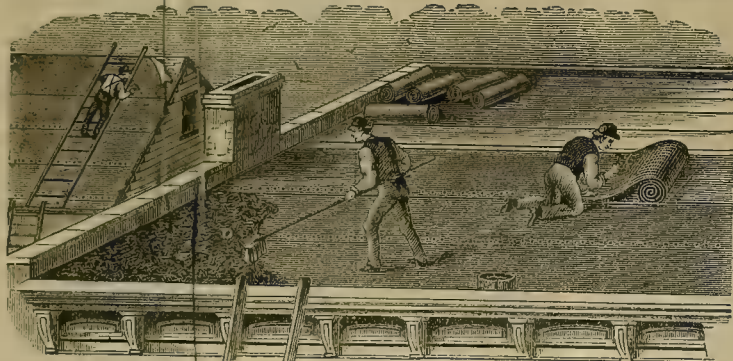
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Chemical Engines. Hose Carts and Portable Extinguishers. Babcock and Champion Fire Apparatus.

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ASBESTOS ROOFING AND ASBESTOS PAINTS,
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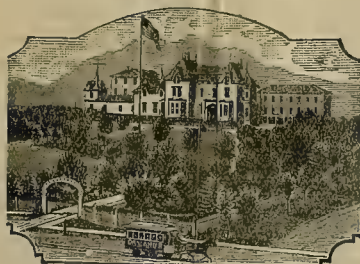
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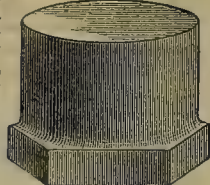
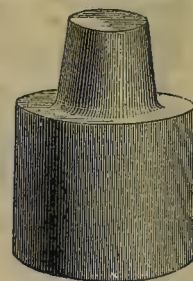
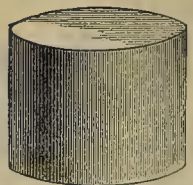
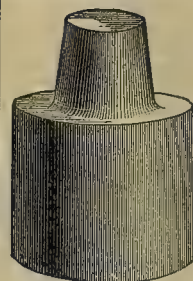
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